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**FOR RICHER, FOR POORER:
THE EFFECT OF MARRIAGE EQUALITY
ON LABOUR OUTCOMES IN MEXICO**

MARCO ANTONIO GÓMEZ LOVERA

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ASESORA:

DRA. AURORA RAMÍREZ ÁLVAREZ

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Dedicated to anyone who endured fear, hatred and prejudice, who fought to be recognised as equals, who fought for the rights without which this research would not have been possible.

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Abstract

I estimate the effect of the local legalisation of same-sex marriage in Mexico on earnings, worked hours, access to social security and specialisation within the household. Using a difference-in-difference approach with semi-panel data from the National Employment and Occupation Survey, I find a positive effect on earnings and access to social security, and negative on the worked hours differential. Several mechanisms for this effect are explored, including positive discrimination from the employer, changes in productivity, as well as bias arising from the data used and a brief discussion on how to solve this data related problem.

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Chapter 1

Introduction

Over the last two decades, acceptance of same-sex relations has grown in the world. In Mexico, the support for marriage equality has increased from 23% in December of 2000 to 55% in May of 2016, according to a survey published in the Mexican newspaper *Excélsior* by Beltrán and Cruz (2016). However, acceptance and legalisation of same-sex marriage haven't come without its share of debate.

Each time a local or federal legislative proposal to legalise same-sex marriage has been presented, it faces a significant backlash from conservative groups, and a public debate follows with mostly ideological or legal arguments on whether the proposition should be accepted or not. Economic arguments are scarce in the discussion, but also in the academy.

The research sought to examine the relationship between sexual orientation and economic outcomes has been growing. Beginning with Badgett (1995), most studies have found that homosexual men¹ earn significantly lower than heterosexual men, while homosexual women² earn significantly more than heterosexual women. When assessing the effect of the approval of same-sex marriage on individuals in a same-sex relationship, the research is scarce. Aldén et al. (2015) find no individual effect on earnings for the Sweden experience, while Burn and Jackson (2014) find a positive effect for the United States.

Following the work of Burn and Jackson (2014), I estimate the effect of the legalisation of same-sex marriage at the state-level using a difference-in-difference-in-difference approach. My research differs in the usage of semi-panel data from the Mexican National Employment and Occupation Survey (ENOE) with observations ranging from 2005 to 2017, rather than just two observed periods (the pre and post-treatment).

It is the first study of this type using Mexican data.

Individuals with a non-heterosexual sexual orientation are identified using the same-sex coupling method, by observing the sex of the head of the household and the reported partner,

¹"Homosexual men" and "gays" are used indistinctly

²"Homosexual women" and "lesbians" are used indistinctly

regardless of marital status.

I find that the legalisation of same-sex marriage is associated with a significant increase in earnings that ranges from 23 to 25% for individuals in a same-sex relation and the probability to have access to social security, while there is no significant effect on worked hours. I also find a significant reduction of the worked hours differential between partners of a same-sex couple of about 5 hours.

Since I'm assessing the effect of same-sex marriage presence in the state rather than an actual marriage, the estimated coefficient, if causal, captures the intent-to-treat.

Proposed mechanisms for the presence of the effect are an increase in productivity, employer discrimination, selection into same-sex couple reporting and omitted variables.

I also acknowledge that there may be a bias arising from the data and how non-heterosexual individuals are identified. In consequence, I make a critical revision of the literature surrounding the debate on how to better measure sexual minorities.

The research is organized as follows. Chapter 2 offers a brief description of the methods used to identify non-heterosexual individuals; revision of related literature regarding the effect of sexual orientation and earnings, and same-sex marriage and earnings; and a brief history of the legalisation of same-sex marriages in Mexico, as well as the difference with this legislation and civil unions. Chapter 3 describes the data used; states the econometric specification of the model; and tests the parallel trends assumption needed for the identification strategy. Chapter 4 states the results; explores the possible mechanisms that explain the existence of the effect; and offers the critical revision of literature surrounding the debate on how to better measure the lesbian, gay and bisexual (LGB) community. Chapter 5 concludes.

Chapter 2

Literature and Background

2.1 Related Literature

Studies regarding sexual minorities are still scarce and only began until the mid-1990s; this arises from the fact that sexual minorities are difficult to detect in most data sources. The studies that have been done use one of three methods to identify non-heterosexual individuals: same-sex sexual behaviour, same-sex coupling and declared sexual orientation. Each one has its limitations. By assessing same-sex sexual behaviour some individuals who have engaged sexually with the same-sex but do not identify as homosexual or bisexual might be catalogued as such, creating a bias. While assigning sexual orientation labels through the revelation that arises from same-sex coupling in household surveys completely vanishes bisexuals and fails to identify non-partnered individuals that are also part of sexual minorities. Besides, since the LGB (lesbian, gay, bisexual) population is relatively small, with these identification methods, the observed same-sex population is small. As for the declared sexual orientation method, surveys containing such question are still scarce, and most of them don't ask about economic outcomes.

2.1.1 Sexual orientation and earnings

Using same-sex sexual behaviour to identify the population, Badgett (1995) found a significant penalty on earnings for gays and a premium for lesbians using the General Social Surveys (GSS) in the United States. Follow-up studies such as Black et al. (2003) and Blandford (2003) found similar results.

Pioneer studies by Klawitter and Flatt (1998) and Allegretto and Arthur (2001), using the 1990 U.S. Census and coupling method, found that men in same-sex couples earn significantly less than their heterosexual counterparts. While Clain and Leppel (2001) found, using the same data source and method, that women in same-sex couples earn significantly more

than women in different-sex relations.

The gay penalty and lesbian premium has been further confirmed by Jepsen (2007) and Antecol et al. (2008) using the 2000 U.S. Census, Reza Arabsheibani et al. (2004) and Arabsheibani et al. (2005) using the U.K. Labour Force Survey, and Ahmed and Hammarstedt (2010) using Swedish register data.

Using direct questions to identify the non-heterosexual population the gay penalty and lesbian premium are not clearly present. Carpenter (2008) did find them using a health survey in Canada, but were missing in the studies by Uhrig (2014) using the U.K. Household Longitudinal Study and Bryson (2017) using U.K.'s 2011 Workplace and Employment Relations Study. Surprisingly, Carpenter and Eppink (2017) find a premium for both lesbians and gays for the first time.

Aksoy et al. (2016) question whether differences in estimated effects arise from the usage of two different identification methods of sexual minorities. Using a large individual-level data set from the U.K. that allows investigation using both methods, they replicate the gay penalty and lesbian premium found in the couple-based literature, but find no effects when non-partnered individuals can be identified and are included in the sample. Their findings lead them to suggest that couple-based samples overstate the true earnings differences that can be attributed to a homosexual orientation.

2.1.2 Same-sex marriage and earnings

The effect of a minority sexual orientation on earnings is not the only subject of interest. As the legalisation of marriage for same-sex couples advances through the world, the effect of the expansion of legal rights is also of interest.

