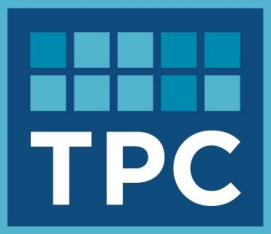

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SAME-SEX MARRIED TAX FILERS AFTER *WINDSOR* AND *OBERGEFELL*

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ABSTRACT

This paper provides new estimates of the number and characteristics of same-sex married couples after Supreme Court rulings in 2013 and 2015 established rights to same-sex marriage. Treasury and the Internal Revenue Service (IRS) subsequently ruled that same-sex spouses would be treated as married for federal tax purposes. Because almost all married taxpayers file joint tax returns, administrative tax records provide new information on the demographic characteristics of married same-sex couples. This paper provides estimates of the population of same-sex tax filers drawn from returns filed in 2013, 2014, and 2015, using methods developed by the Census to address measurement error in gender classification. In 2015, we estimate that about 0.48 percent of all joint filers were same-sex couples or about 250,450 couples.

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INTRODUCTION

Supreme Court rulings in 2013 and 2015 established and expanded rights to same-sex marriage in the U.S. One of the most visible and impactful ways the federal government recognized these new rights was by allowing—indeed, requiring—legally-married same-sex couples to file federal tax returns as married couples. This paper estimates how many couples took up these new federal rights in each state, drawing from returns filed in the years affected by the Court decision. Because the vast majority of married couples file tax returns, the high quality of the administrative data and the availability of the universe of filers, these data also provide new information on the economic and demographic characteristics of same-sex married couples.

In 2015, we estimate that there were 250,450 same-sex married tax filers (about 0.48 percent of all married tax filers). The number of same-sex joint tax filers increased from about 131,080 in 2013 and 183,280 in 2014. The total number of same-sex married filers is lower than the number of Census-estimated same sex couples. Our analysis suggests that some couples who identify as married, like couples in civil unions or domestic partnerships, may instead be partners who were not legally married and thus ineligible to file joint returns. In addition, a small number of couples may not file tax returns.

The economic and demographic characteristics of same-sex married tax filers at the national level are otherwise very similar to those estimated from Census-based sources. Same-sex joint filers are generally younger, higher income, less likely to claim dependent children (especially for male couples), and more geographically concentrated than are different-sex filers. Tabulations by state and by finer geographic area reveal large differences in the number and share of filers that are same-sex couples across the country, with the highest proportion of same-sex filers in states that had legalized same-sex marriage prior to 2013, costal states, and in certain metropolitan areas.

In 2013, the Supreme Court invalidated a key provision of the 1996 Defense of Marriage Act (*Windsor v. United States*) and allowed same-sex couples to be treated as married for all federal tax purposes, as long as they were legally married in a state that recognized their marriage. The Supreme Court subsequently established the right to same-sex marriage in all states in 2015 (*Obergefell v. Hodges*), including those whose state governments had not permitted same-sex marriage. These rulings required legally married same-sex couples to file federal income tax returns using either married filing jointly or married filing separately filing status starting in 2013.

Data from the tax returns filed by same-sex filers are relevant for understanding the number and characteristics of same-sex married couples in the population, and thus augment information available from survey-based sources. Legally-married individuals are generally required to file either as married filing jointly or married filing separately, and a comparison between tax filers and Census estimates suggests that almost all couples file joint returns, especially among the working-age population. These administrative records have other advantages relative to survey-based data. The entire population of more than 50 million records of

married filers is available each year. The data has very little missing data or non-response. The information is likely to be reported accurately because of taxpayers' legal obligations, the existence of third-party reporting (such as of wage submitted by employers), and certain data-quality checks during filing and processing.

That said, even in administrative data, measuring the population of same-sex married couples requires confronting a well-known problem arising because small misclassification errors in recorded gender of different-sex spouses result large biases in the estimated number of same-sex marriages (see e.g., Black et al 2007, O'Connell and Gooding 2007, or Kreider and Lofquist 2015). To address these errors, we use methods similar to those developed by the Census that rely on the correspondence of first names and gender. The basic intuition behind this method is to place more weight on information from couples where names and genders correspond, and thus are less likely to involve a coding error, and less weight when they disagree, and where a misclassification error is more likely. For example, we give more weight to the case in which two males named John and Robert are married, and less to the case in which Mary and John are married, but are reported as male-male.

Despite the use of similar methods, the analysis reveals substantial differences between Census- and tax-derived estimates of the same-sex married population at the national level and across states. In 2015, the number of same-sex joint filers (250,450) is 59 percent of the Census estimate of the number of same-sex spouses (425,357; Census 2016). In contrast, the ratio for different-sex couples is 92 percent (51.8 million versus 56.3 million). Estimates of the corresponding economic characteristics, such as the distribution of income, are more similar between Census and tax data.

Our hypothesis is that a sizable share of same-sex couples who describe themselves as married were more likely to be partners who were not legally married. Research suggests that some same-sex couples in long-term marriage-like relationships, civil unions, or domestic partnerships describe their partners as "spouses" even before being legally married (Gates 2010). (Only legally-married couples may file joint tax returns.) In addition, the gap between the tax- and Census-based estimates shrinks after same-sex marriage is legalized in a state, as one might expect when partners became eligible to be legally-married. Finally, evidence from state vital statistics suggests that the cumulative number of state-issued marriage licenses to same-sex couples corresponds more closely to the number of same-sex tax filers. Other potential sources of difference, like non-filing, state-imposed barriers to joint filing, non-compliance, or measurement error appear to be too small to explain much of the difference.

As a result, we view these estimates as consistent with Census- or other survey-based measures of same-sex relationships. The tax-based estimates measure an important and policy-relevant subset of these couples: those in legally recognized marriages. In this sense, this paper identifies a new data source and contributes new evidence to a rich literature examining the demographics and economic characteristics of same-sex married couples.

BACKGROUND

Prior to 2013, the Defense of Marriage Act (DOMA) defined marriage for federal purposes as the union of one man and one woman for federal purposes. In June 2013, the Supreme Court invalidated a key provision of DOMA (*Windsor v. United States*) in a case concerning whether a same-sex spouse was eligible to claim the Federal estate tax exemption for surviving spouses (a benefit only available to married spouses). Treasury and the Internal Revenue Service (IRS) then ruled that same-sex couples legally married in jurisdictions that recognize their marriages would be treated as married for federal tax purposes, including income and estate taxes (IRS 2013). In 2015, the Supreme Court, in *Obergefell v. Hodges* subsequently established the right to same-sex marriage in 2015 in all states, including those whose state governments did not permit same-sex marriage.

These rulings generally required legally-married same-sex couples to file federal income tax returns using either married filing jointly (using the same form) or married filing separately filing status (using different forms) starting in 2013. Almost all married couples file joint tax returns. In 2014, for instance, 53.9 million couples filed joint returns, while just an additional 2.2 million filed separate returns.[1] Because married filing separately is generally financially disadvantageous, about 96 percent of married filers file jointly.[2] Most couples file a tax return because either they are required to (because they owe taxes) or to claim a refund for withheld taxes or tax credits. Non-filers generally have little income or attachment to formal employment, and studies of the non-filing population indicate that most married non-filers are age 62 or older (Cilke 1998). In general, married couples may not file as single or as head of household unless they meet strict exceptions (e.g., in cases of abandonment). Evidence from IRS studies of tax evasion suggests that misreporting filing status (such as filing single returns when married) is rare, comprising about 1 percent of total non-compliance, and is concentrated among filers claiming child-related tax benefits (IRS 2016). While some taxpayers face higher taxes if married, it is often more advantageous for couples to file as married than as single, with more than half of married-couples receiving a "bonus" in the form of lower taxes (Treasury 2015).

While most married couples file joint returns, some same-sex couples that describe their relationship as "married" in surveys may not file that way because they are not legally married. Evidence suggests that some survey-respondents describe their relationship status as "married" (or their partners as "spouses") when in civil unions or domestic partnerships and other circumstances, and further, that this propensity is higher in states where same-sex marriages are legally recognized (Gates 2010).

Data from administrative records contribute new information to a deep literature examining the demographics of the gay and lesbian population. By necessity, this literature has relied on survey-based data collected by government agencies, like the Census, government-sponsored research at private organizations, like the General Social Survey, or other privately-funded instruments (see, e.g., Black et al. 2000, Black et al 2007, Carpenter and Gates 2008, O'Connell & Felix 2011). Administrative data are increasingly used by economic and demographic researchers because of the high quality of the data and the large sample sizes (see,

e.g., Card et al 2010). Such data provides new information relevant to policymakers and social scientists to help understand issues like economic wellbeing, discrimination, the effects and costs of changes in legal, social, or tax policies, labor market outcomes, or family formation.

Moreover, administrative data is likely to be helpful for examining the characteristics of same-sex couples because sample-based estimates involve greater measurement or sampling error, making it difficult to accurately measure the number or characteristics of small populations. Indeed, few surveys even asked about sexual orientation or same-sex relationships. To address these challenges, new survey instruments were introduced that ask specifically about sexual orientation (as in Carpenter and Gates 2008) and new methodologies were developed to glean information from the Decennial Census and other Census-administered Surveys (e.g., Black et al. 2000, Lofquist, and Lewis 2015). These advances are contributing to new and improved survey instruments (Kreider at al. 2017). By drawing on administrative data, this paper provides a new data source and evidence that addresses certain methodological challenges and provides new, detailed information on same-sex married taxpayers.

