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LOCATION CHOICE OF SAME-SEX COUPLES

Jooyoung Kim
Syracuse University

Abstract

This dissertation explores the location choices of same-sex couples and the economic impacts of their location choices. The research is structured into three chapters.

The first chapter examines the intracity location decisions of same-sex couples. It shows that social acceptance of same-sex couples affects their location decisions, particularly for those with college degrees, leading to higher educational sorting of same-sex couples across cities. I derive the mean utility of each city from a conditional logit model of location choice, separately for same-sex couples with and without college degrees and different-sex couples with and without college degrees. I then run a regression of the mean utility on acceptance for each group to examine the effect of acceptance on location choices. To address the endogeneity arising from the simultaneity between acceptance and the location choice of same-sex couples, I use a novel instrument based on the historical number of churches. The findings reveal that acceptance has a substantial impact on the location choices of college-educated same-sex couples. Counterfactual analysis suggests significant implications for productivity in an area and the welfare of same-sex couples.

The second chapter is motivated by the stylized fact that same-sex couples disproportionately live in central cities of metropolitan areas. I propose two mechanisms that attract same-sex couples into central cities: smaller income elasticity of housing demand and different preferences for downtown/suburban amenities, including consumption amenities, child-related amenities, and acceptance of same-sex couples. Analysis based on American Community Survey data provides evidence supporting these mechanisms.

The third chapter builds on the second by investigating the effect of the presence of same-sex couples in central cities on downtown economic outcomes. The presence of same-sex couples has often been reported as an indicator of imminent gentrification. Using a shift-share instrument, the analysis shows that downtown metropolitan areas with a higher initial share of same-sex couples experienced a larger increase in median income

and housing prices downtown between 2010 and 2017.

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by

Jooyoung Kim

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Contents

Chapter 1.

Acceptance of Same-sex Couples and Their Location Choices

1.1 Introduction

Same-sex couples are not evenly distributed across metropolitan areas in the United States. For instance, in San Francisco, 3.0% of cohabiting couples are same-sex couples, whereas in Detroit, the figure is 1.2%.[1] Among smaller metropolitan areas, Ithaca, New York, has a share of same-sex couples at 3.1%, in contrast to Yuma, Arizona, which has a lower share at 0.7%. While multiple factors may influence their decisions about where to live, one crucial factor that has received limited attention is the social acceptance of same-sex couples.

Understanding the influence of acceptance on the residential choices of same-sex couples is crucial for two reasons. First, the concentration of same-sex couples could increase the productivity of an area in several ways. Diversity itself is known to attract certain types of firms and enhance the productivity of existing workers and firms (Glaeser et al., 1992; Rosenthal and Strange, 2003; Tao et al., 2019). Moreover, individuals in same-sex relationships tend to have higher educational attainment than those in different-sex relationships and are more likely to participate in the labor market (Badgett et al., 2021), contributing to overall productivity through human capital externalities and agglomeration effects (Moretti, 2004; Rosenthal and Strange, 2008). They may also attract other highly educated individuals, given the strong correlation between educational attainment and preferences for liberal or progressive values (Leguizamon and Leguizamon, 2017; Downey

[1]The statistics are from the American Community Survey (ACS) 2015-2019 5-year pooled sample. Due to data limitations, I focus on same-sex couples who are living together. See Section 1.3 for details.

and Liu, 2023). Second, individuals who openly identify as lesbian, gay, or bisexual represent a significant minority group that has grown substantially in recent years.[2] Therefore, understanding their location preferences has become increasingly important. In this paper, I show that the acceptance of same-sex couples affects their location decisions, especially those with college degrees, resulting in higher educational sorting of same-sex couples across areas.

I first present a simple model to generate intuition. In the model, acceptance does not affect wages in equilibrium due to heterogeneity in the preferences of the broader population. According to the model, same-sex couples are more likely to move to areas with higher acceptance. This is because there is a surplus for same-sex couples from choosing a location with higher acceptance since acceptance is not translated into wages in equilibrium. Also, this would be more prominent among college-educated same-sex couples due to lower barriers to migration and a higher marginal rate of substitution of acceptance for wage.

I construct a measure of acceptance of same-sex couples in each city using data from the 2018 General Social Survey (GSS). The GSS has a question about attitudes toward same-sex relationships. It also includes information on some demographic characteristics and whether the respondent voted for the Democratic Party in the most recent presidential election. Because I do not observe reliable estimates of acceptance at the city level due to data limitations, I first estimate a logit regression of acceptance of same-sex couples, where the dependent variable is binary, taking the value of 1 if the respondent states that "Same-sex relationship is not wrong at all", and 0 otherwise. To select relevant predictors among individual characteristics, including partisanship, I use the LASSO technique (Tibshirani, 1996; Hastie et al., 2015). I then use the estimated coefficients from the logit regression with city-level average characteristics from the American Community Survey (ACS) 2015-2019

[2]According to the ACS 2015-2019 5-year pooled data, 1% and 5.3% of married and unmarried cohabiting couples, respectively, are same-sex couples.

5-year pooled data and the Democratic vote share in each city from the 2016 presidential election and estimate the average level of acceptance of same-sex couples in each city.

To investigate the impact of acceptance of same-sex couples on location choices, I first specify a conditional logit model of location choice (McFadden, 1972; Diamond, 2016; Berry et al., 1995; Berry et al., 2004; Nevo, 2001). I derive mean utilities of each city by estimating the model using the ACS data, separately for same-sex couples with and without college degrees and different-sex couples with and without college degrees. A city's mean utility is defined as a utility common to all individuals in each group in the city and not explained by hometown attachment. I then regress the mean utilities of each group on the acceptance of same-sex couples, controlling for city characteristics. The OLS results show a positive effect of acceptance on the mean utilities of college-educated same-sex couples, while there was no statistically significant effects for other groups.

However, the OLS estimates may be biased due to many different sources of endogeneity. Same-sex couples have a higher demand for consumption amenities, tend to attain higher levels of education, and are more likely to participate in the labor force (Black et al., 2002; Badgett et al., 2021). As a result, their preferences for city characteristics may align with those of college-educated individuals. Furthermore, college-educated individuals are known to prefer liberal or progressive values (Downey and Liu, 2023). This suggests that higher levels of acceptance may reflect shared preferences for other city characteristics between same-sex couples and college-educated individuals. In addition, acceptance may evolve endogenously over time. For example, acceptance may increase in areas with more same-sex couples, attracting more same-sex couples, thus creating a self-reinforcing cycle.

To address endogeneity concerns, I employ a novel instrumental variable, the number of evangelical churches present in each city in 1952, obtained from the Association of Religion Data Archives. Evangelical churches, known for their conservative views on same-sex relationships (Williams, 2015), could have influenced attitudes toward same-sex couples in each area (Steensland et al., 2000; Bazzi et al., 2023). The estimate from the

instrumental variable specification still indicates a positive effect of acceptance on the mean utilities of college-educated same-sex couples. Estimates for other groups remain statistically insignificant.

Using the IV estimates, I draw implications for the distribution of college-educated same-sex couples across cities and their welfare. I assume a counterfactual scenario where every city has the same level of acceptance at the mean. Cities with relatively high acceptance, such as San Francisco, turn out to lose almost half of their college-educated same-sex couples, while cities with lower acceptance, such as Memphis, have more than twice as many college-educated same-sex couples as they actually have. This suggests that having higher acceptance would allow cities with currently lower acceptance to attract college-educated people, potentially increasing productivity. In another counterfactual, where I increase acceptance by 1% in every city, I find that the change is equivalent to a 1.5% increase in the wages of college-educated individuals in same-sex relationships.

Potential threats to the validity of the instrument are examined. First, a historical correlation between the number of evangelical churches and the share of same-sex couples could threaten the validity of the instrument. I show a small and stable difference between members of evangelical churches and non-evangelicals in their acceptance from 1973 to 1990, suggesting that evangelical churches would not have had a significant effect on the location choices of same-sex couples before 1990, at least not through acceptance. I also show that even as late as 2000, there was no correlation between the historical number of evangelical churches and the share of same-sex couples. Second, evangelical churches may have influenced location choices through amenities other than acceptance. I include amenities correlated with evangelical churches as controls in the IV regression. The coefficient on acceptance does not change much, suggesting that the baseline controls capture potential unobserved amenities reasonably well.

To provide further evidence of educational sorting, I analyze annual migration decisions using information on individuals' metropolitan areas of residence one year ago. I construct

a measure of acceptance for each year using the GSS, the ACS 1-year file, and the most recent presidential election for each year. I run a regression of the difference in acceptance between destination and origin on individual characteristics. The results indicate that college-educated same-sex couples move to metropolitan areas that are 0.053 pp more accepting than their non-college-educated counterparts, while there is a smaller difference of 0.009 pp between different-sex couples with and without college degrees.[3] These results support the main analysis by showing a pattern of location decisions from observable annual migration decisions.

This chapter contributes to the literature on the location choice of same-sex couples by establishing a causal link between the acceptance of same-sex couples and their location choices. Despite the aforementioned importance, the topic is highly understudied. Black et al. (2002) suggest that differences in family formation patterns of same-sex couples are a driving mechanism for why same-sex couples would disproportionately live in certain cities. They show that when controlling for other locational amenities, the importance of acceptance diminishes or loses its significance in the concentration of same-sex couples. However, using the historical number of evangelical churches as an instrument for acceptance, this paper shows that acceptance remains a significant factor in the location choices of same-sex couples, especially for those with college degrees. To my knowledge, the analysis in this chapter is also the first to examine the educational sorting of same-sex couples across cities.

The results of this chapter also contribute to the broader literature on geographic sorting in the United States by political preference (Brown et al., 2022; Kaplan et al., 2022; Downey and Liu, 2023) and education (Diamond, 2016; Moretti, 2012; Diamond and Gaubert, 2022). The results add to the literature by highlighting the nuanced interaction of minority status, acceptance, and educational attainment.

[3]The coefficients are relatively small overall because the sample includes people who have not moved within the past 12 months, which is more than 95 % of the sample.

The rest of the chapter proceeds as follows. Section 1.2 presents a theoretical model of migration choice and motivates some empirical questions. Section 1.3 describes the data, including the measure of acceptance. Section 1.4 explains my empirical strategy. Section 1.5 presents empirical evidence on the effect of acceptance of same-sex couples on their location choices. Section 1.6 proves the instrument validity. Section 1.7 provides further evidence of selective migration from annual migration flows. Section 1.8 concludes.

1.2 Theoretical framework

In this section, I present a simple model that explains the sorting of same-sex couples across cities. Individual i living in origin o chooses destination d. Individuals are either in a different-sex relationship, D, or in a same-sex relationship, S. Each location j offers a level of acceptance of same-sex couples, a_j, other amenities, ψ_j, and a wage level, w_j.[4] The utility of individual i is $V^i(w_j, a_j, \psi_j)$. I denote the average utilities enjoyed by different-sex and same-sex couples in location j as V_j^D and V_j^S, respectively.