The research into same-sex marriage with the most robust data is that of Aldén et al. (2015), in which they assess the effect of registered partnerships in Sweden introduced in 1995 on labour and fertility. Using longitudinal data from health insurance and labour market from 1994 to 2007 they compare labour and fertility outcomes before and after individuals enter a registered partnership (for those in same-sex couples) or marriage (for opposite-sex couples), both at the individual and couple levels. They find that there's a penalty of 12% on income of gays, while lesbians' income is 16% higher than that of straight women. On the couple level, the only significant change in pooled income is for opposite-sex marriage and for same-sex couples there is no evidence of specialisation, i.e. the income gap between same-sex couple members does not grow after entering the registered partnership. The effect on fertility is null for gays and positive for lesbians. Taking all of this into account, they conclude that marriage for gays is about pooling resources while for lesbians is a way to start a family.

Burn and Jackson (2014) use the legalisation of same-sex marriage across states in the U.S. to analyse the existence of the marriage premium. Using Census and American Community Survey data they find that same-sex marriage legalisation is associated with an increase of 8% in the wages of men in a same-sex relationship in the state, which is attributed to less discrimination from employers. This investigation serves as the basis for mine but expands on two aspects. First, contrary to Burn and Jackson my data source is not limited to two points in time (before and after the legalisation of same-sex marriage), but is instead a semi-panel collected quarterly over 12 years during which legislation on same-sex marriage has been introduced. And second, it's the first investigation made using Mexican data focusing on economic outcomes.

2.1.3 Analysis for Mexico

Rabell and Gutiérrez (2012), using the 2010 Census and the same-sex coupling method found that out of the 25.69 million families present in Mexico, 57,040 are formed by homosexual couples and 172,433 by homosexual-led nuclear families; this represents 0.9% of the total.

2.2 Marriage Equality in Mexico

Activists consider the modern “gay movement” to have been born in June 1969 during the Stonewall Riots in New York. However, the Mexican movement formally began in August 1971 when the Homosexual Liberation Front was formed, and it was until July 1978 when the first gay pride parade was held in the capital.

During the 1980s the movement focused on the AIDS epidemic and the ongoing discrimination. The first political change was achieved in 1997 when Patria Jiménez was selected as a proportional representation Deputy, becoming the first openly homosexual to hold public office.

The first major breakthrough was made in September 1999 when Mexico City passed an ordinance banning discrimination based on sexual orientation, the first in the country. At the federal level, the same protection was achieved with the approval of an anti-discrimination law in April 2003, which also created the National Council to Prevent Discrimination (Conapred). In 2000, Enoé Uranga, an openly lesbian politician, proposed a bill to legalise same-sex civil unions in Mexico City. However, the local Legislature did not discuss the proposal due to great opposition from conservative organizations, the Catholic Church and the City's Mayor, Andrés Manuel López Obrador. The opposition to the discussion ended when the Mayor resigned to seek the Presidency; the bill was then approved in November 2006 and enacted in

March 2007. Approval of civil unions followed in Coahuila (2007), Campeche (2013), Colima (2013), Jalisco (2014), Michoacán (2015) and Tlaxcala (2017).

Mexico City became the first state in the country to legalise same-sex marriage in December 2009, enacting the law in March 2010 and also granting adoption, loan applications inheritance and sharing of insurance policy rights to same-sex couples. The law was challenged by the Attorney General of Mexico following instructions from conservative president Felipe Calderón; however, the constitutionality of the law was upheld by the Supreme Court of the country.

Quintana Roo was the next state to allow same-sex marriages after a succession of events. In November 2011 two same-sex couples got married in the state after discovering that the local Civil Code does not specify gender requirements for marriage. In January 2012 same-sex marriages were suspended pending legal review of the Code and in April the two marriages performed were annulled by Governor Roberto Borge. A month later the annulment was reversed by the local Secretary of State and an ordinance allowing future same-sex marriages was issued.

The next states to allow same-sex marriage were Coahuila, after reforming its Civil Code (2014); Chihuahua, following an executive ordinance (2015); Nayarit, after the approval of a bill (2015); Jalisco, after the local Civil Code was declared unconstitutional by the Supreme Court for limiting marriage to opposite-sex couples (2016); Campeche, Michoacán, Morelos and Colima after reforming their local laws (2016); Chiapas and Puebla following a ruling of the Supreme Court (2017); and Baja California following the cease of a ban issued by the state's government (2017).

In Guerrero same-sex marriages were allowed by executive ordinance in July 2015, but the Civil Register mysteriously stopped issuing licences by March 2017.

Colima is the only state to have abolished civil unions after legalising same-sex marriage.

In June 2015 the country's Supreme Court issued a jurisprudential thesis expanding the definition of marriage to include same-sex couples and deeming unconstitutional and discriminatory local laws restricting it. However, this doesn't automatically legalise same-sex marriage nationwide; couples that wish to marry in a state with restrictions need to petition the Civil Registers through a judiciary process after which the license must be issued.

In May 2017 president Enrique Peña Nieto presented an initiative to amend Article 4 of the Constitution, which would legalise same-sex marriage in the country. The initiative faced great criticism from conservative groups and was deemed responsible for the bad electoral results in that year's elections for the ruling party. In consequence, the proposal was never discussed in Congress.

2.3 Difference between Marriage and Civil Unions

Same-sex civil unions can be legally performed in Mexico in the capital, Campeche, Coahuila, Jalisco, Michoacán and Tlaxcala as of the end of 2017.

Civil unions were first approved in Mexico near the end of 2006 in the capital as a way to give rights and obligations to same-sex couples that were only accessible through marriage like the right to inherit, lease subrogation, alimony and guardianship, after certain requirements have been met. One of the main differences with marriage is that couples in civil union can't jointly adopt children, though they can do so separately.

Discussed almost at the same time as the legislation in the capital, Coahuila's civil unions gave property and inheritance rights to same-sex couples.

Campeche approved civil unions in April 2013, though designed to bring legal certainty to any couple who decided to support each other, not necessarily in a romantic relationship. However, this type of union doesn't grant any rights regarding adoption or guardianship of biological children of the couple. Another distinction is that instead of being performed in the Civil Registry it is filed with the Public Registry of Property and Trade.

In Colima a law was passed in July 2013 giving the same obligations and rights as in a marriage to same-sex couples but with a different name, which was deemed unconstitutional and triggered the legalisation of same-sex marriage in 2016. Civil unions were then abolished.

Civil unions in Jalisco were approved in April 2013 giving the same rights to couples as a marriage, except for the ability to adopt children. Besides, contrary to marriage which is certified by the Civil Registry, civil unions need to be performed with a civil law notary.

In September 2015 civil unions were legalised in Michoacán, but only for same-sex couples, and providing them with the same rights as a marriage, except adoption. Since June 2016 civil unions can be performed also by heterosexual couples.

In Tlaxcala, civil unions were approved in December 2016 providing same-sex and opposite-sex couples the same rights and obligations as a marriage. The law was passed with amendments to the rules of adoption so that any couple in a civil union could do so.