DATA AND METHODOLOGY

The estimates in this paper are derived from individual returns of married-filing-jointly (MFJ) taxpayers from tax years 2013 to 2015 to which information on the gender of each taxpayer is attached using the Social Security Administration's (SSA) Numerical Identification System ("Numident") file, which contains each Social Security applicant's gender.[3] The data includes information on about 52 million couples per year.[4]

An empirical challenge in our analysis is even rare classification errors in gender reporting on tax forms can lead to large biases in estimates of the size of the population. For example, if same-sex marriages make up roughly 0.2 percent of all filers filing joint returns, a 1-in-1000 error in the reported gender of either spouse (e.g., from a transcription error or a clerk accidentally writing "M" rather than "F" on a birth report) would lead to estimates of the same-sex filing population that was roughly double its actual size. While administrative records appear to have much lower classification errors than do survey estimates, classification errors still appear to result in large biases.

To address this bias, we adopt Census-developed methods for reducing misclassification error using indices based on the gender specificity of first names. This approach involves three steps: (1) Constructing an index of the "maleness" (or "femaleness") of a first name. In its index, Census uses the empirical share of individuals with each name who are male (female) (2) Comparing the reported gender to the gender predicted by the name. Census assumes the gender is validated if the index value is greater than 0.95 for that name (3) Modifying the data to reduce misclassified cases. If the index is inconsistent with the respondent-reported gender of a member of an apparent same-sex couple, Census edits the reported gender to match the gender indicated by the name (e.g. they are re-classified as different sex) (O'Connell and Feliz 2011). For example, if the Census observes an apparent same-sex female couple which includes a reported female with a name like "John" (a

name associated with "male" more than 99 percent of the time), the Census would assume that John had been misclassified as female, and was instead the male spouse in a male-female couple.

We follow a similar approach. We start with an index indicating the likelihood an individual is male (female) based on first name, birth year, and whether the individual is listed as the primary or secondary filer among different-sex filers.[5] We constructed our index from two independent sources linking names to genders, and we developed several alternative name indices to assess whether different methods and data sources lead to different results. First, we use the 2015 tax return data of different-sex couples (which are less likely to include a misclassified spouse) linked to Social Security recorded gender. Second, we used the Social Security Administration's published database of baby names, which includes all first names of Social Security Card applicants that occur at least 5 times since the 1880 birth cohort for boys and girls (Social Security Administration 2016).

Rather than choosing one index, we produced four slightly different indexes reflecting different tradeoffs between increasing the accuracy of the index and introducing error into the index from overfitting. We report results generated using the average index value of each name across all non-missing index values, in the spirit of the empirical literature on combinations of forecasts (e.g. Bates and Granger, 1969). The appendix provides detail on the construction of these indexes as well as alternative simulations derived using each of these indexes independently, which produce relatively similar results.[6]

One index was constructed directly from the SSA baby name database using the unconditional average share male for each name in the database. For example, in the name directory of SSA-registered US births, 5,095,674 male births were named "John" out of a total of 5,117,331 total births of children named "John"; the index for "John" is therefore 99.6 percent. We constructed the second index for each name weighted by the birth years of married individuals observed in the tax data with that name, to account for any changes in naming conventions over time. In this approach, we first calculated the proportion male for each name in each birth year (e.g., the fraction of individuals named John born in 1950 that are male), and then took the average of those values weighted by the number of individuals with the same name and birth year in the tax data. For the next two indices we relied on the name information recorded in the tax data and the linked SSA-recorded gender for that person. We calculated the share of all tax filers that were male for each name in the tax data (e.g. the share of tax filers named "John" whose gender was recorded as male). This index was thus formed with name-gender pairs from the tax data (rather than from the SSA-provided baby name database). Lastly, we separately estimated the name-gender shares separately for primary and secondary filers.

The indices are extremely correlated. Most names are highly polarized by gender, gender-name conventions are relatively stable across states and over time, and most people have common names, which means that on a person-weighted basis, the influence of unusual names or unusual naming conventions is very small on aggregate. The name index is highly concentrated close to one or to zero. For instance, primary filers whose name index is greater than 95 percent male are reported to be male 99.65 percent of the time. Of the

90,025 individual first names included in the SSA database, in 89,199 cases the index value is greater than 95 percent male or female, which means that the index is specific not just to Roberts and Elizabeths, but names ranging from Aaditya, Brazos, and Candarius to Xana, Yasmeen, and Zayne. Hence, the index provides information on the predicted gender of individuals from a wide range of geographic, ethnic, national, and religious naming conventions.

For extremely rare names (less than 5 occurrences in the history of SSA records), or individuals whose first name is not recorded in the tax data, the name index is missing. The name index may be missing in the tax data because the first name is recorded only by the first initial ("J."), there is a typographical error in the name so it cannot be recognized as a proper name ("Jhn"), or only the last name is included ("Smith"). Either the primary or the secondary filer's name index is missing from 9.5 percent of filing couples' tax returns.[7]

In the next step, we used the name index to validate the gender reported in the tax records. Following the Census, we assumed the reported gender is accurate if the name index level is at least 95 percent specific to the reported gender.[8] Overall, in 85 percent of couples the name index matches the SSA-reported gender of both individuals (i.e., when we observe male-female (MF) in the administrative data the name index of the primary filer is at least 95 percent male and the name index is at least 95 percent female for the secondary taxpayer). For observed male-male (MM) and female-female (FF) couples, however, the correspondence rate is 33 percent—meaning that in two thirds of cases, the name and reported gender of at least one individual does not match, suggesting misclassification. Excluding couples missing one or both name indices and couples where the name index fails to confirm the SSA-reported gender leaves 77 percent of the original population with name-validated gender information.

Within this validated sample, the likelihood of misclassification is very small. First, misclassification of gender in the administrative data is itself small, about 1-in-1000. By construction, the likelihood that an individual's gender does not match their name index is less than 5 percent and closer to 0.4 percent, on average. As a result, the likelihood that an individual is misclassified in the administrative tax data *and* according to the name index is two orders of magnitude smaller (.001*.004).

In the last step, for the remaining 23 percent of couples for which the index is either missing or does not match the SSA-reported gender, we treat the classification of the couple as missing. This accommodates the need to address the relatively large number of missing, erroneous, or unedited first names in the tax records, and allows us to impute the relationship category based on the data rather than using a strict editing rule. To arrive at national estimates and estimates by state, AGI class, age, and presence of children, we assume couples with missing or inconsistent name indices are missing at random and have the same propensity to be in MF, FF, or MM marriages as couples with the same characteristics and living in the same state. Specifically, we form cells based on tax year, state of residence, an indicator for presence of children, age of primary taxpayer, and AGI-income class, estimate the rate of same-sex marriage within these detailed demographic groups with the name-

validated sample, and estimate population totals as the FF, MM, or MF shares times the total married population of each cell.

To provide intuition for this approach, our method estimates rates of same-sex marriage within the large population of individuals with known and highly gender specific names, like James, John, or Robert (all more than 99.5 percent male) and Mary, Elizabeth, and Patricia (all more than 99.5 percent female). Estimating the number of MM marriages in this population (e.g. the James-Robert marriages), the number of FF marriages (Mary-Elizabeth marriages), and the number of MF marriages (John-Mary and Elizabeth-James marriages), provides an estimate of the relative rate of MM, FF, and MF filers in each demographic group and geographic region. We then assume that the population with missing or less-gender-specific names (e.g. "Kim-Jamie") have the same likelihood of being FF, MM, or MF as do their peers living in the same area and with similar characteristics. For estimates of the economic and demographic characteristics of the same-sex population, we provide estimates using the sample of name-gender matched couples weighted to correspond to the population total using the same demographic and geographic cells. Under the assumption that the sample of name-validated filers is representative of the population within each cell, the estimates of the relative frequency of same-sex marriage in this population provide an accurate estimate of the number of filers in the population.[9]

We then tabulate estimates by state, AGI class, age categories, the presence of children, and certain geographic regions whose populations were sufficiently large to allow disclosure. Estimates of the magnitude of sampling or modeling error are not available for this analysis because the data represent population tabulations any error arises from misclassification and our model-based correction. While the evidence we present indicates the error is small, the reader should bear in mind that no hypothesis tests have been performed.

ESTIMATES OF THE POPULATION AND CHARACTERISTICS OF SAME-SEX JOINT FILERS IN 2015

Table 1 provides estimates of the number of joint filers that are same-sex male, same-sex female, and different-sex couples by state in 2015, and their share of the joint-filing population (to normalize for differences in the total population of marriage-age individuals or any state-level differences in the propensity of couples to marry). (Comparable estimates for 2013 and 2014 are provided in the appendix.) For the U.S. as a whole, we estimate that about 0.48 percent of all joint filers were same-sex filers, or about 250,450 couples (out of 52.1 million joint filers). The proportion of married filers that were same-sex couples varied substantially across the country, from about 4.2 percent of married filers in Washington DC, 1.0 percent in Massachusetts and Vermont, and close to 0.8 percent in Delaware, California, and Washington, to less than 0.2 percent in Mississippi and North Dakota. In general, the share of filers in same-sex marriages are greatest in those states that legalized same-sex marriage earliest and in coastal states, and are lowest in states in the south and Midwest.

Between 2013 and 2015, the number of same-sex filers increased by 91 percent from 131,080 to 250,450. The growth in the number of same-sex filers over this period was greatest in those states where same-sex marriage was legalized in 2014 and 2015, a pattern consistent with same-sex couples in those states exercising their new legal rights.

To examine differences in the rate of same-sex joint filing across states, Figure 1 relates the proportion of same-sex filers by state (excluding Washington, DC) to the year in which same-sex marriage was legalized. In general, rates of same-sex filing are highest in states that had legalized same-sex marriage prior to 2013 or in 2013. While rates were relatively lower in 2013, 2014, and 2015 in states that did not legalize same-sex marriage until 2015, the percentage increase in same-sex filing between 2013 and 2015 was higher in those states.