Suppose that same-sex couples have a strong preference for living in areas with greater acceptance, while among the broader population, there is a high degree of preference heterogeneity for acceptance of same-sex couples. Also, assume for simplicity that there is no preference heterogeneity for other amenities, ψ_j. The level of ψ_j affects the equilibrium wage in j, w_j^*. That is, the wage level adjusts to compensate for the level of ψ_j, thereby equalizing the level of utility an individual can obtain in different locations. Suppose, however, that due to the high degree of heterogeneity in preferences for acceptance of same-sex couples, such acceptance is not reflected in equilibrium wages. In other words, some people like the acceptance of same-sex couples, but a similar proportion of people do not like it, so the equilibrium wage does not depend on the level of acceptance. Therefore, the equilibrium wage depends only on the level of ψ_j.

[4]For simplicity, I assume away the rent level of each city. The same implication can be derived with rent in the model.

Now, consider two destinations, d and d', with $a_{d'} > a_d$ and $\psi_{d'} = \psi_d$.[5] Suppose there are no migration costs. Since the levels of ψ are the same in d and d', equilibrium wages are also the same. Given the same wage levels in d and d', the average utility levels for different-sex couples in d and d' are the same. This is because they have high preference heterogeneity for a. Same-sex couples, however, get a greater average utility in d' than in d. This is because they receive the same equilibrium wage in both locations, while they strongly prefer the higher level of a in d'. Furthermore, there is a wage level, w', that could make same-sex couples' utility levels in d' the same as in d with w^*. Abusing notation, it can be written as $V^S_{d'}(w') = V^S_d(w^*)$. There is also a surplus when same-sex couples choose d'. That is, $V^S_{d'}(w^*) > V^S_d(w^*)$. Therefore, same-sex couples will choose d' over d. Note that the surplus increases with w^* since the marginal rate of substitution of a for w increases with w. The graphical representation is in Figure 1.1.

Now suppose there are migration costs. Without migration costs, d' is strictly preferred by same-sex couples. With migration costs, however, d might be a better choice for *some* same-sex couples, depending on the origin and size of migration costs. That is, holding origin fixed, the degree to which same-sex couples prefer d' to d would be higher for same-sex couples with smaller migration costs. Imposing spatial equilibrium, the two locations d and d' with the same level of ψ are generalizable to two destinations with different levels of ψ_j.

The model has three main implications. First, same-sex couples would be more likely to choose locations with higher acceptance. This may seem obvious, but it is based on the high degree of preference heterogeneity for acceptance of same-sex couples in the broader population. Because of the high degree of preference heterogeneity, acceptance in each area does not translate into an equilibrium wage. Therefore, same-sex couples may enjoy a higher level of acceptance in d' without actually "paying" for it. This could be the reason why their concentration in locations with higher acceptance is exceptionally high

[5] One can think of these as the top two destination candidates.

compared to concentrations with other amenities that translate into an equilibrium wage.

The second implication is that there will be a difference in the tendency to choose locations with higher acceptance between same-sex couples with and without college degrees. There are two reasons for this. First, the equilibrium wage in an area increases with education. As noted earlier, this increases the surplus from choosing a more accepting location because the marginal rate of substitution of acceptance for wages increases with wages. Second, higher education lowers the barriers to migration (Diamond, 2016). Education increases earnings potential, making the financial aspects of relocating more manageable. Higher education also equips individuals with a broader range of skills and qualifications, providing more opportunities in different locations.

Lastly, the model suggests that because of the surplus from choosing a destination with a higher acceptance, same-sex couples might choose d' even when there is a wage offer lower than w^*. This is because even if they are offered a wage lower than w^*, they would still be better off by accepting it and choosing d' as long as the wage is higher than w'.

While this model provides some intuition about how acceptance might affect the location choices of same-sex couples, it makes some rather strong assumptions and does not explicitly model some of the key aspects of location choice, including education and migration costs. I extend the model in Section 1.4 imposing some parametric assumptions on the indirect utility of individuals.

In Section 1.5 and Section 1.7, I will examine whether these model implications hold empirically. In the next section, I provide information on the data I use.

1.3 Data

1.3.1 Census and American Community Survey (ACS)

The main analysis of this paper uses data from the American Community Survey (ACS) 2015-2019 5-year pooled sample. It includes demographic characteristics, economic

characteristics, and family characteristics. According to the Census Bureau, sample weights of the ACS 2015-2019 5-year pooled data are constructed to represent the total population over the entire 5-year period, and the 5-year pooled data is considered a 2017 cross-section in practice. I also use the 2000 Census to measure the lagged share of same-sex couples. The ACS 2005-2019 stacked 1-year samples are used for analyzing annual migration flows.

Same-sex couples in the sample

Because the ACS does not ask directly about an individual's sexual orientation, same-sex couples are identified in the ACS by their relationship to the household head and their sex (Goodnature and Neto, 2021). If a respondent reports that their relationship to the household head is "Husband or wife" or "Unmarried partner" and they are of the same sex, then they are identified as being in a same-sex partnership.[6]. Therefore, individuals are identified as being in a same-sex partnership if they live with their same-sex partner. Admittedly, they are not a random sample of same-sex couples since the identification is based on coresidence information. However, many of their key dimensions, such as income and education, are similar to those of individuals who report same-sex sexual orientation in the General Social Survey data whose identification is not based on coresidence (Black et al., 2007).

1.3.2 Measure of acceptance of same-sex couples

I construct a measure of acceptance of same-sex couples in each city using the General Social Survey (GSS) conducted by the National Opinion Research Center, average demographic characteristics in each city, and Democratic vote share from presidential elections in each city. The GSS has a question about attitudes toward same-sex relationships: "What about sexual relations between two adults of the same sex—do you think it is always

[6]There is a separate option for "Housemate/roommate'. For more information on how same-sex couples are recorded in the Census and the ACS, see Section A.1

wrong, almost always wrong, wrong only sometimes, or not wrong at all?" It also includes demographic characteristics, information on which party each respondent voted for in the most recent presidential election, and information on residence at the Census division level.

Due to data limitations that I explain further later in this section, I do not observe reliable estimates of acceptance at the city level. Therefore, I employ the following approach to estimate acceptance at the city level. Using the responses to the question related to same-sex relationships and respondent characteristics, I estimate a logit regression equation of acceptance of same-sex couples, where the dependent variable is binary, taking the value of 1 if the respondent states that "Same-sex relationship is not wrong at all", and 0 otherwise. I use the estimated coefficients from the logit regression with city-level average demographic characteristics from the ACS and Democratic vote share in each city from the most recent presidential elections to estimate the average acceptance of same-sex couples in each city, a_j.

I include partisanship in the logit regression because it is a significant predictor of acceptance of same-sex couples. Individuals who vote for the Democratic party are known to have, on average, more positive attitudes toward same-sex couples than those who vote for the Republican party (Wilcox, 2018; Bazzi et al., 2023). Individuals who prefer a higher level of acceptance of same-sex couples may be more likely to vote for the Democratic party, and individual opinions may also be influenced by their political party affiliation (Bartels, 2002; Levendusky, 2009; Goren and Chapp, 2017).

Since the purpose of the logit regression is to find the best fit of acceptance given individual characteristics, I use a post-LASSO logit estimation method to select predictors among some individual characteristics (Tibshirani, 1996; Hastie et al., 2015).[7] I include sex, age, age squared, race categories, education categories, and Census division of residence, whether respondents voted for the Democratic party in the recent presidential election, and

[7]The tuning parameter has been chosen by ten-fold cross-validation.

all interaction terms between Census division, Democratic dummy, and other individual characteristics. I then use the variables chosen by LASSO to estimate their relationship with acceptance using logit regression and predict the average level of acceptance in each city, a_j.[8] Table 1.1 shows the top and bottom 15 a_j locations in 2017.[9] Overall, the top locations are concentrated on the West and East Coasts, while the bottom locations are in the Southern states. This pattern aligns with common perceptions of regional cultural differences in the United States.

In their paper, Black et al. (2002) uses the restricted version of the GSS with residence information at the city level. The advantage of using the restricted GSS is that it shows the attitudes towards same-sex couples directly. However, the GSS is a relatively small survey, and for any given year, the sample size in each city can be very small. For this reason, Black et al. (2002) combines the years in a 10-year window from 1983 to 1993. Also, the GSS sampling is stratified within cities, so a measure taken directly from the restricted GSS will represent respondents from only a few randomly selected blocks in each city. In addition, because the GSS is also stratified across cities, there are many cities that do not appear each year. Depending on the year, the number of cities that appear each year is, at most, about 80. For these reasons, using the restricted GSS directly, especially to obtain a measure for each city for each year, could result in a measure that is not very reliable. Also, although the approach of Black et al. (2002) combining years in a 10-year window could be applicable in the late 20th century, it could be problematic in the recent decades, when attitudes toward same-sex relationships have shifted dramatically in a polarizing way, both demographically and geographically. Therefore, to the extent that partisanship and demographic characteristics are good predictors *within* Census divisions, using the public version of the GSS along with city characteristics in the way that I propose in this

[8]For 2018 GSS, LASSO chose 74 variables out of a total of 169. The deviance ratio from the logit is 0.0791, indicating that the model fits the data relatively well.

[9]For acceptance (a_j) in 2017, I use the 2018 GSS that has information on who respondents voted for in the 2016 presidential election to get the post-LASSO logit estimates. Then, I use the coefficients on average demographic characteristics from the ACS 2015-2019 5-year file.

paper would be an appropriate way to measure acceptance of same-sex couples at the city level for the purpose of this paper.

1.4 Empirical strategy

1.4.1 Deriving an estimating equation

To show the effect of attitudes toward same-sex couples on location choices, I specify a discrete choice model that imposes some parametric assumptions on the indirect utility of individuals in Section 1.2 following Diamond (2016). The setup is the conditional logit model, first formulated by McFadden (1972) and widely used in the industrial organization literature (Berry et al., 1995; Berry et al., 2004; Nevo, 2001). Motivated by the theoretical framework in Section 1.2, I divide individuals into four groups: individuals in a different-sex relationship with and without college degrees, and individuals in a same-sex relationship with and without a college degree. The model allows me to obtain the mean utility of each city for each group.

Each individual i in group g chooses a city j in which to reside to maximize the following indirect utility:

$$V_{ij} = \beta_w^g \ln w_j^g - \beta_r^g \ln r_j + \beta_a^g a_j + \psi_j^g + \gamma_{\text{st}}^g d_{j,\text{st}(i)} + \gamma_{\text{div}}^g d_{j,\text{div}(i)} + \varepsilon_{ij}\,, \tag{1}$$

where w_j^g is the average wage of group g workers in city j and r_j is the average rent level in city j which does not vary across groups. There are N cities, and each city provides acceptance of same-sex couples, a_j, and other amenities excluding acceptance, ψ_j^g. $d_{j,\text{st}(i)}$ and $d_{j,\text{div}(i)}$ are dummies indicating that city j is in the state and census division of i's birth, respectively. Thus, γ_{st}^g and γ_{div}^g capture the value of living in i's state of and census division of birth. Each worker also has an individual, idiosyncratic taste for city amenities, ε_{ij}, which is drawn from a Type I Extreme Value distribution.