Chapter 3

Strategy

3.1 Data

To investigate the effect of same-sex marriage on individuals in a same-sex relation, I utilise all available data from the Occupation and Employment National Survey (ENOE) as available for download from the Mexican National Institute of Statistics and Geography (INEGI) website. Data is released quarterly and ranges from the first quarter of 2005 to the fourth of 2017. It is the survey with the largest sample size conducted by INEGI, consisting of 120,260 houses each quarter.

Individuals in a same-sex relationship are identified using the coupling method. Using the variable that states the relationship between each member of the household with respect to the head, any partner can be identified regardless of marital status. After identification, a dummy indicating a same-sex relationship is created. An additional dummy indicating if same-sex marriage is present in the state is created using Table 3.1., and adding the particular situation of Guerrero described in Section 2.2. Earnings are adjusted for inflation to be in constant January 2017 Mexican Pesos, converted using the National Consumer Price Index calculated by INEGI.

The “individuals sample” is restricted to partnered individuals, head of the household or their partner, both living together, over 14 years old with non-zero wage and working. It consists of 4,170,253 observations over 52 quarters, out of which 2,564 correspond to individuals in a same-sex relationship. Figure 3.1 shows how individuals in a same-sex relationship are distributed over time.

A second sample, the “couples sample”, was created. It consists of observations at the household level with both partners living in the same household, both over 14 years of age and with at least one of the partners in the labour force. For each household, the database includes the couple’s pooled earnings, gap between their incomes (earnings gap), a dummy

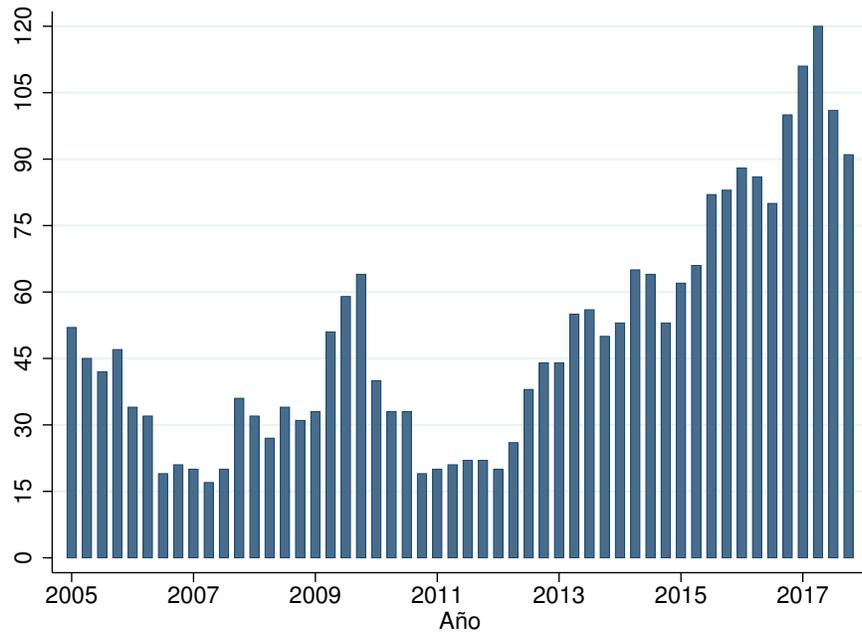
for specialization (equal to one if one partner is exclusively dedicated to housework), mean age, number of children present, mean schooling years, a dummy for rural households and a dummy indicating if the male partner earns more than the female partner in opposite-sex couples.

The couples sample consists of 3,286,911 observations over 52 quarters, out of which 1,662 are same-sex couples. The distribution of same-sex couples over time is presented in Figure 3.2.

Table 3.1: Mexican states with marriage equality as of December 2017

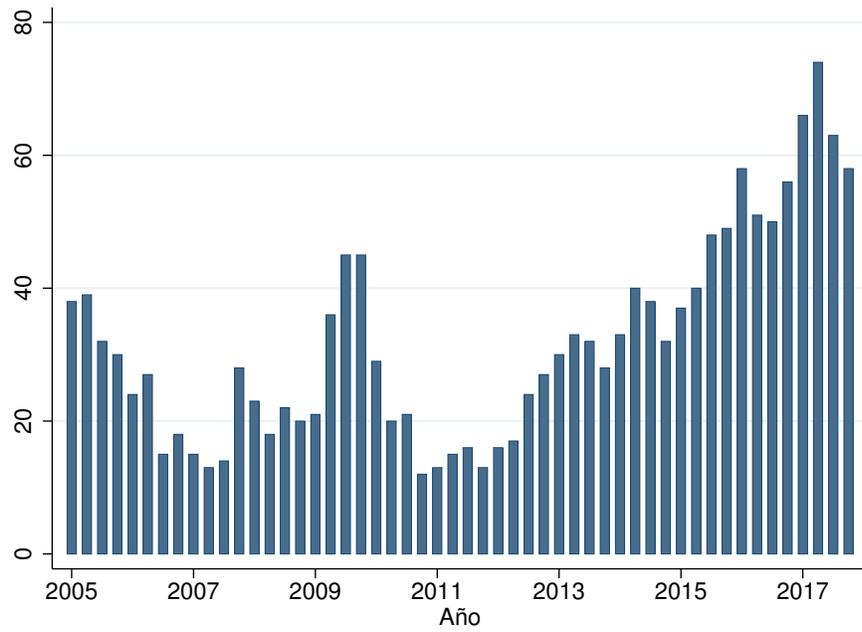
| State | Enactment date | Method |
|-----------------|--------------------|---------------------------|
| Mexico City | March 4, 2010 | Legislative |
| Quintana Roo | May 3, 2012 | Executive |
| Coahuila | September 17, 2014 | Legislative |
| Chihuahua | June 12, 2015 | Executive |
| Nayarit | December 23, 2015 | Legislative |
| Jalisco | May 12, 2016 | Judiciary |
| Campeche | May 20, 2016 | Legislative |
| Colima | June 12, 2016 | Legislative |
| Michoacán | June 23, 2016 | Legislative |
| Morelos | July 5, 2016 | Legislative |
| Chiapas | July 11, 2017 | Judiciary and Legislative |
| Puebla | August 1, 2017 | Judiciary |
| Baja California | November 3, 2017 | Executive |

Figure 3.1: Number of individuals in a same-sex relationship per period



Source: ENOE 2005-2017, INEGI (non-weighted)

Figure 3.2: Number of same-sex couples per period



Source: ENOE 2005-2017, INEGI (non-weighted)

3.2 Descriptive Statistics

Table 3.2 shows descriptive statistics for the individuals sample for the first and last period, and the overall period.