Table 2 provides estimates of the economic and demographic characteristics of joint filers. In 2015, same-sex couples were slightly younger (based on the age of the primary taxpayer) relative to different-sex couples, and substantially less likely to be over age 65. While 48 percent of different-sex couples claimed children as dependents, only 7 percent of male-male couples and 28 percent of female-female couples claimed children. Same-sex couples tend to have higher average incomes than do different-sex couples, and are more likely to earn more than $150,000 than different sex filers; male couples were almost twice as likely. The average adjusted gross income (AGI) of male couples was about $ 165,960, versus $ 118,415 for female couples and $ 115,210 for different-sex couples.

Table 3 provides more detailed analysis of the economic characteristics of different-sex and same-sex filers in 2015. For each group of different-sex couples, FF couples, and MM couples, the table provides information on the average income and distribution of income for each group and by subsample. For instance, the table shows that the average AGI of different-sex couples is about $115,208 and about 19 percent had income over $150,000. Different-sex couples with dependent children had slightly higher incomes ($122,150 compared to $105,983) and were slightly more likely (21 percent compared to 16 percent) to earn more than $150,000.

This pattern in which families with dependent children are higher income is also true of FF and MM couples, but is particularly striking for MM couples, for which the average income of couples with children is about $264,000. Almost half of MM couples with children earn more than $150,000. Differences between same-sex female couples with and without children are much smaller.

Geographic differences in where same-sex couples live are an important contributor to differences in incomes across groups, reflecting the fact that same-sex couples are more likely to be of working age and to live in major metropolitan areas and coastal states where incomes (and costs of living) are relatively high. Table 3 presents two measures intended to illustrate how geographic differences in where same-sex couples live affect their relative economic status. The first measure takes the population of working age (25-55) different-sex couples and weights the sample according to the geographic residence (3-digit zip code) of MM and FF

couples. This adjustment is intended to reflect what the distribution of income is among MF couples whose geographic residence is the same as for MM or FF couples. This analysis, presented as "reweighted to MM (and FF) geographic distribution," shows that the average income of MF couples weighted to correspond to FF places of residence is about $131,116. In contrast, the average income of FF couples in the same age range is about $121,220. In other words, while FF couples appear to be higher income than different-sex couples nationwide, relative to MF couples in their local neighborhoods their income is actually somewhat lower. A similar analysis, which provides the mean income of different-sex couples living in each FF couples three-digit zip code ("mean different-sex income in own zip-3"), suggests that the average income of local MF couples is more than $14,000 greater.

Reweighting MF couples to approximate the geographic distribution of MM couples shows that the average income of MF couples is higher than in the nation as a whole ($152,608), but even with the adjustment MM couples earn higher incomes. The average income of MM couples in the same age range is $168,233. The average income of MF couples living in the same 3-digit zip codes as MM couples is $150,872, showing that MM couples are higher income even relative to other couples in their own neighborhoods.

THE GEOGRAPHIC DISTRIBUTION OF SAME-SEX JOINT FILERS

The population files allow for a more granular examination of the geographic distribution of same-sex joint filers than is possible with survey-based data. Table 4 provides additional information on geographic differences in the share of marriages that are same-sex marriages and presents the range in rates among the top 100 largest commuting zones in the U.S. Commuting Zones (CZs) provide a local labor market geography that covers the entire land area of the United States (Autor and Dorn 2013). Even within the most populous labor markets in the country, the rate of same-sex marriage differs widely. In the San Francisco area, the rate is 1.5 percent of married couples, more than 11 times the rate in Provo, UT (0.13 percent).

Figure 2 provides an expanded illustration of the estimated geographic distribution of same-sex couples for selected, sufficiently large 5-digit zip codes. Same-sex filers are concentrated in certain regions: the North East, Mid-Atlantic states, the West Coast, and New Mexico, and even within these states in certain metropolitan areas and neighborhoods. In between, same-sex filers are concentrated in very small geographic areas, particularly urban areas of otherwise rural states, or cities and towns hosting colleges and universities.

To highlight some of these areas, Table 5 lists the twenty 3-digit zip code areas with the highest estimated proportion of male and female same-sex couples among joint filers in the 500 most populous 3-digit zip code areas (those with more than about 31,000 married couples). For example, the table shows that more than 3 percent of married couples in downtown San Francisco are male same-sex couples. The highest shares of male same-sex filers exist in the central areas of San Francisco, Washington DC, New York, and in other major cities like Seattle, Boston, Atlanta, Chicago, Portland, and Minneapolis. Among female same-sex couples, relatively

small cities and towns are prevalent, like Springfield, MA, Madison, WI, Santa Fe, NM, Durham, NC, Burlington, VT, and those on the coast of Delaware.

Comparison to Census ACS-Based Estimates

Table 6 compares the number of same-sex joint filers to the estimated number of same-sex marriages estimated in the same year (2015) by the U.S. Census Bureau using the American Community Survey (ACS). The first two columns for each year provide the Census estimates of the number of same-sex householders and the number of same-sex spouses. The third column provides the relevant estimates from Table 1 of the number of same-sex filers by state. The fourth column is the ratio of same-sex filers to Census-estimated same-sex spouses. The final column shows the percent change in the number of same-sex filers between 2013 and 2015.

Overall, the estimated number of same-sex filers is about 59 percent of the estimated number of same-sex spouses in the ACS in 2015. (In earlier years, the ratio is lower; see appendix.) Across states, the ratio is below one in every state (including DC), ranging from a low of 27 percent in North Dakota to a high of 91 percent in DC.

Despite these differences in aggregate counts, the estimated economic characteristics of the population appear more similar. For instance, the Census-based estimates corresponding to the material in Table 2 are relatively similar to our own. For instance, for same-sex male spouses, median income is $104,212 in the ACS and $109,799 in the tax data; 47 percent earn more than $100,000 in the ACS versus 49 percent in the tax data. However, the population of same-sex spouses appear older in the Census (20 percent are older than 65 compared to 10 percent in tax data), and the propensity for men to have own children is higher in the census data (13 percent in ACS versus 7 percent in tax). In contrast, for different-sex couples, the distribution of age is quite similar (in both ACS and tax data the share of couples over 65 is about 23 percent), and while joint filers appear more likely to have children (48 percent), than ACS different-sex spouses (39 percent). Thus, different-sex couples appear about seven times as likely to have children as male same-sex couples in the tax data compared to about 3 times as likely in the ACS data.

One potential source of difference is that not all households file tax returns. For instance, the 2015 ACS estimate of the number of different-sex married-couple households is 56.3 million compared to the 51.8 million different-sex married-filing jointly couples in the 2015 domestic filing population. If same-sex couples have the same propensity to be non-filers as does the general population, this might suggest that the true number of same-sex married couples should be about 8.6 percent larger (or about 21,663 non-filing couples). Still, this would represent only about 12 percent of the gap between Census and tax, so most of the difference would remain unexplained. Further, the non-filing rate of the population of married filers probably exceeds the non-filing rate of the same-sex population. Non-filers tend to be older and lower income than filers. According to Table 2, however, same-sex couples generally tend to be both higher income and younger than different-sex filers. If that pattern is true of same-sex married couples more generally, then same-sex couples should have a higher rate of filing than other married couples, and non-filing behavior should explain even less of the gap. A

very small share of married couples file separate returns rather than jointly, and one concern is that same-sex filers may be filing separate returns. However, based on an examination of patterns across fine geographic areas, areas with a substantial same-sex-couple presence are not places with large number of separate filers, suggesting that same-sex married couples file joint returns at about the same rate as do other married couples. Because married filing separately is generally disadvantageous to taxpayers, it is not surprising that few taxpayers elect the status.

A second potential source of the difference is sampling error, measurement error, or reporting errors in the Census ACS-based estimates. The variance in the year-over-year change in same-sex marriage rates from year to year is greater in the ACS data than in the tax data, and nine states are reported to have declining numbers of same-sex married couples between 2013 and 2014, and four between 2014 and 2015. The wide year-to-year swings and declines in the number of married couples seems improbable in the first years when same-sex marriage became legally recognized at the federal level and in many states. It is not clear why such idiosyncratic sampling errors would result in persistent, large differences in the number of same-sex spouses at the national level in each of the three years examined.

Another potential source of difference between ACS and tax-based estimates is measurement error in gender. The use of a similar name-index based methodology should reduce the incidence of these errors and any resulting discrepancy. If misclassification errors remained larger in the Census, one would expect that the presence of misclassified individuals would bias the estimated characteristics of same-sex to look more similar to different-sex couples. Indeed, the difference between the characteristics of different-sex and same-sex couples is larger in the tax data, especially for characteristics like the share with children, the share over age 65, or the share with income below $35,000; the estimates for these shares are more similar across groups in the ACS. However, it is unclear whether these differences are the result of misclassification or other reasons.

We suspect, instead, that the gap between the number of same-sex filers and Census-reported same-sex spouses reflects different definitions of marriage used by filers versus survey respondents. In particular, ACS survey respondents may report being married in some cases in which their marriage has not been legally sanctioned, for instance when they are bonded in a civil union or are in an otherwise long-term, committed marriage-like relationship. The federal filing rules for married couples (and same-sex couples) specify clearly in the instructions that only legally-married couples may file joint returns. Prior to legalization, it was simply difficult for many same-sex couples to obtain a legal marriage in their state of residence.[10] If this were the case, then one would expect the ratio of tax filers to Census-estimated same-sex spouses to be relatively low in states that had refused to issue marriage licenses and, upon legalization, for the number of same-sex filers to rise quickly relative to the Census-estimated number (as committed couples finally tied the knot).