I define δ_j^g as the mean utility from city j that is common to all group g individuals in the city and is not explained by hometown attachment:

$$\delta_j^g = \beta_w^g \ln w_j^g - \beta_r^g \ln r_j + \beta_a^g a_j + \psi_j^g. \tag{2}$$

Rewriting the utility (1) with δ_j^g,

$$V_{ij} = \delta_j^g + \gamma_{\text{st}}^g d_{j,\text{st}(i)} + \gamma_{\text{div}}^g d_{j,\text{div}(i)} + \varepsilon_{ij}.$$

By properties of the Type I Extreme Value distribution, the probability that worker i chooses to live in city j is

$$\Pr(V_{ij} > V_{ij'}) = \frac{\exp\left(\delta_j^g + \gamma_{\text{st}}^g d_{j,\text{st}(i)} + \gamma_{\text{div}}^g d_{j,\text{div}(i)}\right)}{\sum_{k=1}^{N} \exp\left(\delta_k^g + \gamma_{\text{st}}^g d_{k,\text{st}(i)} + + \gamma_{\text{div}}^g d_{k,\text{div}(i)}\right)}$$

for any city j'. Aggregated over individuals, the total population of each group in city j is

$$D_j^g = \sum_{i \in g} \frac{\exp\left(\delta_j^g + \gamma_{\text{st}}^g d_{j,\text{st}(i)} + \gamma_{\text{div}}^g d_{j,\text{div}(i)}\right)}{\sum_{k=1}^{N} \exp\left(\delta_k^g + \gamma_{\text{st}}^g d_{k,\text{st}(i)} + \gamma_{\text{div}}^g d_{k,\text{div}(i)}\right)}.$$

The population differences for workers of group g reflect differences in the mean utility values of these workers for these cities and also idiosyncratic deviations from the mean utilities reflected in migration costs. As discussed in Section 1.2, while population reflects the desirability of a city, migration costs may be a barrier to moving to more desirable cities. Diamond (2016) notes that the model accounts for migration costs by allowing workers to prefer to live in or near their state of birth. These costs represent the psychological and financial costs of migration, as well as the value of living near family and friends.

I estimate preferences for acceptance of same-sex couples using a two-step procedure (Berry et al., 2004; Diamond, 2016). First, I estimate the mean utility of each city for each

group, δ_j^g, using a maximum likelihood estimator. The natural next step would be to estimate the determinants of δ_j^g in Equation (2). However, wages and rents could be endogenous and threaten identification. In a similar model, Diamond (2016) treats wages and rents as endogenous and estimates the coefficients using a system of equations and multiple instruments. In the context of this paper, where the main focus is on a particular amenity, the attitude toward same-sex couples, this approach is not feasible. Instead, using the estimated δ_j^g, I define

$$\tilde{\delta}_j^g \equiv \delta_j^g - (\beta_w^g \ln w_j^g - \beta_r^g \ln r_j) \tag{3}$$

by borrowing estimates from Diamond (2016) where (β_w^g, β_r^g) is (2.116, 1.312) for groups with college degrees and (4.026, 2.496) for groups without college degrees. I then estimate the following regression equation of adjusted mean utility:

$$\tilde{\delta}_j^g = \beta_a^g a_j + Z_j' \eta + \epsilon_j \,, \tag{4}$$

where Z_j is a vector of city characteristics to control for general amenities, ψ, including total population, percentage of college graduates, percentage working full-time, average age, percentage of people with children, racial composition, and percentage of people born in the U.S. Controlling for the total population and percentage of college graduates potentially controls for general amenities because city size is correlated with the higher levels of local amenities (Carlino and Saiz, 2019; Albouy and Stuart, 2020), and college-educated people have a higher demand for local amenities (Diamond, 2016; Albouy, 2016; Albouy et al., 2021). Percentage working full-time accounts for the business environment. Controlling for the average age and percentage of people with children accounts for different demands for consumption amenities. These are important controls because same-sex couples may have a higher demand for nonchild amenities due to their lower propensity to have

children (Black et al., 2002), and the average childbearing age of different-sex couples with college degrees has also increased in recent decades (Couture and Handbury, 2020; Moreno-Maldonado and Santamaria, 2021). The racial composition and the percentage of people born in the U.S. control in part for general levels of tolerance toward different minority groups.

1.4.2 Potential endogeneity

Despite various controls, there are potential concerns about the endogeneity of the OLS estimate of β_a^g in Equation (4). First, there may be unobserved city characteristics that are correlated with acceptance. Individuals in same-sex relationships are known to have greater preferences for consumption amenities and higher levels of education, and to be more likely to supply labor (Black et al. 2002; Badgett et al. 2021). Thus, they may have been disproportionately attracted to growing, high-income, productive cities. Cities with these characteristics also attract people with higher levels of education, and people with higher levels of education are known to be more tolerant of same-sex couples. Figure 1.2 shows the percentage of people who think same-sex relationships are not wrong by education over time. There has always been a significant gap in the acceptance of same-sex couples between college and non-college populations, although the gap has narrowed somewhat over the past decade.

On the other hand, greater acceptance of same-sex couples may be associated with a lower availability of amenities typically favored by couples. This relationship arises because family formation adheres to more traditional norms, while accepting same-sex couples embodies a more progressive and non-traditional perspective. In essence, cities perceived as "family-oriented" may attract couples regardless of their orientation, resulting in a potential link between a high concentration of couples and lower levels of acceptance of same-sex couples. This could be the case here because my analysis is limited to the

location choices of individuals living with their partners.

Another potential concern is that the acceptance may evolve endogenously. Cities with historically higher numbers of same-sex couples may have evolved into places with higher acceptance of same-sex couples, leading to more same-sex couples moving in. Also, people who are willing to live in areas with large numbers of same-sex couples would be more likely to be more accepting of same-sex couples themselves. This would make cities with higher numbers of same-sex couples more accepting of same-sex couples over time than cities with lower numbers of same-sex couples. On the other hand, it could also be the other way around (Brunner and Kuhn, 2018; Colussi et al., 2021). Cities with higher numbers of same-sex couples may have encouraged more backlash and, consequently, less acceptance.

Because of the competing channels discussed, the OLS estimate of β_a^g would capture the net effect, and the expected sign of the bias is theoretically ambiguous. I address these endogeneity concerns by employing a novel instrumental variable.

1.4.3 Historical evangelical church share

I use the historical number of evangelical churches in each city to instrument the acceptance of same-sex couples in recent years. Specifically, I use the number of evangelical churches per capita in 1952 from The Association of Religions Data Archives. I use the number of churches rather than the number of members because brick-and-mortar churches can be long-lived compared to church members. Churche buildings outlive the people who live in an area, while people die or move away. Even if there were a small number of members in a church in 1952, since the building could not move, it could have a long-term effect. I define evangelical denominations according to the categorization

provided by Steensland et al. (2000).[10]

To be a valid instrument, the instrument should first satisfy the relevance condition. The relevance condition in the context of this paper requires that the historical presence of evangelical churches affects the acceptance of same-sex couples today in an area. In recent decades, evangelical churches have been known to have some of the most conservative views on same-sex relationships. The 2018 GSS survey shows that only 32% of people who are members of evangelical churches state that same-sex relationships are not wrong at all, compared to 61% of people who are not members of evangelical churches. In the same survey, 65% of members of Catholic churches state that same-sex relationships are not wrong at all. A literature on American religion suggests the critical role of evangelical churches in transmitting conservative ideology. Churches have effectively propagated religious values and broader moral and political ideas (Wald et al., 1988). Evangelical churches have typically sought greater separation from the broader culture, emphasized missionary activity and individual conversion, and taught strict adherence to particular religious doctrines (Steensland et al., 2000). Therefore, the greater presence of historical evangelical churches may have decreased the acceptance of same-sex couples in a city over time.

Other than the relevance condition, a valid instrument for acceptance of same-sex couples should not affect the location decisions of same-sex couples other than through acceptance. This could be violated if a higher number of churches were correlated with a lower share of same-sex couples in 1952. This is because areas with more same-sex couples could have evolved into areas with a higher acceptance of same-sex couples because of the higher number of same-sex couples and not because of the lower number of churches. Another concern exists if evangelical churches affect unobserved amenities that might

[10]There is no strict definition of evangelical churches. However, according to Encyclopædia Britannica, evangelical churches are "Christian churches that stress the preaching of the gospel of Jesus, personal conversion experiences, Scripture as the sole basis for faith, and active evangelism (the winning of personal commitments to Christ)." See Table A.1 for the list of evangelical denominations used in the analysis.

impact the location decisions of same-sex couples. I explore these potential threats to the instrument validity in the analysis that follows.

1.5 Results

In this section, I first discuss the estimates from the conditional logit model, including hometown attachment and mean utilities, δ_j^g. Then I present the results of the two-stage least squares (2SLS) regression of adjusted mean utilities, $\tilde{\delta}_j^g$, on attitudes toward same-sex couples, a_j.

1.5.1 Conditional logit results

Hometown attachments

Table 1.2 shows the estimated coefficients of hometown attachment, which represents the value of living in or near one's birthplace. For both same-sex and different-sex couples, the coefficient on individuals' state of birth, γ_{st}, is smaller for college-educated individuals. The coefficient on individuals' census division of birth, γ_{div}, shows a similar pattern, although the estimates are quite similar for same-sex couples with and without college degrees and quite noisy for different-sex couples. Overall, college graduates tend to have lower levels of hometown attachment. Also, same-sex couples are shown to have lower hometown attachment than different-sex couples.

Mean utilities

Figure 1.3 plots the estimated mean utilities of each city for each group, separately for same-sex and different-sex couples. The mean utilities are relative to Akron, Ohio, where the mean utility is 0 for all four groups. I divided the mean utilities by the standard deviation within each group. The dots on the top right of each plot are cities that are

relatively preferred or have a larger population of each group, and the dots on the bottom left are cities that are less preferred or have a smaller population of each group.

Although there does not appear to be a large difference between different-sex and same-sex couples in the distribution of mean utilities across cities, one thing is worth noting. The dots are more scattered in the bottom two-thirds for same-sex couples while denser for different-sex couples. On the other hand, in the top third, the two plots show a similar or even denser density for same-sex couples. This shows that cities with a large population of same-sex couples with and without college degrees tend to be equally preferred by both college graduates and non-college graduates. By contrast, for cities with a relatively small population of same-sex couples, same-sex couples with and without college degrees have different opinions about the attractiveness of the cities. In the context of this paper, this may be because cities with large populations often have both a tolerant environment and a high level of local amenities simultaneously. This is not often the case in small cities, which makes the preferences of same-sex couples with and without college degrees appear more distinct from each other.