Table 3.2: Descriptive statistics of the individual sample

| | Same-sex couples | | Opposite-sex couples | |
|----------------------------|------------------|----------|----------------------|-------------|
| | Male | Female | Male | Female |
| 2005 Q1 | | | | |
| N | 27 | 25 | 52,945 | 20,238 |
| Mean age | 46.0 | 39.5 | 42.1 | 39.7 |
| % literacy | 96.3% | 100% | 95.5% | 95.2% |
| Mean school years | 8.8 | 8.4 | 8.7 | 9.3 |
| Mean children in household | 0.78 | 1.32 | 1.76 | 1.75 |
| Mean monthly real income | 7,035.02 | 5,890.82 | 8,647.60 | 6,066.94.71 |
| Mean worked hours | 43.9 | 38.2 | 47.6 | 36.0 |
| Access to social security | 48.1% | 56.0% | 43.1% | 40.6% |
| 2017 Q4 | | | | |
| N | 36 | 55 | 43,599 | 21,244 |
| Mean ge | 32.1 | 32.9 | 43.8 | 41.6 |
| % literacy | 100% | 100% | 97.1% | 97.6% |
| Mean school years | 12.5 | 11.6 | 9.6 | 10.3 |
| Mean children in household | 0.11 | 0.40 | 1.49 | 1.47 |
| Mean monthly real income | 8,594.99 | 6,636.30 | 7,201.85 | 5,359.55 |
| Mean worked hours | 47.2 | 47.5 | 48.0 | 35.8 |
| Access to social security | 58.3% | 65.5% | 42.9% | 39.4% |
| Whole period | | | | |
| N | 1,302 | 1,262 | 2,486,287 | 1,122,518 |
| Mean age | 36.6 | 34.5 | 42.9 | 40.7 |
| % literacy | 98.8% | 99.3% | 96.4% | 96.4% |
| Mean school years | 11.5 | 10.7 | 9.1 | 9.7 |
| Mean children in household | 0.41 | 0.76 | 1.62 | 1.60 |
| Mean monthly real income | 9,305.22 | 6,712.09 | 7,973.10 | 5,712.70 |
| Mean worked hours | 44.7 | 45.8 | 47.7 | 35.8 |
| Access to social security | 50.8% | 58.9% | 42.4% | 38.6% |

Source: ENOE 2005-2017, INEGI (non-weighted)

Table 3.3 shows descriptive statistics for the couples sample, again for the first and last period, besides the full period.

Table 3.3: Descriptive statistics of the couples sample

| | Same-sex couples | | Different-sex couples | |
|----------------------------|------------------|-------------|-----------------------|-------------------|
| | Male | Female | Male top earner | Female top earner |
| 2005 Q1 | | | | |
| <i>One partner works</i> | | | | |
| N | 11 | 14 | 36,158 | 1,888 |
| Mean age | 50.1 | 44.4 | 41.2 | 50.8 |
| Mean schooling years | 7.3 | 7.8 | 7.5 | 7.4 |
| Mean children in household | 0.82 | 0.86 | 1.78 | 1.59 |
| Mean couple's income | \$7,1156.61 | \$6,735.96 | \$7,779.73 | \$5,596.98 |
| <i>Both partners work</i> | | | | |
| N | 8 | 5 | 18,473 | 5,480 |
| Mean age | 41.1 | 36.1 | 40.4 | 42.2 |
| Mean schooling years | 8.4 | 7.9 | 9.3 | 9.8 |
| Mean children in household | 0.63 | 2.20 | 1.78 | 1.67 |
| Mean couple's income | \$12,959.65 | \$9,441.86 | \$14,289.77 | \$14,141.45 |
| Mean max. earning | \$8,149.04 | \$6,618.07 | \$10,055.30 | \$9,540.97 |
| Mean min. earning | \$4,810.61 | \$2,823.79 | \$4,234.47 | \$4,966.10 |
| 2017 Q4 | | | | |
| <i>One partner works</i> | | | | |
| N | 8 | 9 | 26,639 | 2,093 |
| Mean age | 40.6 | 32.8 | 43.4 | 53.7 |
| Mean schooling years | 10.8 | 11.2 | 8.8 | 8.8 |
| Mean children in household | 0.00 | 0.78 | 1.5 | 1.2 |
| Mean couple's income | \$4,630.40 | \$4,407.81 | \$6,318.58 | \$4,873.31 |
| <i>Both partners work</i> | | | | |
| N | 16 | 25 | 15,181 | 4,339 |
| Mean age | 31.9 | 33.4 | 41.8 | 43.8 |
| Mean schooling years | 13.8 | 11.9 | 10.0 | 10.6 |
| Mean children in household | 0.13 | 0.32 | 1.51 | 1.37 |
| Mean couple's income | \$16,670.91 | \$15,123.93 | \$12,019.47 | \$12,353.7 |
| Mean max. earning | \$9,764.95 | \$9,272.17 | \$8,104.62 | \$7,890.09 |
| Mean min. earning | \$6,905.96 | \$5,851.76 | \$3,914.85 | \$4,463.61 |
| Whole sample | | | | |
| <i>One partner works</i> | | | | |
| N | 320 | 365 | 1,573,886 | 117,690 |
| Mean age | 40.8 | 36.2 | 42.3 | 51.1 |
| Mean schooling years | 8.8 | 9.5 | 8.1 | 8.0 |
| Mean children in household | 0.81 | 0.88 | 1.62 | 1.39 |
| Mean couple's income | \$7,570.69 | \$6,279.36 | \$7,082.46 | \$4,856.37 |

Table continues

| Table 3.2 continued | | | | |
|----------------------------|------------------|-------------|-----------------------|-------------------|
| | Same-sex couples | | Different-sex couples | |
| | Male | Female | Male top earner | Female top earner |
| <i>Both partners work</i> | | | | |
| N | 513 | 464 | 855,853 | 246,915 |
| Mean age | 35.5 | 33.8 | 41.1 | 42.8 |
| Mean schooling years | 12.1 | 11.0 | 9.7 | 10.2 |
| Mean children in household | 0.29 | 0.74 | 1.64 | 1.52 |
| Mean couple's income | \$18,133.16 | \$13,222.17 | \$13,253.92 | \$13,509.47 |
| Mean max. earning | \$11,567.71 | \$8,185.24 | \$9,123.88 | \$8,717.15 |
| Mean min. earning | \$6,535.46 | \$5,036.93 | \$4,130.04 | \$4,792.32 |

End of table 3.2

Source: ENOE 2005-2017, INEGI (non-weighted)

It is interesting to note in Table 3.2 that while the mean age of people in an opposite-sex relation grows over time, as the Mexican population ages, the mean age of individuals in a same-sex couple falls by almost 15 years. Both males and females in a same-sex relation earn less than their heterosexual counterparts in 2005 but more by the last observation in the last quarter of 2017. Males in a same-sex relation work less hours than males in an opposite-sex relation both in the first and last period, though the gap reduces; while females in a same-sex relation work more than those in an opposite-sex relation and the gap actually widens. Finally, while the access to social security for individuals in an opposite-sex relation remains somewhat stable from 2005 to 2017, it actually increases for those in a same-sex relation.

The pattern for age and earnings described for individuals in Table 3.2 can be seen also when assessing couples, as shown in Table 3.3, regardless of specialization.