Indeed, this is the pattern across states and over time. In 2012, a large proportion of the Census-estimated population of same-sex married couples resided in states where same-sex marriage would not be legalized until 2015, and where it would be difficult to have obtained a legal marriage. In those states, in 2013 and 2014, the

ratio of same-sex tax filers to Census-estimated same-sex spouses tends to be lowest. And in 2015, the states with the lowest apparent ratio of joint filers to Census-estimated same-sex spouses were almost uniformly those that delayed issuing marriage licenses to same-sex couples longest and those that, prior to legalization, prohibited same-sex couples from filing joint state returns: North Dakota, South Dakota, Kansas, Alabama, Arkansas, Louisiana, Mississippi, West Virginia, and Oklahoma.[11]

When same-sex marriage is legalized in a state, estimates move closer together. In the year of legalization, the number of joint-filers doubles (after increasing 30 percent in the prior year), while the number of Census-estimated same-sex married couples increases 36 percent—about the same rate as in the prior year (30 percent) the year after legalization (when the number increases 35 percent, on average). In other words, the empirical pattern is consistent with anecdotal evidence that long-term same-sex couples were more likely to self-report being married across the country as legal barriers were removed, but that the surge in legal marriages occurred when they were finally able to get legally married after state law changes and the Supreme Court rulings.

Finally, in the handful of states that publish data on the number of licenses issued to same-sex couples, the cumulative number of state-issued marriage licenses to same sex-couples appears to correspond more closely to the number of same-sex filers. We searched the vital statistics webpages and annual reports for all 50 states plus the District of Columbia for information on the number of marriage licenses issued or marriages certificates issued to same-sex couples to examine the correspondence between the number of legally married same-sex couples and the number of same-sex tax filers. We excluded estimates quoted second hand in the media or partial tabulations from New York (which excluded New York City).[12] Data was published by Hawaii, Washington, Indiana, Michigan, Oregon, Virginia, and West Virginia. Hawaii and Washington published statistics on both the number of same-sex marriages recorded and of the residence of the couples, which allows the most direct correspondence to the same-sex filing population.

In each of these states, the number of same-sex tax filers is closer to the number of same-sex marriages recorded by the state government. In Hawaii and Washington, in 2015, the difference between the number of same-sex joint filers and the cumulative number of marriages to same-sex state-residents couples are within 1 percent of each other. In contrast, the Census-estimated number is 43 percent higher in Hawaii and 34 percent higher in Washington State.

In other states (which did not differentiate marriages to residents from non-residents), the number of same-sex joint filers always exceeds the total number of marriage licenses issued, but by much less than the Census-estimated number of married couples. For instance, by 2015 Indiana had issued 3,821 marriage licenses to same-sex couples; we estimate that there were 3,996 same-sex couples in Indiana (5 percent greater) and the ACS-based Census estimate is 8,470 (122 percent greater). In Michigan, Oregon, Virginia, and West Virginia, the estimated number of same-sex filers is 79 percent, 37 percent, 25 percent, and 61 percent greater than the number of licenses issues, respectively, whereas the corresponding Census estimates are 209 percent, 126 percent, 133 percent, and 224 percent greater. It is not surprising that the number of same-sex filers exceeded

the number of licenses issued in these states because some couples are likely to have been married in other states (or foreign jurisdictions) where same-sex marriage was legal. Indiana, Michigan, Virginia, and West Virginia, all legalized same-sex marriage relatively late and Oregon legalized relatively early, but after its neighbor Washington.) But in all cases, the number of same-sex filers is closer to the number of marriage licenses issued. This might be expected if the tax and Census sources were measuring slightly different definitions of marriage.

CONCLUSION

This paper provides new, detailed statistics on the characteristics of same-sex married couples filing joint tax returns drawn from administrative data sources. The use of administrative data has strong advantages over survey-based measures for studying small populations like the married same-sex couples, providing more precise information regarding their economic and demographic characteristics, and geographic distribution.

The data show striking differences between same-sex and different-sex couples in terms of income, presence of children, and place of residence. While we explore some sources of differences and speculate as to others, many interesting and important questions related to employment, income, family structure, living arrangements of children, the relationship between family responsibilities and economic outcomes, or the role of state and federal policies remain for future work.

TABLE 1

Same-Sex Couple Households by State 2015

Area	Married different-sex couples (number)	Married same-sex couples (number)	Married male-male couples (number)	Married female-female couples (number)	Married	Married same-sex couples (percent)	Married male-male couples (percent)	Married female-female couples (percent)
United States	51,809,201	250,450	110,617	139,834	99.52%	0.48%	0.21%	0.27%
Alabama	736,973	1,446	508	938	99.80%	0.20%	0.07%	0.13%
Alaska	123,576	506	125	381	99.59%	0.41%	0.10%	0.31%
Arizona	1,018,830	5,546	2,315	3,231	99.46%	0.54%	0.23%	0.32%
Arkansas	475,652	1,149	420	729	99.76%	0.24%	0.09%	0.15%
California	5,948,710	47,819	24,571	23,248	99.20%	0.80%	0.41%	0.39%
Colorado	960,517	4,926	1,777	3,149	99.49%	0.51%	0.18%	0.33%
Connecticut	601,888	3,572	1,419	2,153	99.41%	0.59%	0.23%	0.36%
Delaware	151,891	1,303	547	756	99.15%	0.85%	0.36%	0.49%
District of Columbia	51,707	2,252	1,690	562	95.83%	4.17%	3.13%	1.04%
Florida	3,025,105	17,627	9,339	8,288	99.42%	0.58%	0.31%	0.27%
Georgia	1,458,788	5,574	2,576	2,997	99.62%	0.38%	0.18%	0.20%
Hawaii	240,748	1,548	766	782	99.36%	0.64%	0.32%	0.32%
Idaho	319,338	762	245	517	99.76%	0.24%	0.08%	0.16%
Illinois	2,111,988	8,643	4,097	4,546	99.59%	0.41%	0.19%	0.21%
Indiana	1,162,269	3,996	1,426	2,570	99.66%	0.34%	0.12%	0.22%
Iowa	595,757	1,979	669	1,310	99.67%	0.33%	0.11%	0.22%
Kansas	536,186	1,192	389	803	99.78%	0.22%	0.07%	0.15%
Kentucky	741,637	2,053	793	1,260	99.72%	0.28%	0.11%	0.17%
Louisiana	622,220	1,559	622	937	99.75%	0.25%	0.10%	0.15%
Maine	244,784	1,816	539	1,277	99.26%	0.74%	0.22%	0.52%
Maryland	928,661	5,618	2,220	3,398	99.40%	0.60%	0.24%	0.36%
Massachusetts	1,123,184	11,265	4,338	6,927	99.01%	0.99%	0.38%	0.61%
Michigan	1,712,041	4,159	1,538	2,621	99.76%	0.24%	0.09%	0.15%
Minnesota	1,037,972	4,727	1,849	2,879	99.55%	0.45%	0.18%	0.28%
Mississippi	392,698	601	184	417	99.85%	0.15%	0.05%	0.11%
Missouri	1,037,468	2,998	1,125	1,873	99.71%	0.29%	0.11%	0.18%
Montana	193,890	437	124	313	99.78%	0.22%	0.06%	0.16%
Nebraska	357,420	777	279	498	99.78%	0.22%	0.08%	0.14%
Nevada	418,389	2,590	1,296	1,294	99.38%	0.62%	0.31%	0.31%
New Hampshire	260,713	1,749	536	1,213	99.33%	0.67%	0.20%	0.46%
New Jersey	1,508,687	6,458	2,900	3,558	99.57%	0.43%	0.19%	0.23%

New Mexico	300,782	2,141	710	1,431	99.29%	0.71%	0.23%	0.47%
New York	2,869,572	19,657	10,231	9,426	99.32%	0.68%	0.35%	0.33%
North Carolina	1,609,732	6,328	2,255	4,073	99.61%	0.39%	0.14%	0.25%
North Dakota	141,937	180	51	129	99.87%	0.13%	0.04%	0.09%
Ohio	1,851,126	4,550	1,816	2,734	99.75%	0.25%	0.10%	0.15%
Oklahoma	638,344	2,048	679	1,370	99.68%	0.32%	0.11%	0.21%
Oregon	702,890	5,126	1,758	3,368	99.28%	0.72%	0.25%	0.48%
Pennsylvania	2,236,796	8,106	3,359	4,747	99.64%	0.36%	0.15%	0.21%
Rhode Island	165,087	1,150	457	693	99.31%	0.69%	0.27%	0.42%
South Carolina	752,056	2,037	786	1,251	99.73%	0.27%	0.10%	0.17%
South Dakota	165,177	226	74	151	99.86%	0.14%	0.04%	0.09%
Tennessee	1,083,075	2,884	1,136	1,748	99.73%	0.27%	0.10%	0.16%
Texas	4,236,697	15,062	6,466	8,596	99.65%	0.35%	0.15%	0.20%
Utah	556,919	2,042	820	1,222	99.63%	0.37%	0.15%	0.22%
Vermont	118,398	1,184	399	785	99.01%	0.99%	0.33%	0.66%
Virginia	1,445,066	5,771	2,367	3,404	99.60%	0.40%	0.16%	0.23%
Washington	1,308,716	11,159	4,624	6,535	99.15%	0.85%	0.35%	0.50%
West Virginia	321,715	828	256	572	99.74%	0.26%	0.08%	0.18%
Wisconsin	1,093,328	3,059	1,058	2,001	99.72%	0.28%	0.10%	0.18%
Wyoming	112,101	265	93	173	99.76%	0.24%	0.08%	0.15%

Source: Office of Tax Analysis 2016

TABLE 2

Characteristics of Couples Filing Married-Filing-Jointly 2015

(in percent)