1.5.2 Effect of attitudes toward same-sex couples on mean utilities

First stage

Table 1.3 reports the coefficient estimate from the regression of log acceptance on the historical number of evangelical churches per 10,000 population and other city characteristics.[11] The number of evangelical churches in 1952 is negatively associated with acceptance in 2017. One more evangelical church per 10,000 population in 1952 is associated with 1.5% less acceptance of same-sex couples in 2017. The first stage F-statistic associated with the hypothesis that the instrument is unrelated to the endogenous regressor is 38.32. The Kleibergen-Paap LM test strongly rejects the null hypothesis that the equation is

[11] See Table A.2 in the Appendix for results for control variables.

under-identified.

2SLS results

Table 1.4 shows the results of the OLS and 2SLS regressions. In panel A, I report the results for same-sex couples. In column (1), the OLS specification finds that doubling a_j increases the mean utility of college-educated same-sex couples by 2.227. The IV specification in column (2) shows a slightly larger coefficient on acceptance of 3.099. Although the point estimate of the IV specification is slightly larger, there is no significant difference between the OLS and IV estimates. This could be due to an offset of the competing biases discussed in Section 1.4.2. Using the estimate of coefficient on log wage of 2.116 for college graduates from Diamond (2016) that is used to obtain adjusted mean utility, the IV estimate indicates that same-sex couples are willing to give up 1.46% of their wages for 1% higher acceptance.

Columns (3) and (4) in Panel A show the results for same-sex couples without a college degree. Although the signs are different, both the OLS and IV estimates are not statistically significant. Panel B shows the results for different-sex couples. Although the signs are positive for different-sex couples with college degrees and negative for those without, all the OLS and IV estimates, both for college and non-college, are noisy and not statistically significant.

Overall, my results show that acceptance has a positive effect in attracting college-educated same-sex couples and no significant effect for same-sex couples without college degrees and different-sex couples with and without college degrees. As noted in Section 1.2, this could be because college-educated same-sex couples are more sensitive to acceptance. This is consistent with Diamond (2016), who finds that college workers are more sensitive to the general amenity level than non-college workers. The results imply higher educational sorting among same-sex couples across cities due to varying acceptance levels in different

cities.

1.5.3 Counterfacual distribution of college-educated same-sex couples

One way to understand the effect is to think about a counterfactual situation where the acceptance is equal across cities and how this would change the distribution of individuals according to the estimate. To show the effect of acceptance on sorting, I calculate the share of college-educated same-sex couples among all cohabiting couples in a counterfactual scenario where acceptance is at the empirical mean level in all cities. Figure 1.4 compares the counterfactuals to the actual shares. The red line is a 45-degree line. Cities above the red line have higher same-sex college shares in the counterfactual, and those below have lower shares in the counterfactual. Cities with relatively high acceptance, such as San Francisco or Portland, lose some college share in the counterfactual. On the other hand, cities with relatively low acceptance, such as Memphis or Houston, have higher college shares in the counterfactual.

Many Southern states spend millions on advertising to attract high-skilled workers (Moretti and Wilson, 2017), while they may be losing college-educated people due to their less accepting culture. A Democratic city councilman noted after Indiana Governor signed a controversial anti-LGBTQ bill, "Indiana is losing jobs and young professionals like crazy. How much more can our state government make Indiana uninviting" (Eason, 2015). The counterfactual analysis suggests that having higher acceptance will allow cities with currently lower acceptance to attract college-educated people, potentially increasing productivity.

1.5.4 Welfare implication

One question related to acceptance would be how it affects the welfare of individuals who care about acceptance. I provide an implication for the welfare of an individual in

terms of wages, S_i, from the increase in acceptance.

Under the logit assumptions, the expected welfare associated with the cities in the choice set takes a closed form and can be calculated as follows (Williams, 1977; Small and Rosen, 1981):

$$E(S_i) = \frac{1}{\beta_w^g} \ln \left(\sum_j e^{\delta_j} \right) + C,$$

where C is an unknown constant representing the absolute level of utility. Then, the change in welfare from 1% increase in a_j in every city is

$$\Delta E(S_i) = \frac{1}{\beta_w^g} \left[\ln \left(\sum_j e^{(\delta_j + 0.01\beta_a^g)} \right) - \ln \left(\sum_j e^{\delta_j} \right) \right].$$

Using β_w^g = 2.116 for college-educated individuals as in Equation (3), the estimated change in welfare from a 1% increase in a_j is about a 1.5% increase in wage.

1.6 Probing instrument validity

1.6.1 Historical share of same-sex couples and number of churches

As mentioned in Section 1.4.3, a historical correlation between the number of churches and the share of same-sex couples could threaten the instrument's validity. If cities with a lower number of churches in 1952 had a higher share of same-sex couples, to begin with, then the subsequent change in acceptance would not necessarily be due to the evangelical churches in the city, but could be explained by the influence of a higher proportion of same-sex couples. Because there is no reliable data on the share of same-sex couples in 1952, it is not possible to check whether there was a significant relationship between these two in the historical period. Table A.3 in the appendix shows no correlation between evangelical churches and same-sex cohabiting partners/friends. However, because "partner" in

the 1940 Census refers to any non-relative who shares the home and expenses with the household head, including responses such as co-head and business partner, it is difficult to conclude that there was no correlation between evangelical churches and the share of same-sex couples from the results alone.

However, one question that could provide an indirect implication for the relationship is when evangelical churches began to become politicized and vocal in their opposition to same-sex relationships. Evangelical churches began to be politicized on the right in the second half of the 20th century (Bazzi et al., 2023). For example, members of evangelical churches received almost no church teaching on abortion issues in the 1950s and 1960s (Rosen, 1967). Similarly, the antigay movement in evangelical churches began in the late 1970s (Williams, 2015). The issues at the center of the politicization of evangelical churches have varied over time, and the issue of same-sex couples was not one of them until the last few decades. Figure 1.5 shows the change over time in the percentage who think same-sex relationships are not wrong among members of evangelical churches and among non-evangelicals. The oldest GSS survey, in 1973, shows very low levels of acceptance of same-sex couples among both evangelicals and non-evangelicals. Although there was a difference between evangelicals and non-evangelicals, this difference may have had a negligible effect on the location choices of same-sex couples since the general attitude toward same-sex couples across the country was very negative regardless of religion.

The earliest year for which I can observe a reliable estimate of the share of same-sex couples for each city is 2000. Table 1.5 shows the results of the regression of the share of same-sex couples on the historical number of evangelical churches per capita and other city characteristics. Interestingly, even as late as 2000, there was no discernible correlation between the historical number of evangelical churches and the share of same-sex couples. In contrast, there is a clear negative relationship between the number of churches and the share of same-sex couples in 2017. This lack of correlation in 2000 could be due to the relatively recent change in societal attitudes toward same-sex couples. As shown in

Figure 1.5, although there has been a difference between evangelicals and non-evangelicals, the dominant public opinion on same-sex relationships has been against them until recently. Notably, evangelical churches have become more vocal in their opposition to same-sex relationships in response to this evolving public opinion in recent decades. It may be that until about 2000, same-sex couples did not feel particularly unaccepted by members of evangelical churches since they were not accepted by majorities.

1.6.2 Other influence of evangelical churches

Apart from the historical correlation between evangelical churches and the share of same-sex couples, there is a valid concern that evangelical churches may have influenced various local amenities, thereby impacting location choices through these amenities instead of solely through their effects on acceptance. This could potentially threaten the validity of the instrument if the controls do not fully capture some of these amenities in the IV specification.

To see the correlation between churches and other amenities, I run a set of regressions of amenities on evangelical churches in 1952, controlling for city characteristics as in the IV specification. Figure 1.6 shows the coefficients on the churches in each amenity regression, where amenities have been normalized to have a standard deviation of one.[12] Historical churches are positively correlated with employment rates and negatively correlated with restaurants and bars per capita.

I add these correlated amenities as controls to the 2SLS regression of mean utilities of college-educated same-sex couples and see how the coefficient on churches changes. Column (1) in Table 1.6 reproduces column (2) of Panel A in Table 1.4. Column (2) shows that the estimated coefficient of acceptance remains relatively stable after adding the amenities. In column (3), I also control for the percentage of same-sex couples in each city in 2000 to control for other potential amenities that same-sex couples may prefer. Again,

[12] See Table A.4 in the Appendix for the full regression results corresponding to the figure.

the coefficient remains stable. The results suggest that while there can be unobserved amenities correlated with churches that could affect the location choices of same-sex couples, the controls in the main specification capture various amenities quite well. This could be because I control for amenities using average demographic characteristics of each city, and average values of demographic characteristics differ across cities mainly because individuals with different characteristics value city amenities differently (Altonji and Mansfield, 2018).

In addition, the two aforementioned facts may alleviate some of the lingering concerns about unobserved amenities. First, evangelical churches began to diverge from the dominant public opinion in the 1990s. Second, there was no correlation between the number of evangelical churches and the concentration of same-sex couples even until 2000. These two facts provide supporting evidence that evangelical churches had a limited impact on the location choices of same-sex couples through other amenities.

1.7 Evidence from migration flows

In this section, I provide further evidence of selective migration regarding the acceptance of same-sex couples by looking directly at one-year migration decisions. I use the stacked cross-section ACS 1% samples from 2005 to 2019. Although the sample is cross-sectional, respondents are asked where they lived one year ago. Individuals living in a different MSA of residence than one year ago are considered to have migrated. Using the sample of partnered individuals aged 25 to 55, I run the following regression of acceptance of same-sex couples:

$$\begin{aligned} a_{idt} - a_{iot} = \beta_1 College_{it} + \beta_2 Samesex_{it} + \beta_3 College_{it} \times Samesex_{it} \\ + X_{it}\gamma + Z_{dt}\delta + \mu_{ot} + \varepsilon_{idot} \end{aligned}$$

where the dependent variable is a difference in acceptance between the destination d and origin o of individual i in year t. Individuals who have not moved within the last 12 months have a difference of 0. The variables *College* and *Samesex* are dummies for college degree and same-sex relationship, respectively. The interaction term between college and same-sex relationship dummies, which is the variable of interest, is also included in the regression. X_{it} is a vector of individual-level controls including income, sex, age, age squared, race, presence of child, and years in the U.S. Z_{dt} is a vector of MSA characteristics including total population, percentage college-educated, and average income. Origin-year fixed effects, μ_{ot}, are included to capture the time trend specific to individuals from each origin. Standard errors are clustered at the origin-year level.

The first column in Table 1.7 shows the regression results without including destination characteristics. The coefficients are small overall since the sample includes people who did not move within the past 12 months, which is more than 95% of the sample.[13] The coefficient on the college degree dummy indicates that individuals in a different-sex relationship with a college degree move to MSAs that are 0.044 pp more accepting than their counterparts without a college degree. Same-sex couples without a college degree go to MSAs with acceptance 0.038 pp higher than different-sex couples without a college degree. Same-sex couples with a college degree move to MSAs with acceptance of 0.099 pp (0.044 pp + 0.045 pp) higher than their counterparts without a college degree. However, these coefficients may capture many different MSA characteristics other than preferences for acceptance of same-sex couples. MSAs with more individuals who prefer liberal or progressive values are more likely to have higher local amenities and better labor market situations because college-educated individuals are known to have stronger preferences for liberal and progressive values (Downey and Liu, 2023), and they also have stronger

[13]See Table A.5 for the results for the sample of people who have moved from one MSA to another within the last 12 months. Looking at the whole sample gives an idea of the overall migration decision, including the decision not to move, while looking at the sample of movers shows where they end up moving when they do decide to move.

preferences for consumption amenities and value greater labor market opportunities (Chen and Rosenthal, 2008).