3.3 Econometric Specification

I wish to estimate the effect of same-sex marriage legalisation over four labour outcomes: hourly wages, worked hours and access to social security for the individuals sample; and the difference in worked hours for the couples sample to assess the effect on specialisation within the household. To do so, the following differences-in-differences-in-differences specification for individual i is estimated:

$$Y_{it} = \beta_1 gay_{it} + \beta_2 post_{it} + \beta_3 (gay_{it} \times post_{it}) + X_i' \theta + Q_{it} + S_{it} + \varepsilon_{it}$$

Where Y is one of the four variables of interest for individual i at time t , gay is a dummy variable indicating if the individual i is in a same-sex relation as revealed by coupling, $post$ is a dummy variable indicating if same-sex marriage is allowed at time t in the state where individual i lives, X is a vector of covariates, Q is a dummy for each of the quarters included in the sample to identify time-trends, S is a dummy for each of the 32 Mexican states to capture state-level fixed effects and ε is the idiosyncratic error.

The base vector of covariates for the individuals sample includes sex, a dummy for living in a rural area, age, age squared, school years, dummy for being married, and a dummy for the presence of children in the household. Additional controls are included to test different models.

For the couples sample, the covariates include a dummy for living in a rural area, mean age of the couple, mean school years of the couple, a dummy for being married, a dummy for the presence of children in the household, a dummy indicating if both partners work, and a dummy indicating if the top earner is male.

Additional controls related to the labour market include the class of worker, which is divided into subordinated and salary workers, employers, and self-employed workers; and economic industry, comprised of agricultural, construction, manufacturing, services, others, and non-specified.

The coefficient of primary interest is β_3 , which captures the mean differential of the outcomes of interest between states with and without same-sex marriage over time, and differentially for individuals in a same-sex or opposite-sex relationship. Since the estimated effect is that of same-sex marriage eligibility rather than being actually married, the coefficient, if causal, captures the intent-to-treat (ITT).

Both models are estimated via Weighted Least Squares (WLS) as to interpret the coefficients as the conditional mean for the whole Mexican population, not just the ENOE sample. However, for the access to social security variable, which is binary, the regression is estimated as a weighted probit. Standard errors are clustered at the state level.

3.4 Parallel trends assumption

For the differences-in-differences identification strategy to sustain, the assumptions of the OLS model must be satisfied, as must also the parallel trends assumption. This assumption implies that in the absence of treatment, the difference in the outcomes of interest between the treatment and control group is constant over time so that any change in their trend can be attributed to the treatment.

Usually, a visual inspection of the trends before the intervention between the control and

treatment groups is made. However, this might be complicated when the treatment is administered to different subgroups of the sample at different times along the observed period. I'll use two alternative methods. First, the placebo method shows that if the trend assumption is true, then there should be no significant change in the outcome when “assessing the impact of a placebo treatment” in the pretreatment period. Second, I'll use the real treatment regressed over an outcome that must not change with the intervention.

Placebo treatment

The pretreatment period ranges from the first quarter of 2005 and the first quarter of 2010 before same-sex marriage was enacted in the Mexican capital. I will use this period of the sample and assign randomly a “placebo treatment” to half of the states beginning in the fourth quarter of 2007. The results of the model using the placebo sample for the three outcomes of relevance are stated in Table 3.4.

Table 3.4: Placebo treatment effect on labour outcomes (WLS)

| | Log Real Wage | Worked Hours | Social Security Access | Worked Hours Differential |
|------------|---------------------|---------------------|---------------------------|------------------------------|
| gay | -0.0323 (0.0696) | 1.2371 (1.7850) | 0.5370*** (0.2075) | 0.0444 (1.0330) |
| post | -0.0275 (0.0137) | 0.1611 (0.1906) | -0.0153 (0.0158) | 0.2848 (0.1699) |
| gay post | 0.0301 (0.1016) | -0.1400 (2.6882) | -0.2589 (0.3298) | -1.7249 (2.1461) |
| <i>N</i> | | 394,348,801 | | 321,148,662 |
| adj. R^2 | 0.330 | 0.114 | 0.145 | 0.315 |

Standard errors in parentheses, clustered at the state level

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

It can be seen that the placebo treatment does not have a significant effect on any of the outcomes that are under assessment. However, being in a same-sex relationship regardless of the period has a significant impact on access to social security.

Unrelated outcome

This test makes sure other outcome variables that should be unaffected by the legalisation of same-sex marriage are indeed unaffected. In this case, I will use the underutilization status, which is defined as a person currently working that explicitly states the need or disponibility to work more hours than the currently worked. I use this variable under the assumption

that being in this state depends not on sexual orientation or having access to marriage but on economic or firm-level factors. Results are shown in Table 3.5.

It is clear that this outcome, in particular, is unaffected by the legalisation of same-sex marriage in the states, as the estimated effect is small and insignificant.

There is no formal test for the parallel trends; however, this statistical inspection provides some evidence that the main assumption of the identification strategy is likely to hold.

Table 3.5: Marriage equality effect on an unrelated labour outcome (WLS)

| | Underutilization |
|------------|---------------------|
| gay | -0.0112 (0.0108) |
| post | -0.0044 (0.0063) |
| gay post | -0.0296 (0.0227) |
| N | 999,541,392 |
| adj. R^2 | 0.023 |

Standard errors in parentheses, clustered at the state level

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Chapter 4

Results and Discussion

4.1 Results

Table 4.1 presents the estimates of the effect of same-sex marriage legalisation on the labour outcomes of interest, with both baseline and additional controls for the individuals sample. The sign of the effect of the baseline controls matches expectations. For example, wages grow over age and school years and are reduced when in a rural locality.

Even-numbered columns show results taking into account the additional labour market controls described in Section 3.3.

As columns (1) and (2) in Table 4.1 show, there is a penalty on hourly earnings for being homosexual³ of about 6% and, as expected, a penalty for being a woman that ranges from 7% to 9%, the lowest corresponding to the model with labour market controls. As for the coefficient of interest, it can be seen that being in a same-sex relationship in a state with marriage equality after its legalisation has a positive effect of about 23% to 25% and it is statistically significant. This effect is unusually high; in the next section, I will analyse the possible explanations for this magnitude.

Columns (3) and (4) show there is a negative effect of marriage equality on worked hours though not significant. However, it is interesting that being homosexual per se means that worked hours are higher than for heterosexuals. Two of the proposed reasons for this to happen is that fear of discrimination leads homosexuals to work harder and that as traditional gender roles in the household don't apply, homosexuals have extra time to work. Further investigation is needed to prove these theories. Also, as expected, females work fewer hours than men.

As shown in columns (5) and (6), individuals in a same-sex relationship are about 20 percentage points more likely to have access to social security than heterosexuals, and marriage

³For simplicity the term “homosexual” is used when a person is observed as being in a same-sex relationship, though it may be the case that they don't identify as such.

equality gives an additional 24 to 36 percentage points to such probability. This increase in the likelihood is due to the legalisation of same-sex marriage, as previously inaccessible health-related rights for partners are acquired.