Household Characteristics	Married different-sex couples (Percent)	Married same-sex couples (Percent)	Married male-male couples (Percent)	Married female-female couples (Percent)
Total households (number)	51,809,201	250,450	110,617	139,834
Age of householder				
15 to 24 years	1%	3%	1%	4%
25 to 34 years	13%	18%	14%	22%
35 to 44 years	19%	21%	20%	23%
45 to 54 years	21%	27%	30%	25%
55 to 64 years	22%	21%	23%	19%
65 years and over	23%	10%	12%	8%
Average age of primary taxpayer (years)	52.3	47.1	49.3	45.4
Average age of secondary taxpayer (years)	50.4	46.1	47.5	45.1
Children in the household	48%	19%	7%	28%
Household Adjusted Gross Income				
Less than $35,000	20%	14%	12%	16%
$35,000 to $49,999	10%	8%	7%	9%
$50,000 to $74,999	17%	14%	13%	15%
$75,000 to $99,999	16%	15%	13%	16%
$100,000 to $150,000	19%	22%	21%	22%
$150,000 or more	19%	27%	34%	22%
Average AGI (dollars)	115,210	139,415	165,960	118,415
Median AGI (dollars)	79,966	98,179	109,788	90,531

Source: Office of Tax Analysis 2016

TABLE 3

Economic Characteristics of Couples Filing Married-Filing-Jointly 2015

Household Characteristics	Average AGI (Dollars)	Less than $35,000 (Percent)	$35,000 to $49,999 (Percent)	$50,000 to $74,999 (Percent)	$75,000 to $99,999 (Percent)	$100,000 to $150,000 (Percent)	$150,000 or more (Percent)
All married joint filers	115,325	20%	10%	17%	16%	19%	19%
Different-sex couples	115,208	20%	10%	17%	16%	19%	19%
with dependent children	125,011	17%	10%	16%	15%	20%	21%
without dependent children	105,983	23%	10%	17%	16%	18%	16%
primary taxpayer age 25-55	119,803	16%	10%	18%	16%	20%	20%
Reweighted to FF geographic distribution	131,116	15%	10%	16%	16%	20%	23%
Reweighted to MM geographic distribution	152,608	16%	9%	15%	14%	19%	27%
Female same-sex couples	118,417	16%	9%	15%	16%	22%	22%
with dependent children	122,537	19%	9%	14%	14%	21%	23%
without dependent children	116,779	15%	9%	16%	16%	23%	22%
primary taxpayer age 25-55	115,094	15%	9%	17%	16%	22%	21%
mean different-sex income in own zip-3	129,239						
Male same-sex couples	165,962	12%	7%	13%	13%	21%	34%
with dependent children	264,000	9%	4%	9%	10%	20%	49%
without dependent children	158,799	13%	7%	13%	14%	21%	33%
primary taxpayer age 25-55	168,233	11%	7%	13%	13%	21%	35%
mean different-sex income in own zip-3	150,872						

Source: Office of Tax Analysis 2016

TABLE 4

Top 10 and Bottom 10 among the 100 Largest Commuting Zones

Number of Same Sex Couples and their Share of Married-Filing-Jointly Returns 2015

Order by share of marriages	Commuting Zone	Number	Share of Marriages	Order by share of marriages	Commuting Zone	Number	Share of Marriages
1	San Francisco, CA	13,220	1.52%	91	Oshkosh, WI	260	0.23%
2	Santa Rosa, CA	1,416	1.25%	92	Grand Rapids, MI	609	0.23%
3	Seattle, WA	9,281	1.09%	93	Gary, IN	289	0.23%
4	Boston, MA	9,458	1.04%	94	Baton Rouge, LA	279	0.23%
5	Portland, OR	4,006	0.97%	95	Huntsville, AL	256	0.22%
6	Miami, FL	5,131	0.92%	96	Greenville, SC	374	0.21%
7	Albuquerque, NM	1,248	0.90%	97	Johnson City, TN	228	0.21%
8	San Diego, CA	4,845	0.88%	98	Youngstown, OH	194	0.15%
9	New York, NY	13,892	0.84%	99	Brownsville, TX	209	0.14%
10	Portland, ME	1,111	0.83%	100	Provo, UT	151	0.13%

Source: Office of Tax Analysis 2016

TABLE 5

Top 20 among the 500 Largest 3-Digit Zip Codes

Number of Same Sex Couples and their Share of Married-Filing-Jointly Returns 2015

Female				Male			
Order by share of marriages	3-Digit Zip Code	Number	Share of Marriages	Order by share of marriages	3-Digit Zip Code	Number	Share of Marriages
1	Oakland, CA 946	1,197	2.2%	1	San Francisco, CA 941	4,263	3.5%
2	Seattle, WA 981	2,112	1.4%	2	Washington, DC 200	1,687	3.1%
3	San Francisco, CA 941	1,469	1.2%	3	New York, NY 100	4,357	2.7%
4	Springfield, MA 010	892	1.1%	4	California 922	2,249	2.0%
5	Portland, OR 972	1,584	1.1%	5	Seattle, WA 981	2,423	1.6%
6	Long Beach, CA 908	605	1.1%	6	Ft. Lauderdale, FL 333	1,661	1.6%
7	Washington, DC 200	561	1.0%	7	Oakland, CA 946	808	1.5%
8	Madison, WI 537	455	1.0%	8	Los Angeles, CA 900	3,013	1.3%
9	Boston, MA 021	1,684	1.0%	9	Atlanta, GA 303	1,204	1.2%
10	Durham, NC 277	350	0.9%	10	Long Beach, CA 908	663	1.2%
11	Boston, MA 024	739	0.92%	11	Boston, MA 021	1,880	1.13%
12	Sacramento, CA 958	978	0.89%	12	Jersey City, NJ 073	321	0.98%
13	Albuquerque, NM 875	297	0.84%	13	San Diego, CA 921	1,928	0.88%
14	Silver Spring, MD 209	407	0.83%	14	Chicago, IL 606	2,389	0.87%
15	North Bay, CA 954	692	0.80%	15	Arlington, VA 222	270	0.80%
16	Tacoma, WA 984	487	0.75%	16	Van Nuys, CA 914	318	0.78%
17	Burlington, VT 054	336	0.74%	17	Portland, OR 972	1,049	0.73%
18	New York, NY 100	1,183	0.74%	18	Dallas, TX 752	1,114	0.72%
19	Minneapolis, MN 554	1,236	0.73%	19	New Orleans, LA 701	222	0.64%
20	Delaware, 199	477	0.71%	20	Minneapolis, MN 554	1,078	0.64%

Source: Office of Tax Analysis 2016

Table 6

Comparison of Same-Sex Couple Data by State 2015

	2015				Change
	Census		Tax	Ratio	
	Same-Sex Couples	Same-Sex Spouses	Same-Sex Filers	Tax/Census Spouses	Percent Change Tax 2013-2015
United States	858,896	425,357	250,450	59%	91%
Alabama	7,814	4,257	1,446	34%	143%
Alaska	1,359	694	506	73%	115%
Arizona	20,781	7,349	5,546	75%	177%
Arkansas	5,501	3,095	1,149	37%	215%
California	120,998	67,208	47,819	71%	46%
Colorado	18,902	10,118	4,926	49%	213%
Connecticut	9,513	6,130	3,572	58%	29%
Delaware	3,799	2,326	1,303	56%	52%
District of Columbia	5,346	2,486	2,252	91%	48%
Florida	58,565	24,663	17,627	71%	165%
Georgia	22,490	9,611	5,574	58%	164%
Hawaii	4,568	2,276	1,548	68%	135%
Idaho	3,834	1,369	762	56%	218%
Illinois	31,322	15,415	8,643	56%	256%
Indiana	14,602	8,470	3,996	47%	318%
Iowa	6,207	3,130	1,979	63%	32%
Kansas	6,322	3,578	1,192	33%	159%
Kentucky	9,158	4,551	2,053	45%	267%
Louisiana	9,539	4,090	1,559	38%	186%
Maine	6,202	3,201	1,816	57%	44%
Maryland	18,098	10,389	5,618	54%	49%
Massachusetts	27,977	16,513	11,265	68%	26%