The second column mitigates this concern by including destination characteristics of the total population, the percentage of college graduates, and the average income level that can explain consumption amenities and labor market opportunities. The coefficient on the college degree dummy decreases significantly, suggesting that the included destination characteristics do a good job of controlling for consumption amenities and labor market opportunities. The coefficient on the same-sex dummy decreases in magnitude as well. This is consistent with results from Black et al. (2002), who argue that the concentrations of same-sex couples in high amenity cities are due to their higher demand for consumption amenities resulting from the difference in family formation of same-sex couples. They find that the importance of "gay friendliness" decreases or loses significance when controlling for other local amenities. However, the coefficient on the interaction term does not change much even when the destination controls are added. The coefficient indicates that college-educated same-sex couples move to MSAs with 0.053 pp higher acceptance than their non-college-educated counterparts.

In Column (3), I add the percentage of same-sex couples in the destination to account for the preference of same-sex couples to live near other same-sex couples. Adding the percentage of same-sex couples in the destination makes little difference to the college dummy and the interaction term. However, it makes the same-sex dummy statistically insignificant. This reflects the correlation between acceptance of same-sex couples and the share of same-sex couples. It also shows a difference in migration decisions between same-sex couples with and without college degrees.

Overall, the results show a sorting of individuals in same-sex relationships across MSAs by educational attainment. Same-sex couples with college degrees are more likely to move to more accepting MSAs than their counterparts without college degrees. Consistent with the literature showing preferences for progressive and liberal values among college-

educated people (Downey and Liu, 2023), different-sex couples with college degrees are also more likely to move to MSAs with higher acceptance. However, the difference is smaller for different-sex couples than for same-sex couples.

1.8 Conclusion

Acceptance of same-sex couples is one of the most important factors in the location choice of same-sex couples. This paper shows that acceptance indeed matters for same-sex couples, especially for those with college degrees, in their decision on where to live, resulting in the educational sorting of same-sex couples across metropolitan areas.

Further, the results presented in this paper could have significant implications for policymakers. Creating a more welcoming environment for individuals with non-normative sexual orientation can potentially increase the education level in an area both directly because of the inflow of same-sex couples with college degrees and also indirectly because higher concentrations of same-sex couples signal progressive values, which can be a pull factor for college-educated people.

However, it is important to note two caveats in this study. First, the measure of acceptance derived from the GSS survey data and the ACS, while informative, may not fully capture the nuanced and evolving nature of societal attitudes towards same-sex couples. This measure relies on available data and machine learning techniques that may introduce some degree of measurement error. Additionally, acceptance is a complex and multifaceted concept that can vary widely across areas and over time. Second, this paper borrows Diamond (2016)'s coefficient for wage and rent instead of estimating these coefficients directly, as a structural estimation would require. While this approach is practical and grounded in existing literature, it may introduce biases or inaccuracies specific to the context of this study. Therefore, while the findings provide valuable insights, they should be interpreted with caution. Future research could use improved measurements of

acceptance and potentially undertake a structural estimation of the coefficients to enhance the robustness of the results.

Figure 1.1: Relationship between wage, amenities, and utility

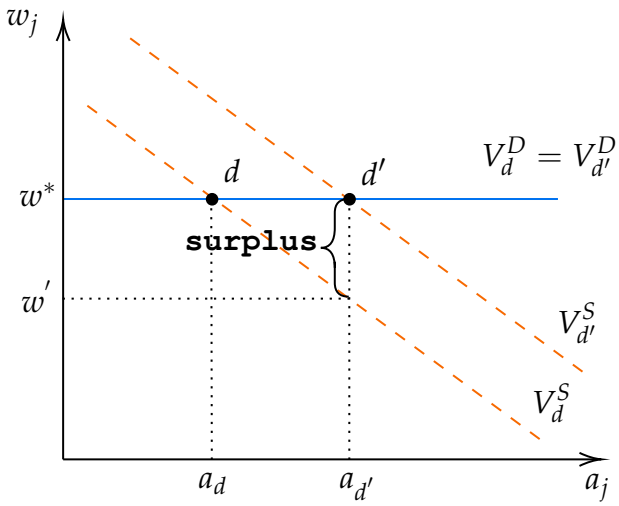
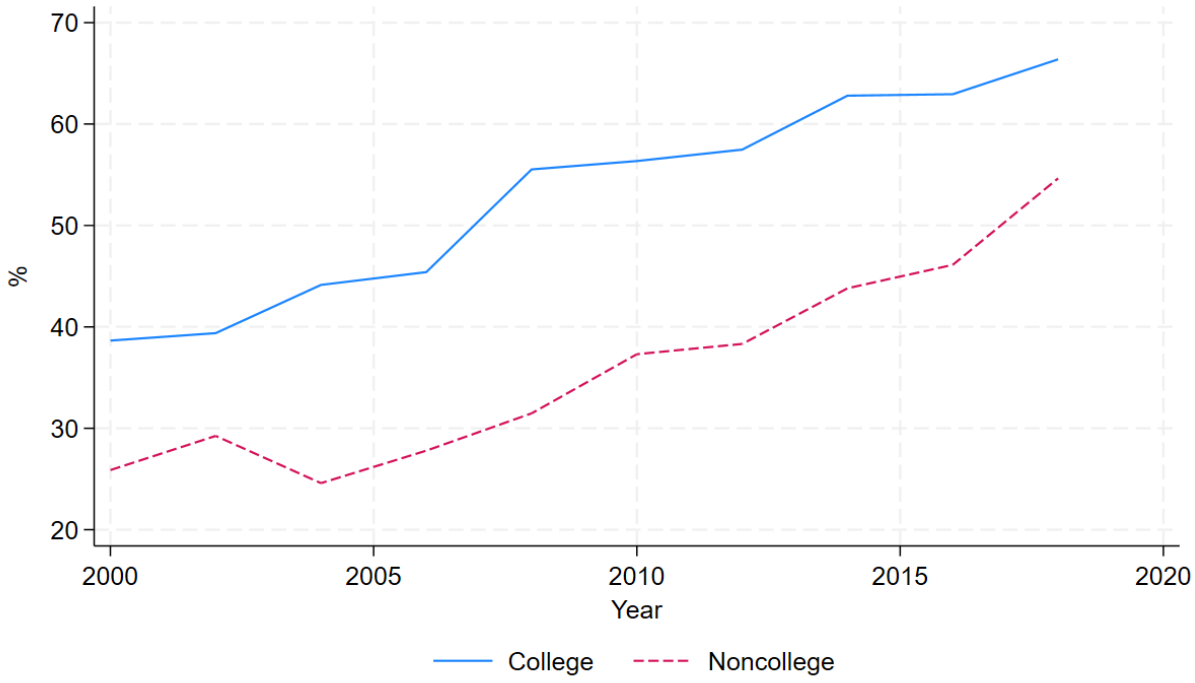


Table 1.1: Top and bottom 15 a_j locations

Top 15		Bottom 15	
Burlington-South Burlington, VT	0.781	Jackson, TN	0.448
Pittsfield, MA	0.771	Jackson, MS	0.449
San Jose-Sunnyvale-Santa Clara, CA	0.770	Montgomery, AL	0.450
Boston-Cambridge-Newton, MA-NH	0.769	Anniston-Oxford-Jacksonville, AL	0.458
Santa Cruz-Watsonville, CA	0.765	Mobile, AL	0.463
Santa Fe, NM	0.765	Gadsden, AL	0.467
San Francisco-Oakland-Hayward, CA	0.763	Memphis, TN-MS-AR	0.468
Portland-South Portland, ME	0.761	Decatur, AL	0.479
Flagstaff, AZ	0.755	Birmingham-Hoover, AL	0.479
Springfield, MA	0.751	Gulfport-Biloxi-Pascagoula, MS	0.481
Bridgeport-Stamford-Norwalk, CT	0.751	Shreveport-Bossier city, LA	0.482
Worcester, MA-CT	0.749	Tuscaloosa, AL	0.482
Providence-Warwick, RI-MA	0.749	Monroe, LA	0.484
El Centro, CA	0.748	Daphne-Fairhope-Foley, AL	0.484
Manchester-Nashua, NH	0.746	Rocky Mount, NC	0.503

Note: a_j is the percentage who state "Same-sex relationship is not wrong at all" in each city, estimated according to the post-LASSO procedure specified in Section 1.3.2.
Source: 2018 GSS, ACS 2015-2019 5-year pooled data, and Democratic vote share from the 2016 presidential election.

Figure 1.2: Percentage who believe same-sex relationships are not wrong by education



Note: Respondents are asked what they think about same-sex relationships: 1) always wrong, 2) almost always wrong, 3) wrong only sometimes, 4) not wrong at all.
Source: General Social Survey, 2000-2018.

Table 1.2: Conditional logit results: Estimates of hometown attachment

	(1)	(2)	(3)	(4)
	Same-sex		Different-sex	
	College	No college	College	No college
γ_{st}	2.13^{***}	2.84^{***}	2.57^{***}	3.27^{***}
	(0.31)	(0.35)	(0.48)	(0.72)
γ_{div}	0.84^{***}	0.91^{***}	0.95^{*}	1.00
	(0.17)	(0.27)	(0.38)	(0.63)

Note: Estimates from the conditional logit model in Section 1.4.1.
Standard errors are clustered at the city level.
Source: ACS 2015-2019 5-year pooled file.

Figure 1.3: Mean utilities of each city from conditional logit

Note: (a) The figures plot the estimated mean utilities from the conditional logit model in Section 1.4.1. (b) The mean utilities are relative to Akron, Ohio, where the mean utility is 0 for all four groups (c) Mean utilities have been divided by the standard deviation within each group. (d) Each dot represents one city.
Source: ACS 2015-2019 5-year pooled file.

Table 1.3: First stage: Acceptance and number of evangelical churches

Dependent variable: Log acceptance (log a_j)	
Number of evangelical churches, 1952 (per 10,000 population)	-0.015*** (0.002)
Other city characteristics	✓
Observations	223
Adj. R^2	0.7610
First stage F-statistic	38.32
Kleibergen-Paap LM, p-value	0.001

Note: (a) The dependent variable is the log estimated percentage of people who think same-sex relationships are not wrong. (b) The unit of evangelical churches is per 10,000 population. (c) Evangelical denominations are defined based on Steensland et al. (2000). (d) Other city characteristics include log population, percentage of college-educated people, percentage working full-time, average age, percentage of people having children, racial composition, and percentage of people born in the U.S. (See Table A.2 in the Appendix for results for these variables.) (e) The first stage F-statistic is to test the hypothesis that the instrument is unrelated to the endogenous regressor. (f) Kleibergen-Paap LM p-value corresponds to the Kleibergen-Paap LM test whose null hypothesis is that the equation is underidentified. Standard errors are clustered at the state level. *** $p < 0.01$
Source: ACS 2015-2019 5-year pooled file, 2018 GSS, 2016 presidential election results.