For all outcomes of interest, the preferred specification is that which includes the labour market controls, since the additional controls may reduce potential omitted variable bias.

As for the couples sample, column (7) of Table 4.1 shows the effect of same-sex marriage legalisation on specialisation, measured as the differential of worked hours between partners in a couple. A bigger differential means that one partner specialises in housework and the other in labour market participation.

Results show that for same-sex couples living in a state with same-sex marriage after it was legalised, the worked hours differential decreases. The reduction in the worked hours gap may arise from the fact that as earnings also rise with same-sex marriage legalisation, the working partners may be prone to reducing their work hours. This explanation is in line with negative effect regarding worked hours at the individual level, though it must be remembered that the result was not statistically significant.

Table 4.1: Effect of marriage equality on labour outcomes (WLS)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|-----------------|------------------------|------------------------|-------------------------|-------------------------|------------------------|------------------------|------------------------|
| | Log Real Hourly Wage | Worked Hours | Social Security Access | Worked Hours | Social Security Access | Worked Hours | Differential |
| gay | -0.0619*** (0.0214) | -0.0604*** (0.0189) | 2.7507*** (0.6885) | 2.5450*** (0.6623) | 0.2174** (0.0930) | 0.1859* (0.1025) | 0.9882 (0.7042) |
| post | -0.0035 (0.0143) | 0.0014 (0.0142) | 0.2033 (0.2412) | 0.2732 (0.2239) | 0.0288 (0.0300) | 0.0471** (0.0223) | -0.0961 (0.2478) |
| gay post | 0.2340** (0.1026) | 0.2531** (0.1044) | -2.0995 (1.4135) | -1.2906 (1.2669) | 0.2382** (0.1123) | 0.3615** (0.1156) | -5.0887*** (1.4555) |
| sexo | -0.0900*** (0.0165) | -0.0732*** (0.0137) | -12.2898*** (0.3721) | -13.2405*** (0.4355) | -0.2332*** (0.0301) | -0.2902*** (0.0288) | |
| <i>Controls</i> | | | | | | | |
| Baseline | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Labour market | No | Yes | No | Yes | No | Yes | - |
| N | | | 999,541,392 | | | | 799,328,145 |
| adj. R^2 | 0.302 | 0.353 | 0.116 | 0.148 | 0.159 | 0.448 | 0.317 |

Standard errors in parentheses, clustered at the state level

For columns (5) and (6) pseudo R^2 is shown

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

4.2 Robustness and Sensitivity Analysis

4.2.1 Imputation of missing wages

As Campos Vázquez et al. (2013) has documented, the proportion of workers that don't report earnings in the ENOE has increased in recent years, and this is not a random phenomenon. Workers with a university education or higher, and occupied in the formal sector are more prone to non-reporting.

As this phenomenon might affect the results, missing earnings are imputed for each quarter using the hot-deck procedure⁴ with ten repetitions. Variables used for the first imputation consist of five-year age groups, city, formality, education level, locality size and self-reported range of the earnings as multiples of the minimum wage. Two additional imputations of another ten repetitions are made, first dropping the range of earnings and then replacing the locality size with a dummy variable for rural areas.

While the imputation adds no further observations of individuals in a same-sex relationship, it does provide an additional 558,884 observations for the individuals sample and 490,905 observations for the couples sample. I will use these new samples to test the robustness of the results presented in the previous section.

It can be seen in columns (1) and (2) of Table 4.2 that the penalty for being homosexual on earnings drops in a percentage point to 5%. And the effect of being in a same-sex relationship in a state with marriage equality after its legalisation remains relatively unchanged, ranging from 24 to 26%.

The effect on worked hours remains negative and non-significant. The coefficients on social security access are somewhat lower though not that different from the ones seen in Table 4.1.

As for the couples sample, the effect on the worked hours differential remains relatively close to the previous estimate.

⁴The hot-deck imputation is a procedure to handle missing data. It randomly selects a value for the variable from an observation similar to that of the missing value, according to a set of descriptive variables.

Table 4.2: Effect of marriage equality on labour outcomes (WLS) [Sample with imputed wages]

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|-----------------|------------------------|-----------------------|-------------------------|-------------------------|------------------------|------------------------|------------------------|
| | Log Real Hourly Wage | Worked Hours | Worked Hours | Social Security Access | Worked Hours | Differential | Differential |
| gay | -0.0523** (0.0231) | -0.0524** (0.0204) | 2.5151*** (0.6842) | 2.2971*** (0.6562) | 0.2261** (0.0932) | 0.1674 (0.1061) | 0.8470 (0.7077) |
| post | -0.0056 (0.0161) | -0.0040 (0.0159) | 0.2575 (0.2080) | 0.3077 (0.1997) | 0.0378* (0.0226) | 0.0481** (0.0218) | -0.1054 (0.2421) |
| gay post | 0.2401** (0.1096) | 0.2568** (0.1107) | -2.2480 (1.4700) | -1.4291 (1.3298) | 0.2102* (0.1210) | 0.3385*** (0.1163) | -4.9097*** (1.4546) |
| sexo | -0.0501*** (0.0162) | -0.0355** (0.0152) | -11.9060*** (0.3050) | -12.8384*** (0.3817) | -0.2010*** (0.0294) | -0.2695*** (0.0284) | |
| <i>Controls</i> | | | | | | | |
| Baseline | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Labour market | No | Yes | No | Yes | No | Yes | - |
| N | | | 1,179,350,987 | 0.143 | 0.156 | 0.463 | 956,516,018 |
| adj. R^2 | 0.293 | 0.332 | 0.111 | 0.143 | 0.156 | 0.463 | 0.340 |

Standard errors in parentheses, clustered at the state level

For columns (5) and (6) pseudo R^2 is shown

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4.3: Effect of civil unions and marriage equality on labour outcomes (WLS)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|-----------------|------------------------|------------------------|-------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| | Log Real Hourly Wage | Worked Hours | Social Security Access | Worked Hours Differential | Worked Hours Differential | Worked Hours Differential | Worked Hours Differential |
| gay | -0.0741*** (0.0217) | -0.0726*** (0.0188) | 2.6951*** (0.7379) | 2.4781** (0.7076) | 0.2126** (0.0953) | 0.1673* (0.1018) | 1.3197* (0.7644) |
| post | -0.0034 (0.0143) | 0.0014 (0.0142) | 0.2035 (0.2413) | 0.2734 (0.2240) | 0.0288 (0.0300) | 0.0471** (0.0223) | -0.0970 (0.2476) |
| gay post | 0.1576* (0.0838) | 0.1761* (0.0879) | -2.4497 (1.4894) | -1.7117 (1.2880) | 0.2063 (0.1670) | 0.2353 (0.1627) | -2.8356* (1.6019) |
| ucivil gay | 0.1330** (0.0545) | 0.1340*** (0.0422) | 0.6093 (1.2936) | 0.7327 (1.2452) | 0.0541 (0.1684) | 0.2177 (0.2538) | -3.9366*** (1.0815) |
| sexo | -0.0900*** (0.0165) | -0.0732*** (0.0137) | -12.2898*** (0.3721) | -13.2405*** (0.4355) | -0.2332*** (0.0301) | -0.2902*** (0.0288) | |
| <i>Controls</i> | | | | | | | |
| Baseline | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Labour market | No | Yes | No | Yes | No | Yes | - |
| N | | | 999,541,392 | | | | 799,328,145 |
| adj. R^2 | 0.302 | 0.352 | 0.116 | 0.148 | 0.159 | 0.448 | 0.317 |

Standard errors in parentheses, clustered at the state level

For columns (5) and (6) pseudo R^2 is shown

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

4.2.2 Considering Civil Unions

Before same-sex marriage was legalised in Mexico, laws recognising certain rights for same-sex couples came into place in the form of a legal figure known as civil unions. As described in Section 2.3, these unions granted almost the same rights and obligations as marriage, except mainly the possibility to jointly adopt children.