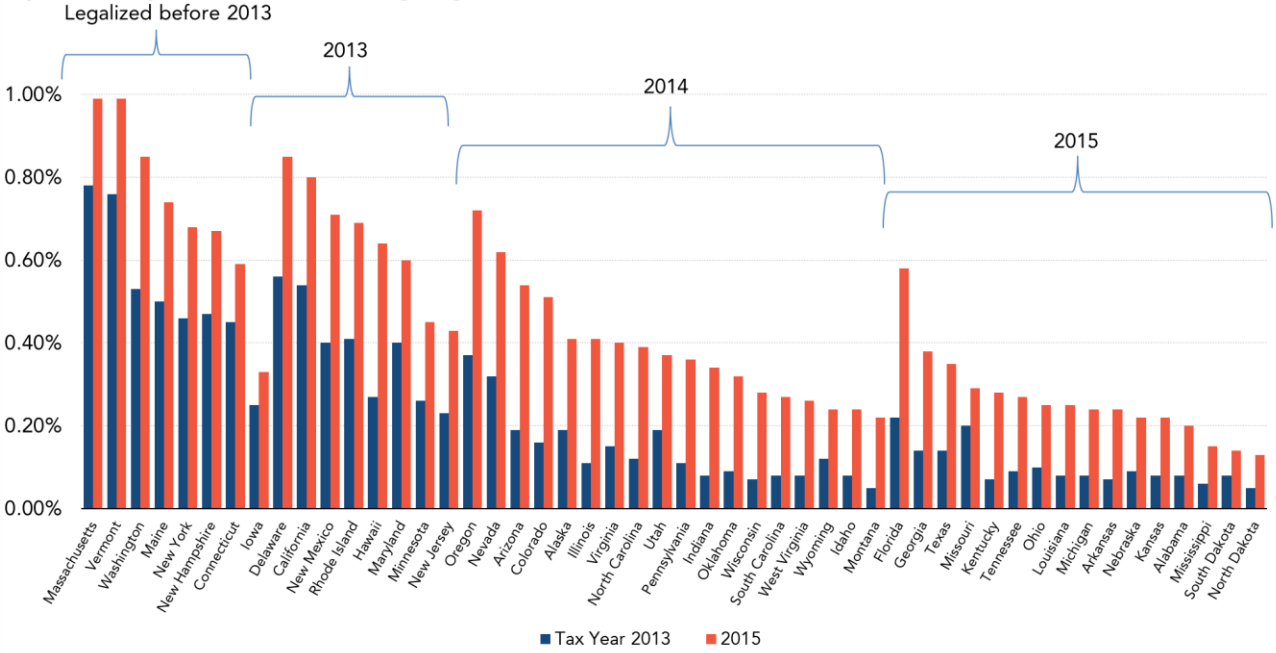
Michigan	19,817	7,183	4,159	58%	204%
Minnesota	13,999	8,110	4,727	58%	73%
Mississippi	3,893	1,497	601	40%	127%
Missouri	15,593	5,855	2,998	51%	42%
Montana	1,571	544	437	80%	297%
Nebraska	3,361	1,687	777	46%	139%
Nevada	8,683	4,220	2,590	61%	91%
New Hampshire	4,397	2,847	1,749	61%	39%
New Jersey	21,376	11,440	6,458	56%	85%
New Mexico	7,525	3,852	2,141	56%	69%
New York	67,267	36,065	19,657	55%	47%
North Carolina	23,915	10,894	6,328	58%	218%
North Dakota	1,323	658	180	27%	140%
Ohio	26,863	11,119	4,550	41%	135%
Oklahoma	9,797	5,197	2,048	39%	233%
Oregon	15,850	8,424	5,126	61%	93%
Pennsylvania	31,412	14,834	8,106	55%	213%
Rhode Island	3,456	1,828	1,150	63%	64%
South Carolina	7,471	3,424	2,037	59%	245%
South Dakota	1,144	814	226	28%	74%
Tennessee	15,254	6,579	2,884	44%	191%
Texas	66,546	27,240	15,062	55%	155%
Utah	5,856	3,270	2,042	62%	91%
Vermont	3,590	2,380	1,184	50%	27%
Virginia	21,175	10,719	5,771	54%	163%
Washington	26,184	14,956	11,159	75%	60%
West Virginia	4,414	2,202	828	38%	218%
Wisconsin	13,483	6,159	3,059	50%	278%
Wyoming	784	441	265	60%	83%

Source: Office of Tax Analysis 2016 and Henchman and Stephens (2014).

FIGURE 1

Same-Sex Filers as a Percent of Joint Filers

By state and year of same-sex marriage legalization

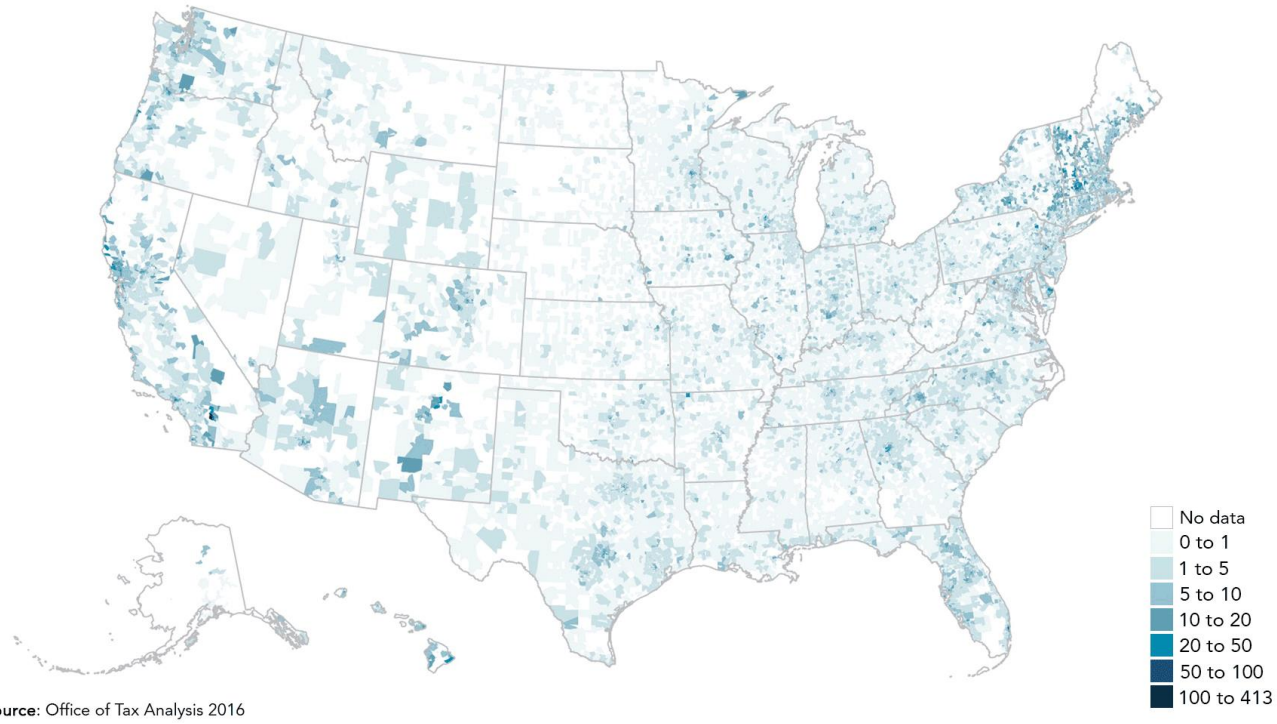


Source: Office of Tax Analysis 2016

FIGURE 2

Share of Joint Filers that are Same-Sex Couples by Zipcode 2015

(rate per 1,000 joint filers)



Source: Office of Tax Analysis 2016

APPENDIX

I. DATA ON VITAL STATISTICS FROM STATES THAT REPORT SAME-SEX MARRIAGE DATA

The table below shows the number of marriage licenses (or marriages recorded) for same-sex couples by state agencies in the small number of states that report such data online or in annual reports, and compares those numbers to the corresponding tax- and Census-estimated populations of same-sex filers and spouses.

To populate the table, we searched the vital statistics webpages and annual reports for all 50 states plus the District of Columbia for information on the number of marriage licenses issued and/or marriages certificates issued to same-sex couples to examine the correspondence between the number of legally married same-sex couples and the number of same-sex tax filers. We excluded estimates quoted second hand in the media or partial tabulations from New York (which excluded New York City). Data was published by Hawaii, Washington, Indiana, Michigan, Oregon, Virginia, and West Virginia. Hawaii and Washington published statistics on both the number of same-sex marriages recorded and of the residence of the couples, which allows the most direct correspondence to the same-sex filing population.

The table provides the cumulative number of marriages recorded each year (as of the end of the year), the number of same-sex filers and Census-ACS-estimated number of same-sex married couples from the corresponding year. The note to the table provides the sources for each state's vital statistics data.

APPENDIX TABLE 1

Comparison of Vital Statistics Records, Tax Filers, and Census Estimates

State and Latest Year	Cumlative Marriages (Vital Statistics)	Same-Sex Filers (Tax)	Census Same-Sex Spouses (ACS)	% Difference Tax v. Vital	% Difference Census v.Vital
States that report marriage licenses to same-sex couples *and* in-state residence:					
Hawaii (2014)	1,108	1,140	1,771	2.9%	59.8%
Hawaii (2015)	1,589	1,578	2,276	-0.7%	43.2%
Washington (2014)	9,274	9,635	12,529	3.9%	35.1%
Washington (2015)	11,191	11,159	14,956	-0.3%	33.6%
States that report marriage licenses to same-sex couples but pool in-state and out-of-state residents					
Indiana (2014)	1,430	2,665	5,687	86%	298%
Indiana (2015)	3,821	3,996	8,470	5%	122%
Michigan (2015)	2,327	4,159	7,183	79%	209%
Oregon (2014)	2,027	3,775	6,150	86%	203%
Oregon (2015)	3,731	5,126	8,424	37%	126%
Virginia (2014)	1,584	4,020	7,778	154%	391%
Virginia (2015)	4,609	5,771	10,719	25%	133%
West Virginia (2014)	310	500	1,004	61%	224%

Sources:

Hawaii:
http://health.hawaii.gov/vitalstatistics/preliminary-marriage-total-same-sex/
http://health.hawaii.gov/vitalstatistics/preliminary-non-resident-marriage-data-total-and-same-sex/
Indiana:
http://www.in.gov/isdh/files/2015-indiana-marriage-report-final.pdf
Michigan:
https://www.mdch.state.mi.us/pha/osr/annuals/MxDiv15.xls
Oregon:
https://public.health.oregon.gov/BirthDeathCertificates/VitalStatistics/MarriageData/marrsex14.pdf
https://public.health.oregon.gov/BirthDeathCertificates/VitalStatistics/MarriageData/marrsex15.pdf
Virginia:
https://www.vdh.virginia.gov/HealthStats/stats.htm
Washington:
http://www.doh.wa.gov/DataandStatisticalReports/VitalStatisticsData/Marriage/MarriageTablesbyTopic
West Virginia:
http://www.wvdhhr.org/bph/hsc/pubs/vital/2014/2014Vital.pdf

II. NAME INDEX METHODOLOGY

The name index is constructed from two sources. First, the Social Security Administration provides tabulations of applicants for Social Security cards by first name and gender dating back to 1880 by year and by state for all names with at least 5 occurrences (Social Security Administration 2015). The database contains a list of first names and the number of female and male individuals recorded with each name by the Social Security program. From these data, we form two alternative indices of the fraction of individuals who are male for each name first for all names observed in the SSA name database. The first index is simply the raw mean proportion male (or female) for each name. (For example, the share of individuals named "John" that are male in the database.) This proportion is available for all 95,025 first names in the database.