Table 1.4: Mean utilities and acceptance of same-sex couples

Panel A: Same-sex couples

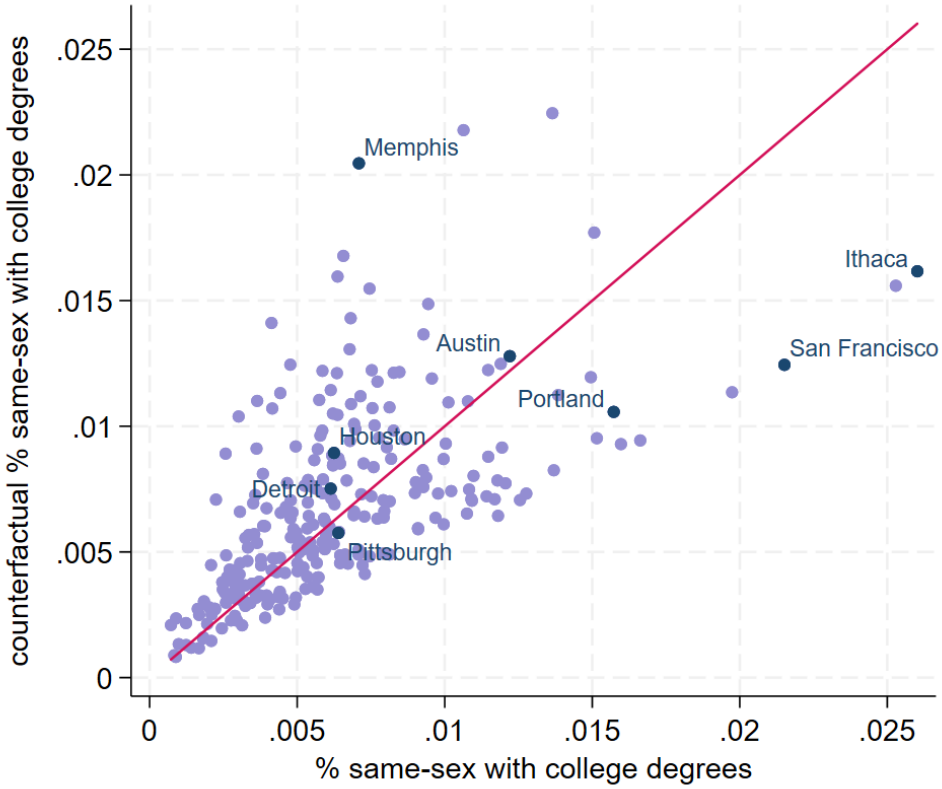
Dependent variable: Adjusted mean utility ($\tilde{\delta}_j^g$)				
	(1)	(2)	(3)	(4)
	College		No college	
	OLS	IV	OLS	IV
Log acceptance (log a_j)	2.227***	3.099**	0.872	-0.583
	(0.593)	(1.540)	(0.900)	(1.856)
Other city characteristics	✓	✓	✓	✓
Observations	223	223	223	223

Panel B: Different-sex couples

Dependent variable: Adjusted mean utility ($\tilde{\delta}_j^g$)				
	(1)	(2)	(3)	(4)
	College		No college	
	OLS	IV	OLS	IV
Log acceptance (log a_j)	0.330	0.572	-0.195	-1.537
	(0.461)	(1.344)	(0.796)	(1.748)
Other city characteristics	✓	✓	✓	✓
Observations	223	223	223	223

Note: (a) The dependent variable is the adjusted mean utility from the conditional logit model in Section 1.4.1. (b) a_j is the estimated percentage of people who think same-sex relationships are not wrong. (c) Other city characteristics include log population, percentage of college-educated people, percentage working full-time, average age, percentage of people having children, racial composition, and percentage of people born in the U.S. Standard errors are clustered at the state level. ** $p < 0.05$, *** $p < 0.01$
Source: ACS 2015-2019 5-year pooled file, 2018 GSS, 2016 presidential election results.

Figure 1.4: Counterfactual share of college-educated same-sex couples among total cohabiting couples



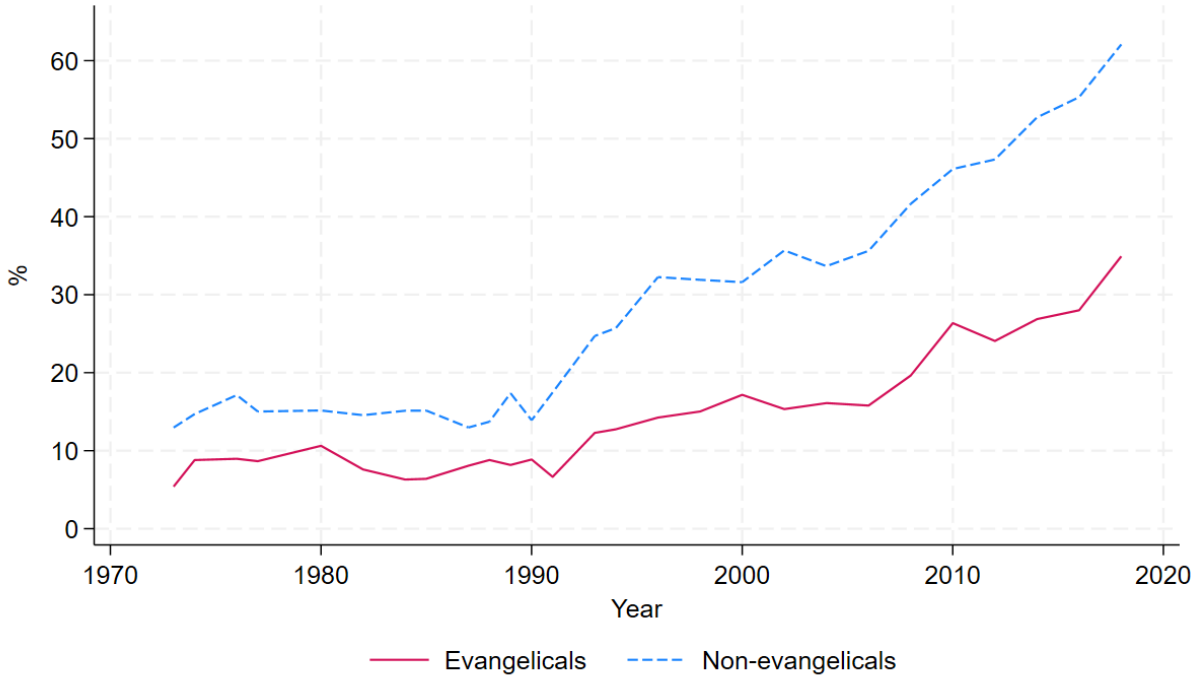
Note: (a) This figure plots the counterfactual share of college-educated same-sex couples out of total cohabiting couples against the actual share, given the IV estimate on acceptance from Section 1.5.2. (b) The counterfactual situation is where the level of acceptance is the same across cities at the mean level.
Source: ACS 2015-2019 5-year pooled file, 2018 GSS, 2016 presidential election results.

Table 1.5: Evangelical churches and share of same-sex couples

Dependent variable: Share of same-sex couples in a city		
	(1) 2000	(2) 2017
Evangelical churches per capita, 1952	0.030 (0.047)	-0.127** (0.056)
Census division FE	✓	✓
Other city characteristics	✓	✓
Observations	223	223
Adj. R^2	0.4439	0.4790

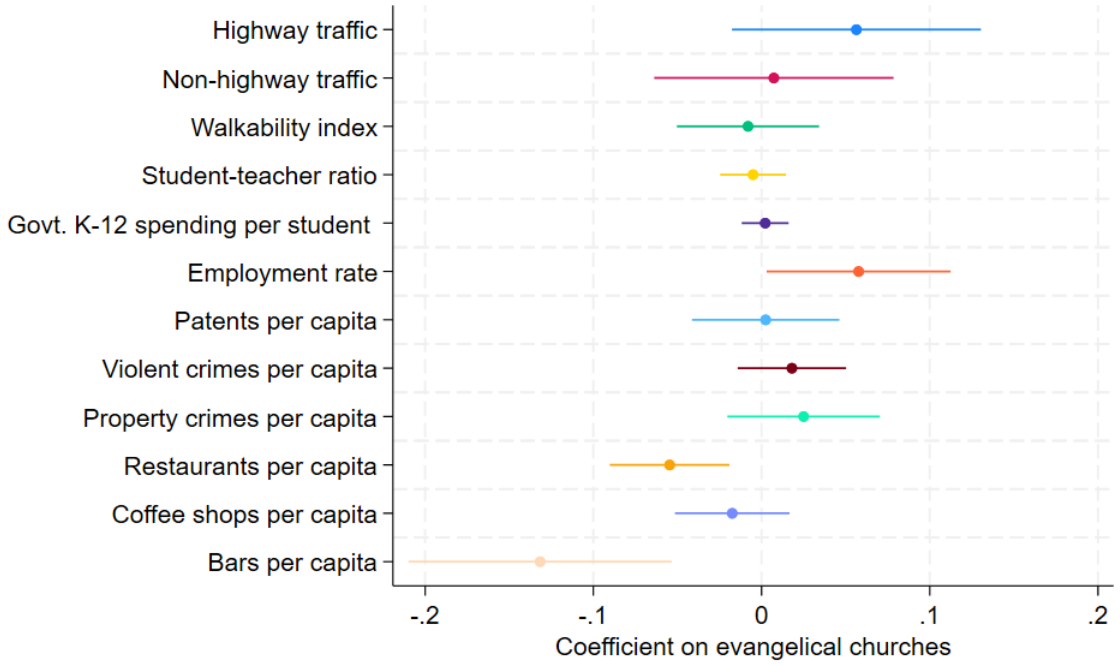
Note: (a) The unit of evangelical churches is per 10,000 population. Evangelical denominations are defined based on Steensland et al. (2000). (b) Other city characteristics include log population, percentage of college-educated people, percentage working full-time, average age, percentage of people having children, racial composition, percentage of people born in the U.S., log average rent, and log average wage. Standard errors are clustered at the state level. ** $p < 0.05$
Source: ACS 2015-2019 5-year pooled file.

Figure 1.5: Percentage who believe same-sex relationships are not wrong



Notes: (a) Respondents are asked what they think about same-sex relationships: 1) always wrong, 2) almost always wrong, 3) wrong only sometimes, 4) not wrong at all. (b) Evangelical denominations are defined based on Steensland et al. (2000).
Source: General Social Survey, 1973-2018.