If what benefits labour outcomes of non-heterosexual individuals is the legal recognition of certain rights, the effect may have begun before the enactment of same-sex marriage. To test this, an additional dummy is included in the model taking the value of 1 for those in a same-sex relation present at the state and time where civil unions are allowed.

Table 4.3 shows the results of this model. It can be seen that for the hourly wages the effect of same-sex marriage for individuals in a same-sex relationship is reduced to around 16%, remaining significant, and civil unions show a significant effect of about 13%. The effect on worked hours remains non-significant, and the effect on access to social security is now non-significant.

As for the couples sample, the effect of same-sex marriage is also reduced when the presence of civil unions is taken into account, from a reduction of 5 hours to one of 2.8 hours.

All of this leads me to believe that, from an economic point of view, non-heterosexual individuals benefit from the recognition of rights that give them certainty regarding financial and health support for each other within a couple.

4.3 Possible Mechanisms

My proposed mechanisms that explain the presence of a premium in hourly wages for individuals in a same-sex relationship in a state and time where marriage equality is present are an increase in productivity, employer discrimination, omitted variables, and selection into same-sex couple reporting.

4.3.1 Increase in productivity

An increase in productivity may be discarded since marriage equality has a non-significant effect on worked hours.

However, it may be the case that the acceptance and tolerance that comes with the recognition of same-sex marriage leads to a higher productivity, even if worked hours have no significant change. Badgett (2014), Badgett et al. (2014), and Badgett et al. (2017) find evidence in India, Indonesia and emerging countries that discrimination reduces economic productivity because people end up in jobs where they don't fully use their knowledge, and

harassment is likely to reduce their output.

4.3.2 Positive discrimination

As for employer discrimination, it is difficult to detect with the available data. One way to do so may be controlling for the presence of legislation banishing discrimination due to sexual orientation; however, this would be of no use, since Mexico has had federal antidiscrimination legislation due to sexual orientation since 2003, as stated in Section 2.2.

4.3.3 Omitted variables

The magnitude of the effect on individuals in a same-sex relationship is unusually high, higher than any premium found in previous research. This raises the suspicion that there may exist a bias arising from an omitted variable that is correlated with the legalisation of same-sex marriage, one that can not be accounted for with the information provided by the ENOE.

As the sensitivity analysis shows, when civil unions are included the effect of same-sex marriage legalisation drops. It wouldn't be surprising that other variables correlated with marriage equality and affecting people in a same-sex relation exist and can't be identified with current data. For example, geographic sorting and gender identity⁵.

4.3.4 Selection into reporting

It may be the case that there exists selection into same-sex couple reporting over time that bias the results. For this to be true, the number of individuals in a same-sex relation identifiable in the ENOE must grow by more in states with same-sex marriage legalisation than in others and must do so conditional on the controls included in the model. If true, the data arising from the ENOE is not representative of the non-heterosexual population, as some might conceal information that allows them to be identified as non-heterosexual.

When researching the relationship between sexual orientation and earnings, each method of identification of the non-heterosexual population has its caveats. As mentioned in Section 2.1, according to Aksoy et al. (2016) the couples-based approach greatly overstates the magnitude of the gap, and it might be so because of selection into reporting.

To test the existence of selection into reporting that biases the sample, I will compare the distribution of age and years of education of individuals in a same-sex relationship, as observed in the individuals sample, with the LGB population identifiable in 2010's National

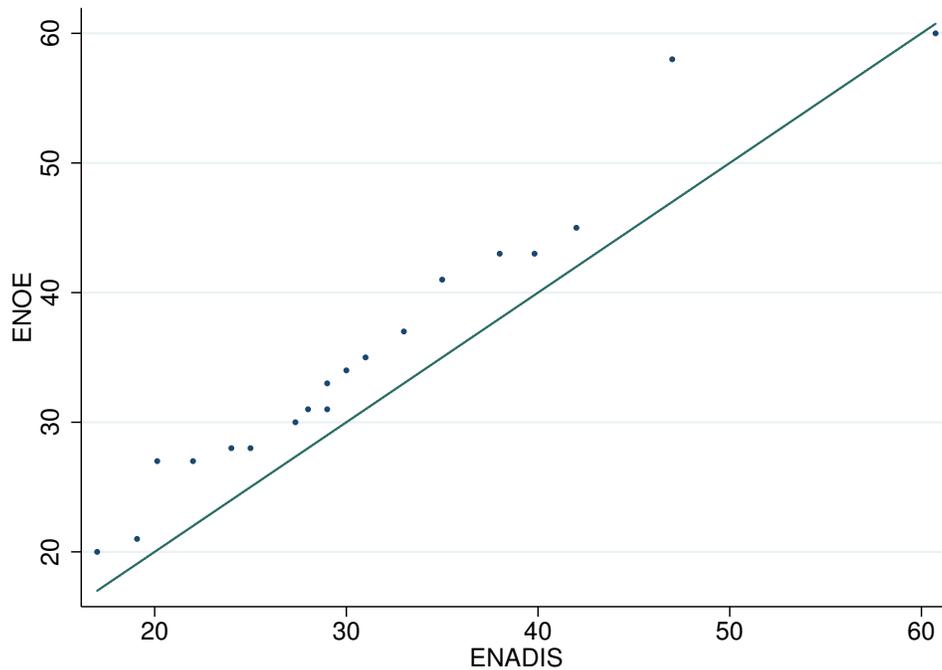
⁵How a person expresses their gender regardless of assigned sex at birth.

Discrimination Survey (Enadis), as this is the population intended to be “treated” by marriage equality. Since the Enadis information was collected during the second half of October and first half of November 2010 by Conapred, I will compare it with the results of the ENOE for the fourth quarter of 2010.

Figures 4.1 and 4.2 show quantile-quantile plots for the two variables. The general idea is the following: we take the distribution of both variables in the Enadis as the true one for the LGB population in Mexico, since the survey is designed to be representative of this population at the national level, and compare it to the distribution observed for individuals in a same-sex relationship as identified in the ENOE. If the data in the ENOE followed the same distribution as the “true” one arising from the Enadis, then the points in the plot will fall approximately in the straight line.