The second index is constructed by weighting the SSA names by the empirical year of birth of individuals in the tax data (to adjust for the fact that the gender specificity of some names may have changed over time). First, we calculate the share of individuals that are male for each name-birth year in the SSA baby name data (e.g., the fraction of individuals named "John" born in 1950 that are male). Second, we calculate the weighted mean of those name-birth-year values weighted by the number of individuals with each name and each birth year reported in the tax data. E.g., if 90 percent of Johns in the tax data were born in 1950 and 10 percent in 1960, then the index was formed by a 90/10 weighting of the 1950 and 1960 birth years' gender ratio for the name "John". The potential advantage of this approach is that it should improve the accuracy of the index to the extent that the gender-specificity of names changed over time. However, a potential disadvantage is that could increase the predictive error of the index, particularly of relatively rare names, to the extent that differences in gender-specificity of names over time are not informative. For instance, because very few married taxpayers in 2015 were born prior to 1925 or after the late 1990s, information from those birth cohorts that might have been helpful for identifying the gender specificity of relatively rare names was instead thrown out.

Next, we construct an index directly from tax return data using the first name of each taxpayer using the population of different-sex couples in 2015. We focus on different-sex couples when forming the index because misclassification of gender is less frequent. For each name we first calculate the fraction of all filers that are male for each first name. Second, we re-calculate the share of primary filers and secondary filers that are male for each name separately. For different sex couples, on about 93 percent of returns the male is listed as the primary filer; in many states and among older taxpayers, the rate is above 97 percent. Only in certain states and among younger married couples does the fraction of primary taxpayers that are male fall close to 75 percent. Because of this behavior, misclassification errors are more likely to take a certain form with misclassifications resulting in FF couples most likely to occur with the primary filer and MM with the secondary file.

The advantage of this approach is that it adds new information about the likely gender of filers with otherwise less specific first names because men are almost always listed first on a joint tax return as the primary filer (more than 90 percent of the time). For instance, while names like "Kim" or "Kelly" are not very gender specific, primary filers named Kim or Kelly are almost always male and secondary filers named Kim or Kelly are almost always female. The potential improvement in accuracy, however, also comes at the expense of potential overfitting. For example, under this approach a reported male-male couple whose names are Kim and John is less likely to be deemed misclassified than a reported male-male couple where the name order is reversed, but a primary filer named Kim in a female-female couple might be more likely to be deemed misclassified even if her gender were reported accurately.

In alternative specifications, we experimented with constructing more detailed indices using information on year of birth and state of birth and found that the estimates changed little from these relatively marginal changes.[1]

The indices are merged by first name and any names that never appear in the SSA baby name directory are excluded. This step screens out erroneous or missing names from the tax records, which sometimes arise when taxpayers do not include their first name on their return, use an abbreviation, or have a spelling error.

The final index we used is the simple average of non-missing values of the SSA name index and the index derived from the tax data on primary (secondary) filers. Rather than choose among the multiple indices, we follow the empirical record of forecasting methods that use the unweighted average of multiple forecasts (Bates and Granger 1969). Because the indices are highly correlated and because values for the fraction of individuals with a given name are concentrated close to zero and one, alternative specifications result in very similar results.

In the primary analysis, we assume that an individual's gender is corroborated or confirmed if their SSA-reported gender matches the gender indicated by the name among names with greater than 95 percent gender specificity. In other words, we assume that an individual is indeed female (and not misclassified) if her recorded gender is "female" and if her name index indicates that more than 95 percent of individuals with that name are female. If, instead, the index is less than 95 percent female, we treat the individuals gender as missing (and the couple's status as same- or different-sex as missing).

To form population estimates from the sample of filers with both 'confirmed' and missing same-sex status, we first formed narrow groups by tax year, state of residence, presence of dependent children, age of primary

[1] In other specifications, we also examined whether comparisons between observed rates of same-sex marriage pre-2013 could be used to establish a baseline rate with which to compare to 2013 and 2014. However, we abandoned that approach because we could not reject the possibility that some same-sex couples filed joint returns prior to 2013.

filer, and income. Within each group, we assume that the share of joint filers that are same sex male and female is the same whether status is confirmed with the name index or not confirmed (missing). (All groups that contained any couples with missing same-sex status also contained couples with non-missing status, making this feasible.) For instance, consider a hypothetical group of married filers living in New York state in 2015 without dependent children, whose primary filer was between the ages of 20 and 30 who had income between $30,000 and $40,000. Furthermore, assume there were 5,000 filers in that group, of whom 4,500 had non-missing information on gender, and 16 of those 4,500 were same-sex male couples (or about 0.35 percent). We would assume that 0.35 percent of the other 500 filers with missing information were also same-sex male couples (about 2), and estimate the total number of same-sex male couples in the total group of 5,000 to be 17.8. Summing across all groups within state (or within the country) yields to total estimated population for the state (or nation).

To assess the sensitivity of this approach to alternative assumptions, we provide the following alternative simulations. First, appendix Table 2 reports alternative estimates of national and state population totals of same-sex joint filers using each of the four individual indexes described above and the primary index used in the paper (the mean value of the four individual indices for each sample individual). The analysis shows that alternative indices have modest effects on the estimated number of same-sex filers. Using the first two SSA-based indices imply slightly higher numbers of same-sex filers of about 6 percent and 7 percent, respectively, as does the fourth index based on name, gender, and primary and secondary filer information from the IRS-SSA administrative data (about 4 percent higher). However, the index that uses the IRS-SSA data without conditioning on primary or secondary filing produces an estimate for the US population as a whole that is about 10 percent lower. Our sense is that the SSA-based estimates and the IRS-based index that uses primary and secondary filing order result in indices that are more highly polarized and imply that there are very few ambiguous names. As a result, the 95 percent threshold is more easily met. The other IRS-based index, because it is drawn from only the population of married filers and does not condition on filing order, results in an index that suggests there is more ambiguity between names and genders. More individuals are identified as potentially misclassified under this index. (Varying the index threshold, as we discuss in the next section, results in a similar pattern in which a higher threshold results in a lower estimate of the same-sex married population. In this sense, alternative specifications of the name index and alternative specifications of the threshold are not independent (or additive) sources of uncertainty. Instead, they provide alternative tests of how any uncertainty in the name index translates into uncertainty in the population estimates.)

While the four alternative indices provide indication of how alternative methods affect the results, there are obviously many plausible methods. For instance, because these indices are largely based on databases formed at the national level they may not reflect differences in naming conventions across groups because of regional differences, differences across immigrant or ethnic groups, or changing popularity or gender-specificity of

names within groups over time. The resulting reduction in classification error might therefore be larger in those areas where the name index is less specific, leading us, for instance, to identify more individuals in those areas as misclassified even though they were not. Similarly, classification error may vary by region, birth cohort, demographic, or filing characteristics. If that error is correlated with likelihood of being in a same-sex couple, that could result in bias (either up or down) toward the rate of same-sex marriage in the population less likely to be misclassified. In effect, our method diminishes the contribution of misclassified groups, which matters for the average reported to the extent the same-sex marriage rate of the group differs from the overall population.

Appendix Table 3 presents estimates of the number of male and female same-sex couples and their demographic and economic characteristics in 2014 using alternative thresholds for the name index. In these alternatives, we use indexes of 0.99, 0.9, 0.75, and 0.5 to 'validate' the SSA gender classification, and then use the same raking method on those data to construct national population estimates and the demographic and economic characteristics of male and female same-sex couples provided in Table 2B. We also present estimates without any adjustment.

Changing the threshold in the narrow range around 0.95 has little effect on the estimates, both because relatively few individuals fall into those ranges and because the odds of misclassification are small. Increasing the threshold to 0.99, however, reduces the estimated number of male same-sex couples by more than 10 percent because it screens out a relatively sizable number of couples with names just under the threshold. Reducing the threshold to 0.5 increases the reported number of both male and female couples by about 10 percent while also shifting the reported characteristics of those couples toward the distribution of characteristics of male-female couples. For instance, the proportion with children rises substantially for male couples suggesting that male-female couples are being misclassified as male-male.

Finally, while the estimates in Table 1 (state and national totals) are based on imputations of same-sex status by groups formed by year, state, presence of children, age, and income, the estimates for more granular geographic areas (commuting zone or zip code) implicitly add an additional dimension of geographic specificity, in that the share of filers that are same sex is estimated for each sub geographic area. In effect, these estimates impute missing same sex shares based on non-missing observations within the same community zone or zip code (rather than from non-missing observations across the state). While this level of granularity has a cost, in that many more groups have no same-sex couples, it also offers an assessment of how more granular geographic definitions would affect the results. The sum of the number of estimated same-sex couples over these finer geographic areas is about 255,500 in 2015, or about 2 percent greater than the national estimates in Table 1 for 2015, suggesting that the estimates is not very sensitive to incremental improvements in how the groupings are formed.