Figure 1.6: Correlation between 2017 amenities and 1952 evangelical churches



Note: (a) Evangelical denominations are defined based on Steensland et al. (2000). (b) Amenities have been normalized to have a standard deviation of one.
Source: ACS, ARDA, FBI, EPA, NaNDA, USPTO, US Census Bureau.

Table 1.6: Robustness to adding amenities correlated with evangelical churches

Dependent variable: Adjusted mean utility ($\tilde{\delta}_j^g$) of college-educated same-sex couples			
	(1)	(2)	(3)
Log acceptance (log a_j)	3.099**	3.398**	3.231**
	(1.540)	(1.510)	(1.358)
Employment rate		-0.009	-0.010
		(0.010)	(0.009)
Restaurants per capita		0.806***	0.724**
		(0.289)	(0.292)
Bars per capita		-0.211	0.190
		(0.600)	(0.571)
% same-sex couples, 2000			0.137***
			(0.041)
Other city characteristics	✓	✓	✓
Observations	223	221	221
First stage F-statistic	38.32	54.98	56.84
Kleibergen-Paap LM, p-value	0.001	0.000	0.000

Note: (a) Other city characteristics include log population, percentage of college-educated people, percentage working full-time, average age, percentage of people having children, racial composition, and percentage of people born in the U.S. (b) The first stage F-statistic is to test the hypothesis that the instrument is unrelated to the endogenous regressor. (c) Kleibergen-Paap LM p-value corresponds to the Kleibergen-Paap LM test whose null hypothesis is that the equation is underidentified. Standard errors are clustered at the state level. ** $p < 0.05$
Source: ACS 2015-2019 5-year pooled file, 2018 GSS, 2016 presidential election results.

Table 1.7: Regression of difference in same-sex acceptance between destination and origin

Dependent variable: Δ % Same-sex acceptance ($a_{idt} - a_{iot}$)			
	(1)	(2)	(3)
College degree	0.044^{***}	0.008^{***}	0.009^{***}
	(0.003)	(0.003)	(0.003)
Same-sex relationship	0.038^{***}	0.024^{**}	0.004
	(0.011)	(0.011)	(0.010)
College $\times$ Same-sex relationship	0.045^{***}	0.045^{***}	0.041^{***}
	(0.017)	(0.016)	(0.016)
Origin-year fixed effects (μ_{ot})	✓	✓	✓
Individual level controls (X_{it})	✓	✓	✓
Destination characteristics (Z_{dt})		✓	✓
% same-sex couples in destination			✓
Observations	8461781	8461781	8461781
Adj. R^2	0.0324	0.1649	0.1876

Note: (a) The sample is restricted to partnered people aged 25 to 55. (b) Individual level controls include income, sex, age, age squared, race, presence of child, years in the U.S. (c) Destination city characteristics include total population, percentage of college-educated, and average income. Standard errors are clustered at the origin-year level. ** $p < 0.05$, *** $p < 0.01$
Source: ACS 2005-2019.

Chapter 2

Why do same-sex couples live in central cities?

2.1 Introduction

Another interesting aspect of the location decision of same-sex couples is that they disproportionately live in central cities in the United States. According to the American Community Survey (ACS)[14], among people in a same-sex relationship living together, 29% live in central cities, while only 16% of different-sex couples live in central cities. Why is this the case, and how do their concentrations affect central cities? In this chapter, I investigate the mechanisms that explain why people in same-sex relationships disproportionately sort into central areas of cities. In the next chapter, I will show that their presence in central areas affects downtown economic outcomes in metropolitan areas.

Studying the factors affecting the degree of urbanization of same-sex couples is important for two main reasons. First, the presence of same-sex couples in central urban areas is often linked to gentrification and economic growth. Diversity attracts innovative companies and enhances productivity through urbanization economies (Glaeser et al., 1992; Rosenthal and Strange, 2003; Tao et al., 2019). As discussed in the previous chapter, same-sex couples tend to have higher educational attainment and labor market participation (Badgett et al., 2021), contributing to human capital externalities and attracting other highly educated individuals (Moretti, 2004; Rosenthal and Strange, 2008; Leguizamon and Leguizamon, 2017; Downey and Liu, 2023).

Second, as emphasized in the previous chapter, individuals who openly identify as lesbian, gay, or bisexual represent a significant and growing minority group. Understand-

[14] ACS 2015-2019 5-year pooled sample.

ing their specific preferences for living in central cities is increasingly important for urban policy and planning.

I suggest two mechanisms that can explain why same-sex couples live in central areas of cities: the income elasticity of housing demand and different preferences for downtown/suburban amenities. Regarding the first mechanism, the standard urban model predicts high-income people will live closer to the city center because the income elasticity of housing demand is smaller than the income elasticity of commuting costs (Alonso, 1964; Mills, 1967; Muth, 1969). The different demographic characteristics of same-sex couples act in two distinct ways. One way is through the difference in household income. The American Community Survey (2015-2019) shows that same-sex households earn more income than different-sex households on average. All else equal, the higher income level of same-sex couples would make them sort into central areas of cities according to the traditional standard urban model. This is because commuting costs increase faster than housing demand with income (Becker, 1965; Goodman, 1988; Haurin, 1991; Zabel, 2004; Glaeser et al., 2008; Albouy et al., 2016). The second reason relates to the fact from the American Community Survey (2015-2019) that same-sex couples are less likely to have children. Same-sex couples face constraints that make having or adopting children much more costly than different-sex households, which results in far fewer children than different-sex couples (Black et al., 2002). The presence of children in households increases the income elasticity of housing demand, which makes suburbs more favorable according to the standard urban model. This means not having children will amplify the effect of income since the difference between the income elasticity of housing demand and the income elasticity of commuting cost gets larger.

The second mechanism relates to the different preferences for downtown/suburban amenities. In the U.S., child-related amenities such as good school quality or neighborhood safety are generally better in suburban areas than downtown, while consumption amenities such as nice restaurants and bars are better downtown (Glaeser et al. 2001). People without

children sort into consumption amenities because they can spend their lifetime resources more on things unrelated to children, while sorting away from child-related amenities such as school quality or neighborhood safety. Therefore, the fact that same-sex couples are less likely to have children suggests they would disproportionately live in downtown areas.

Another important local amenity individuals in same-sex relationships would consider is the acceptance of same-sex couples in the neighborhood, which is generally considered to be higher downtown than in the suburbs. There are some reasons central cities can be perceived as more accepting. First, a higher share of a minority group in an area could imply a higher level of (or perception of) tolerance towards the minority group in the area. The higher percentage of same-sex couples in central cities resulting from the first mechanism – and also from this second mechanism itself – will act as an endogenous amenity that signals a high level of tolerance towards different sexual orientations. Additionally, central cities are generally more diverse in various ways. The general diversity in central cities seems to allow for increased tolerance, support, and coexistence in the anonymity of central cities. Further, acceptance of same-sex sexual orientation is higher among people with a college degree than among those without a degree.[15] Because college-educated shares in central cities are higher than those in suburban or rural areas, it can also impact the perceived acceptance in central cities. Hence, same-sex couples might sort into central cities for a more accepting environment. This will create a piling-on effect, amplifying the sorting that arises from the differences in demand for housing and child-related amenities. The amenities aspect—child-related/consumption amenities and acceptance—implies that income can have different effects on the decision to live downtown for same-sex and different-sex couples if their valuations for downtown and suburban amenities are different enough.

Using the American Community Survey (ACS) 2015-2019 5-year pooled data, I first

[15]General Social Survey, 1973-2020, National Opinion Research Center.

estimate the income elasticity of housing demand to confirm the results in the literature that the income elasticity of housing demand is less than 1. This means that people with higher incomes will live closer to the center of cities than those with lower incomes, providing indirect evidence that having a higher average income leads same-sex couples to locate in central cities. Additionally, I show that same-sex couples have smaller income elasticities of housing demand than different-sex couples, which is attributed to the fact that they are less likely to have children.

Next, I investigate whether the mechanisms I suggest are reflected in the location decisions of couples. I first run a binary choice regression of the decision of whether to live downtown on individual characteristics, including CBSA fixed effects, separately by couple types. The results show that having children decreases the probability of living in central cities by 5.5 pp (percentage point), 12.7 pp, and 8.0 pp for different-sex, same-sex male, and same-sex female couples, respectively. This implies that the presence of children significantly affects the decision to live downtown, and since same-sex couples are less likely to have children, this contributes to the disproportionate share of same-sex couples downtown.

The different income elasticity of demand for housing and the different valuations of central city amenities suggest that income might affect the decision to locate in central cities differently for same-sex and different-sex couples. Consistent with this, the results show that when income increases by 10 %, the probability of living downtown increases by 0.34 pp and 0.25 pp for same-sex male and same-sex female couples without children, whereas there is no statistically significant effect for different-sex couples. For different-sex couples with children, the same change in income is associated with a 0.11 pp decrease in the probability of living downtown. The coefficients for same-sex couples with children are not statistically significant.

Further, to examine how amenities relate to the decision to live in downtown areas, I conduct similar regressions, including downtown amenities relative to the suburbs, while

controlling for CBSA characteristics. Overall, couples without children display stronger preferences for consumption and city amenities than couples with children, and this preference is stronger for same-sex couples than for different-sex couples. Also, the number of Evangelical churches per capita downtown relative to the suburbs, which represents the relative level of acceptance of same-sex couples in downtown areas, is negatively correlated with the downtown residency of same-sex couples but not for different-sex couples.

Lastly, I investigate whether the presence of same-sex couples in central cities contributes to economic growth in central cities. I regress the median income of downtown Census tracts in 2017 on the same-sex couple population share downtown in 2010. To address the endogeneity problem, I use a shift-share instrument constructed by the initial shares and migration flows of same-sex couples. The regression results using this shift-share instrument show that one standard deviation increase in the share of same-sex couples increases the median income by 3.4%.

To my knowledge, the research in this chapter is the first to look at within-city location decisions of same-sex couples. There are some studies that analyze the location choice of same-sex couples in the United States (Black et al., 2002; Cooke and Rapino, 2007; Beaudin, 2017; Marcén and Morales, 2022). The research in this chapter contributes to the literature by adding differential income elasticity of housing demand as an additional factor influencing the location decisions of same-sex couples. Furthermore, it contributes to the literature by showing that acceptance is indeed an essential factor in the location decisions of same-sex couples.

The rest of the chapter proceeds as follows. Section 2.2 provides a theoretical framework on the location choice of same-sex couples. Section 2.3 describes data and some basic empirical patterns. Section 2.4 presents empirical support for the theoretical model. Section 3.6 concludes.

2.2 Theoretical framework: Who wins the bid contest?

In this section, I introduce a simple model that explains the sorting of same-sex couples into central areas of cities. The model follows traditional urban models (Alonso, 1964; Mills, 1967; Muth, 1969) and incorporates local amenities (Polinsky and Shavell, 1976; Brueckner et al., 1999).