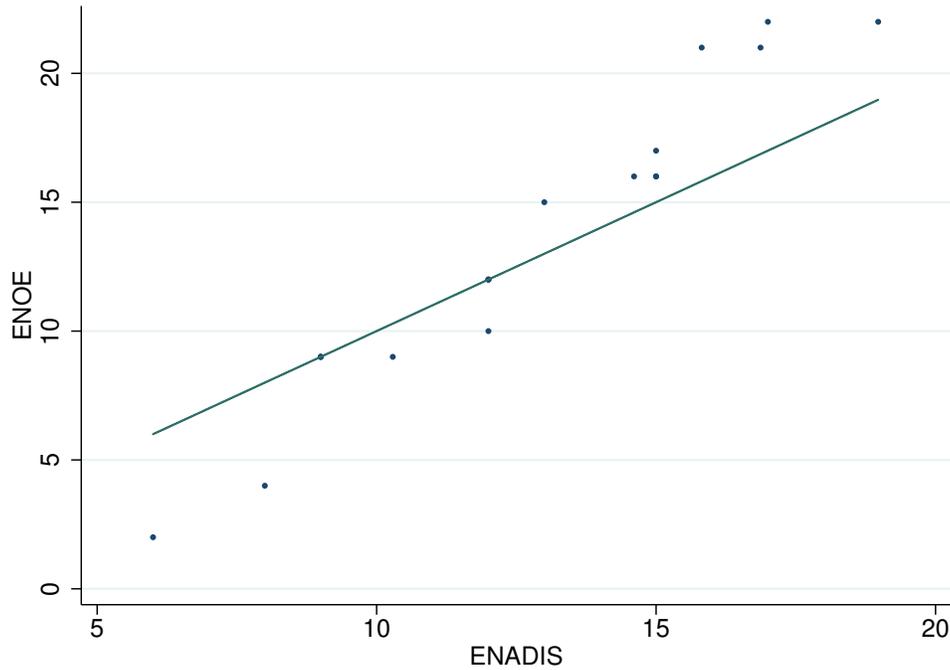
It can be seen that by age, the distribution of the ENOE is somewhat close to that of the Enadis. However, when comparing the years of education, it is clear that there is an interval where ENOE’s LGB population is under-represented and another where it is over-represented.

Figure 4.1: Quantile-quantile plot for age of the LGB sample



Source: ENOE 2010 IV, INEGI and Enadis 2010, Conapred

Figure 4.2: Quantile-quantile plot for years of education of the LGB sample



Source: ENOE 2010 IV, INEGI and Enadis 2010, Conapred

This leads me to believe that indeed there is selection into reporting that, along with the strategy to identify non-heterosexual individuals, causes a bias.

As researchers, we need better sources of information to better understand the effects of sexual orientation on economic outcomes. And this can only be done if national statistics offices offer additional ways to identify sexual minorities. The next section gives a glimpse into the recent debate surrounding ways to measure this population better.

4.4 How to Better Measure the LGB Community?

We just don't know how big the non-heterosexual population is.

As mentioned in Chapter 2, researchers can identify a lesbian, gay or bisexual (LGB) individual in one of three ways: same-sex coupling, same-sex sexual behaviour or declared sexual orientation. This, however, has limitations, which I have already mentioned.

Valfort (2017) offers an additional glimpse to the limitations of observational data, ones that should be considered when taking results of research into account to develop policies. First of all, omitted variable bias may arise from the fact that a factor, often unmeasurable, is correlated with the probability of belonging to a sexual minority and the economic outcome,

as discussed above. Second, a “non-disclosure bias” may result from the ability of the researcher to observe the sexual minority status, but not necessarily by others; and current surveys rarely offer the information to control for this. Third, the indirect measurement of sexual orientation may have problems of representation and statistical power because of the sample size. Fourth, the comparison between same-sex couples and opposite-sex couples likely generates a biased estimate due to the “household specialisation bias”. And finally, measurement errors where the sex of the respondent or their partner are inaccurately recorded are not uncommon.

Aside from statistical and measurement limitations, it is challenging to define the whole of the lesbian, gay, bisexual, transgender, intersexual (LGBTI) community when researching about it, as noted by Koehler and Menzies (2017). When talking about the LGBTI community the context matters. For example, usually, when talking about sexual orientation we can be talking about the persons’ emotional, romantic or sexual attraction to another person of the same and/or opposite gender. Also, when talking about sex, some might confuse it with gender; the former refers to a biological component and the latter to a social construct. And even when referring to gender, there’s the identity, how the person internally identifies, and the expression, how the person appears to others.

As if this weren’t complex enough, sexual orientation, gender identity, and gender expression are not binary; they exist in a series of spectrums that can be hard to identify using a survey questionnaire.

We also need to bear in mind that even if the questions are right, people might not be willing to disclose the information because of stigma and marginalisation. Researchers need to decide how to proceed and what information to seek to use the best possible approach. Taking into account the discussion found in the literature about measuring the LGBTI community, some recommendations can be made:

- It is urgent to start asking direct questions regarding sexual orientation and gender identity nationwide. Censuses are the most logical option to have a sample big enough to make a meaningful statistical inference, but other national surveys may be used. Specifically for Mexico, the question might be included in the Census, Intercensal Survey and ENOE.
- Data collection tools that offer full concealment of the answers need to be considered to incentivise the disclosure of pertinence to a minority.
- LGBTI organisations need to get involved in providing consultation and training so that statistic offices ask the right questions (in accordance to what information is desired) in the right way (culturally appropriate).

Chapter 5

Conclusions

In this research, I find evidence of a positive effect of state-level legalisation of same-sex marriage on earnings of partnered non-heterosexual individuals living in such states at such time, with respect to partnered heterosexuals. The estimated effect ranges from 23% to 25%, and it's statistically significant.

I find no significant change in worked hours and a positive impact of 24 to 36 percentage points on the probability to have access to social security. I also find a reduction of about 5 hours in the worked hours differential among same-sex couples living in a state where same-sex marriage has been legalised.

The most plausible mechanisms for the effect on earnings are an increase in productivity that occurs even if worked hours don't change and an omitted variable bias. However, the unusually high magnitude of the effect also leads me to seriously consider an overestimation of it due to the method with which non-heterosexual population was identified, in line with recent research in the matter, and selection into reporting a same-sex relationship.

Therefore the effects found, at best, must be considered a correlation between same-sex marriage legalisation and labour outcomes, rather than a causal effect.

This research adds to the growing literature on the subject of sexual orientation and economic outcomes as the first one using Mexican data.

Taking into account the experience on doing this research it is clear that national statistics offices need to make changes in their census and most important surveys to identify sexual minorities better so that future research faces fewer constraints when studying the subject. Future research for Mexico should attempt to estimate the effect of same-sex marriage legalisation using surveys where the individuals declare their sexual orientation. This may be accomplished using the Enadis 2010 by the Conapred and the Enadis 2017 by INEGI, once the results are made public.

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