APPENDIX TABLE 2

Estimates using alternative name indices (2015)

		Based on SSA Baby Names		Based on IRS/SSA Match	
	Primary Specification (Average Index)	Index 1 Mean gender share by first name	Index 2 Mean gender share weighted by birth year	Index 3 Mean gender share by first name	Index 4 Mean gender share by name and filing order
United States	250,450	266,097	267,054	224,510	260,911
Alabama	1,446	1,550	1,539	1,302	1,524
Alaska	506	557	551	475	536
Arizona	5,546	5,919	5,919	5,043	5,769
Arkansas	1,149	1,250	1,238	1,016	1,219
California	47,819	51,156	51,407	41,997	50,004
Colorado	4,926	5,238	5,245	4,399	5,132
Connecticut	3,572	3,739	3,769	3,262	3,700
Delaware	1,303	1,363	1,356	1,180	1,348
District of Columbia	2,252	2,350	2,350	2,031	2,331
Florida	17,627	18,757	18,777	15,841	18,312
Georgia	5,574	6,014	6,015	4,979	5,819
Hawaii	1,548	1,633	1,634	1,335	1,641
Idaho	762	818	807	678	804
Illinois	8,643	9,222	9,282	7,833	9,011
Indiana	3,996	4,210	4,197	3,620	4,144
Iowa	1,979	2,097	2,100	1,768	2,072
Kansas	1,192	1,274	1,284	1,082	1,253
Kentucky	2,053	2,171	2,178	1,862	2,157
Louisiana	1,559	1,702	1,696	1,360	1,653
Maine	1,816	1,891	1,891	1,707	1,882
Maryland	5,618	5,875	5,915	5,086	5,822
Massachusetts	11,265	11,665	11,730	10,302	11,544
Michigan	4,159	4,417	4,428	3,743	4,359
Minnesota	4,727	4,922	4,962	4,281	4,877

Mississippi	601	664	656	535	647
Missouri	2,998	3,172	3,183	2,677	3,124
Montana	437	466	461	389	458
Nebraska	777	832	848	704	832
Nevada	2,590	2,754	2,772	2,313	2,710
New Hampshire	1,749	1,803	1,810	1,637	1,791
New Jersey	6,458	6,867	6,935	5,807	6,717
New Mexico	2,141	2,261	2,256	1,938	2,237
New York	19,657	20,925	21,090	17,546	20,420
North Carolina	6,328	6,783	6,773	5,663	6,616
North Dakota	180	203	199	161	200
Ohio	4,550	4,771	4,785	4,149	4,719
Oklahoma	2,048	2,223	2,219	1,823	2,170
Oregon	5,126	5,378	5,390	4,677	5,294
Pennsylvania	8,106	8,458	8,474	7,378	8,366
Rhode Island	1,150	1,200	1,209	1,077	1,180
South Carolina	2,037	2,172	2,179	1,845	2,136
South Dakota	226	238	240	203	240
Tennessee	2,884	3,082	3,065	2,632	3,012
Texas	15,062	16,388	16,431	13,370	15,853
Utah	2,042	2,226	2,226	1,771	2,192
Vermont	1,184	1,221	1,229	1,094	1,226
Virginia	5,771	6,115	6,136	5,183	6,003
Washington	11,159	11,751	11,861	10,028	11,570
West Virginia	828	861	865	749	860
Wisconsin	3,059	3,205	3,205	2,749	3,149
Wyoming	265	288	287	230	276

Source: Office of Tax Analysis 2016

APPENDIX TABLE 3

Estimates using alternative name-index thresholds (2015)

(in percent)

Index Threshold	No Adjustment		0.5		0.75		0.9		0.95		0.99	
Household Characteristics	M-M couples (Percent)	F-F couples (Percent)	M-M couples (Percent)	F-F couples (Percent)	M-M couples (Percent)	F-F couples (Percent)	M-M couples (Percent)	F-F couples (Percent)	M-M couples (Percent)	F-F couples (Percent)	M-M couples (Percent)	F-F couples (Percent)
Total Filers (number)	256,907	299,719	122,125	152,133	114,887	144,960	113,080	141,359	**111,149**	**140,512**	98,214	138,666
Age of householder												
15 to 24 years	2%	3%	2%	4%	2%	4%	2%	4%	**1%**	**4%**	1%	4%
25 to 34 years	17%	22%	15%	22%	15%	22%	14%	22%	**14%**	**22%**	14%	23%
35 to 44 years	24%	26%	20%	23%	20%	23%	20%	23%	**20%**	**23%**	20%	23%
45 to 54 years	27%	25%	29%	25%	29%	25%	29%	25%	**30%**	**25%**	29%	25%
55 to 64 years	20%	17%	22%	19%	22%	19%	23%	19%	**23%**	**19%**	23%	18%
65 years and over	10%	7%	12%	8%	12%	8%	12%	8%	**12%**	**8%**	12%	7%
Age of primary (years)	47.7	44.9	48.9	45.3	49.1	45.3	49.2	45.3	**49.3**	**45.4**	49.3	44.9
Age of secondary (years)	45.3	43.9	46.8	45.0	47.2	45.0	47.3	45.0	**47.5**	**45.1**	47.8	44.7
Children in the household	39%	48%	10%	30%	8%	29%	7%	29%	**7%**	**28%**	7%	28%
Adjusted Gross Income												
Less than $35,000	19%	18%	14%	16%	13%	16%	13%	16%	**12%**	**16%**	12%	16%
$35,000 to $49,999	10%	10%	7%	9%	7%	9%	7%	9%	**7%**	**9%**	7%	9%
$50,000 to $74,999	16%	17%	13%	16%	13%	16%	13%	15%	**13%**	**15%**	12%	16%
$75,000 to $99,999	14%	16%	13%	16%	13%	16%	13%	16%	**13%**	**16%**	13%	16%
$100,000 to $150,000	18%	20%	20%	22%	21%	22%	21%	22%	**21%**	**22%**	21%	22%
$150,000 or more	23%	19%	32%	22%	33%	22%	33%	22%	**34%**	**22%**	34%	21%
Average AGI (dollars)	129,296	113,464	159,430	118,869	164,094	118,397	165,080	118,404	**175,590**	**118,417**	168,708	116,223

Source: Office of Tax Analysis 2016

NOTES

1 In 2014, U.S. Census estimated that there were 56.1 million married-couple households (Census 2016). Because some married couples are not householders, the total number of Census-estimated couples is slightly larger. We focus on married householders because Census estimates of same-sex married couples are at the household level.

2 Linking spouses that filed separate returns imposed data challenges because of a large number of erroneous or missing identifiers for the other spouse. We do not examine married-filing-separately returns in this paper. Few couples file separate returns. We do not believe same-sex couples file separate returns at differential rates. For instance, in our analysis of geographic distribution of same-sex filers, we find no relationship between the share of same-sex joint filers and the share of married filers filing separately; areas with a high density of same-sex married couples do not appear to have high rates of married-filing separate returns.

3 Tax filers are not asked for their gender directly on their tax return. This information is recorded in the SSA Numident file which records an applicant's gender, place of birth, date of birth, and other information at birth or at immigration (for natural born citizens, naturalized citizens, and permanent residents), or upon application for individual taxpayer identification numbers (for individuals without a Social Security Number). We link the SSA-recorded gender to tax returns data using the Social Security number or individual taxpayer ID number.

4 The data were extracted in late 2015 for tax years 2013 and 2014 and in late 2016 for tax year 2015. We exclude returns filed for earlier tax years (e.g., returns filed in 2013 for tax years prior to 2013), taxpayers whose address indicates that they live abroad (including in a U.S. Territory or on a military base outside of the U.S.), and a very small number of returns with missing or erroneous geographic information. While almost all returns from 2013 have been processed, a small percentage from 2014 and 2015 (about 1 percent) had yet to be processed. Hence, a small number of returns for those years are excluded.

5 We use the filing order because it is informative about gender: in different-sex joint filers, the primary taxpayer is male in about 93 percent of cases. Errors in classification that result in misidentification of same-sex filers therefore disproportionately take on a specific form (primary taxpayer misclassified "F" instead of "M" or secondary filer misclassified as "M" instead of "F"), which can be used to improve the accuracy of the correction.

6 For instance, relative to the primary estimates presented here, three of the indices produced population estimates that were 4, 6, and 7 percent larger, and one estimate was 10 percent lower.

7 In addition, for 0.1 percent of couples, the SSA has no record of gender for one of the taxpayers.

8 In the appendix, we present a table produced with several alternative values of the threshold. The estimates appear not to be very sensitive to the exact value, which is reassuring.

9 Qualitatively, the name index appears to identify misclassified couples well, in the sense that a large fraction of reported MM couples include apparently misclassified secondary taxpayers (and vice versa for FF couples). Simulations in generated data suggest that this method provides an accurate correction for misclassification under the assumption that misclassification in the SSA data and using the name index is independent.

10 In addition, it is plausible that some formally-married same-sex spouses chose not to file joint returns because of legal, administrative, or other economic barriers that made it difficult for same-sex couples to file in the first years after Windsor. In those years, considerable uncertainty existed regarding the legal status, filing requirements, and other tax-related issues, and a number of states that did not recognize same-sex marriage imposed barriers to joint filing, such as requiring that same-sex couples file as single for state purposes. In certain states, prior to the 2015 ruling, same-sex couples were required to file separate state returns or to provide duplicative pro forma single federal returns to state authorities, which imposed substantial additional compliance burdens.

11 According to Henchman and Stephens (2014), for tax year 2013, 22 states did not recognize same-sex marriage while requiring taxpayers to reference their federal return when filing state income tax. In 18 of those states, same-sex filers were either required to complete pro forma single federal tax returns, to apportion income according to single state returns, or advised to file federal returns as single. The twelve states requiring the additional burden of pro forma single returns were Georgia, Idaho, Indiana, Kentucky, Louisiana, Michigan, Nebraska, North Carolina, Oklahoma, South

Carolina, Virginia, and West Virginia. Alabama, Arizona, Kansas, North Dakota, Ohio, and Wisconsin require apportionment. Montana's rules were unclear.

12 These data are summarized in an appendix table, which provides a comparison between vital records, estimates of same-sex joint filers, and Census same-sex spouses.

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