Households live in a city that has a central business district at its center. All jobs are assumed to be concentrated in the central business district. Suppose there are four types of households: same-sex couples with and without children and different-sex couples with and without children. They decide how far they would live from the center of the city. Each city is assumed to be equivalent to a commuting zone. Hence, in the model, households do not have to consider job availability when deciding where to live. Household i with income y gets utility from composite good Z, housing H, and local amenities. The level of local amenities, $a(x)$, varies with the distance from the city center, x. The maximization problem of household i is as follows:

$$\max u^i(Z, H, a(x)) \text{ s.t. } I = Z + p(x) \cdot H + tx.$$

where $p(x)$ is the price of a unit of housing that varies with the distance from the city center, t is the commuting cost, and I is the income of household i. $p(x)$ can also be considered as a bid function of household i for each location x, that is, how much they are willing to pay at each location x. Solving the maximization problem, getting $p'(x)$, and taking derivative with respect to income I, one can obtain

$$\begin{aligned} p'(x) &= \frac{\left[\frac{\partial u^i/\partial a}{\partial u^i/\partial Z}\right] a'(x) - t}{H} \\ &= \frac{v_a^i \, a'(x) - t}{H}. \end{aligned} \tag{5}$$

and

$$\frac{\partial\, p'(x)}{\partial I} = \underbrace{-\frac{a'(x)\, v_a^i}{I\, H}}_{\text{(a)}} \underbrace{\left[\, \varepsilon_{H,I} - \varepsilon_{v_a,I} \,\right]}_{\text{(b)}} + \underbrace{\frac{t}{I\, H}}_{\text{(c)}} \underbrace{\left[\, \varepsilon_{H,I} - \varepsilon_{t,I} \,\right]}_{\text{(d)}} \tag{6}$$

where v_a^i is the marginal valuations of amenities after optimal adjustment of housing consumption, and $\varepsilon_{\cdot,I}$ denotes income elasticity. See Section A.2 for the details of the derivation.

The sign of $\frac{\partial\, p'(x)}{\partial I}$ determines whether high- or low-income households live closer to the center of the city, assuming income elasticity of housing demand is constant. If it is positive, the bid function $p(x)$ gets flatter as income increases, which implies that low-income households have a higher willingness to pay closer to the center of the city and high-income households in the suburbs. If it is negative, $p(x)$ gets steeper as income increases, and high-income households have a higher willingness to pay closer to the center of the city.

Suppose there are no local amenities. Then, equation (5) reduces to $p'(x) = -t/h$, and there is only the second term in equation (6). Since (c) is positive, the sign of the bracketed part in the second term, (d), determines the sign of $\frac{\partial\, p'(x)}{\partial I}$. That is, the relative sizes of the income elasticity of housing demand, $\varepsilon_{H,I}$, and the income elasticity of commuting costs, $\varepsilon_{t,I}$, determine the sign. Assuming the main cost of transport is time (Becker, 1965), and hence the income elasticity of commuting costs is roughly one,[16] high-income people will live closer to the city center if the income elasticity of housing demand is smaller than one. Although the literature provides various estimates of the income elasticity of housing demand from 0.1 to 0.7, there is a consensus that they are less than one (Goodman, 1988; Haurin, 1991; Zabel, 2004; Glaeser et al., 2008; Albouy et al., 2016). Hence, without

[16]The analysis of Becker (1965) suggests that the income elasticity of commute cost should equal one, given that the wage is the opportunity cost of time. Glaeser et al. (2008) assumes a slightly smaller income elasticity of commute cost of 0.75.

amenities, the model predicts that high-income people live closer to the city center, which implies that same-sex couples are more likely to live closer to the city center since they earn a higher average income than different-sex couples.

Considering the effect of children on the income elasticity of housing demand can further explain why same-sex couples disproportionately live in central cities. It is known that households without children have a lower income elasticity of demand for housing (Gillingham and Hagemann, 1983; De Leeuw, 1971). Since same-sex couples are less likely to have children, as shown in Table 2.1, one can expect that they would have a lower income elasticity. Assuming the income elasticity of commute cost is the same for couples with and without children in equation (6), this means the bid function of same-sex couples will get steeper at a faster rate when income increases, which drives same-sex couples to live closer to downtown.

However, it is important to note that high-income people live in suburban rather than central cities in most U.S. metropolitan areas. In the ACS 2015-2019 5-year pooled sample, the median household income in central cities is $51,312, while the median household income outside central cities is $69,639. Some explanations have been offered in the literature, including the attractive effect of local amenities (Brueckner et al., 1999; Nechyba and Walsh, 2002), differential access to public transit across neighborhoods (LeRoy and Sonstelie, 1983; Glaeser et al., 2008), and age of housing stock (Brueckner and Rosenthal, 2009). While the relative sizes of the income elasticity of housing demand and income elasticity of commuting cost can work as one mechanism pulling high-income people to city centers, and also same-sex couples to city centers, we should consider other factors as well. In this paper, I include local amenities in the model to demonstrate how different valuations of amenities between same-sex and different-sex couples lead to different location choice patterns.

With amenities in the model, although the second term in equation (6) is negative, if the first term related to amenities is large enough, then it is possible to have a positive sign

for $\frac{\partial p'(x)}{\partial I}$. First, the literature indicates that the income elasticity of housing demand is smaller than the income elasticity of local amenities (Eom et al., 2014; Yinger, 2015), which means that (b) is negative. To have a positive sign for the first term, $a'(x)$ needs to be positive. If this is the case and the first term is large enough to offset the negative second term, high-income people will live in the suburbs, which is mostly what we observe in the U.S.

There are two reasons why the values of the amenities same-sex couples and different-sex couples perceive might differ. First, same-sex couples are less likely to have children, so they have smaller preferences for good school quality or neighborhood safety while having greater preferences for consumption amenities such as bars and nice restaurants (Black et al., 2002).[17] Conversely, different-sex couples who have children or are likely to have children value school districts with good quality. They might also have fewer resources to enjoy consumption amenities when they have children. In the U.S., schools in suburban areas generally have better quality than those in central cities, and consumption amenities are concentrated in central cities. Second, same-sex couples could have a greater preference for acceptance of same-sex couples. In the U.S., tolerance toward minorities is considered to be higher in central cities than in suburban areas. I show this also applies to the case for same-sex couples in Section 2.3. For these reasons, it is reasonable to assume that the amenities by distance from the city center are perceived differently for same-sex and different-sex couples, which I denote as $a_s(x)$ and $a_d(x)$, respectively.

Specifically, the above argument on amenities within a city gives a plausible reason to think that $a'_s(x) < a'_d(x)$. That is, amenities that same-sex couples perceive decrease faster than those different-sex couples perceive as the distance from the city center increases. First, this makes $p'(x)$ in equation (5) smaller for same-sex couples holding income fixed, which means they would have a steeper bid function. Second, $\frac{\partial p'(x)}{\partial I}$ in equation (6) also

[17] In their paper, Black et al. (2002) suggest the reason why same-sex couples are more likely to live in high-cost, high-income cities is because they have more lifetime resources to be spent on local amenities that are not child-related.

becomes smaller for same-sex couples, making the slope of their bid function steeper than that of different-sex couples when income increases. If this is the case, the model predicts that same-sex couples would be more likely to live in central cities, especially when they have a high income. Further, if $a'_s(x)$ is small enough and $a'_d(x)$ is large enough, even the signs of $\frac{\partial p'(x)}{\partial I}$ for same-sex and different-sex couples can differ, resulting in different directions of the effects of income for the two groups.

Another implication of the model is that the concentration of same-sex couples in the central city can endogenously affect the bid function and hence sorting if the perceived amenities for same-sex couples, $a_s(x)$, increase with the number of same-sex couples in the central city. As discussed, the differences in income, housing demand, and perceived amenities would make individuals in same-sex partnerships sort into the central city. This increasing concentration of individuals in same-sex partnerships would make $a'_s(x)$ more negative, resulting in even steeper bid functions for same-sex households and a higher degree of sorting of them into the central city.

2.3 Data and basic empirical patterns

I use data from the 2000 Census and the American Community Survey (ACS) 2008-2012 and 2015-2019 5-year pooled samples for individuals. These surveys include demographic characteristics, economic characteristics, family characteristics, and residency at the Public Use Microdata Area (PUMA) level of each individual. I also use the census tract-level data obtained from the National Historical Geographic Information System (NHGIS), which is also based on the decennial Census and ACS. I construct constant 2010 census tract boundaries using the Longitudinal Tract Data Base (LTDB).

2.3.1 Definition of downtown of a city and downtown PUMA

In Chapters 2 and 3, a "city" refers to a Core-Based Statistical Area (CBSA) defined by the Census Bureau. I define the center of a city as the centroid of the Central Business District (CBD) of the city following Fee and Hartley (2013) (Section A.3). I follow Couture and Handbury (2020) to define the downtown geography of each city and PUMAs that are downtown. The downtown geography is defined as tracts closest to the city center accounting for 15 percent of a CBSA's population in 2010. Census tracts aggregate up to a PUMA, and PUMAs generally intersect with the downtown area of a CBSA. I define a PUMA as a downtown PUMA if at least 50% of the PUMA's population lives in census tracts classified as downtown. Further, because there are many CBSAs where PUMAs are too large to represent downtowns accurately, I select some CBSAs that have well-defined downtowns: I keep CBSAs where at least 50% of the downtown census tracts population lives in downtown PUMAs according to both 2000 and 2010 PUMA definitions. [18][19]

2.3.2 Amenities

Consumption amenities

I obtain the number of restaurants and bars by Census tract from the National Neighborhood Data Archive (NaNDA). I also complement these with the National Walkability Index from the Smart Location Database provided by the U.S. Environmental Protection Agency (EPA) Smart Growth Program. The Walkability index is based on measures such as intersection density, proximity to transit stops, and diversity of land uses such as employment and household mix. Being used with the number of restaurants and bars, this

[18]Up until the 2012 sample, the ACS used the 2000 PUMA definition, and from 2013, it uses the 2010 PUMA definition.

[19]I do not restrict CBSAs in Section 2.4.1, because I do not need downtown residency in the analysis. In Section 2.4.2, I drop some more CBSAs depending on the subsamples used because, in some CBSAs, all the individuals in a subsample are either all classified as living downtown or all classified as not living downtown. Since, in this case, I cannot get any variation in the downtown residency, I drop these CBSAs.

index can be used to account for the accessibility of consumption amenities in urban areas.

Education-related amenities

Data on student enrollment, number of teachers, and education expenditures at the school district level are obtained from NaNDA.

Cultural amenities

Acceptance of same-sex couples in a community is a significant amenity for these couples. While some surveys, such as the General Social Survey, include direct questions about attitudes toward same-sex relationships, their geographic data lacks the granularity needed to measure acceptance at downtown and suburban levels. Therefore, I use two variables as proxies for this acceptance: the Democratic vote share in the 2016 presidential election and the number of evangelical Protestants in 2010.

People who vote for the Democratic party are known to be more accepting of same-sex couples than those who vote for the Republican party (Wilcox, 2018; Bazzi et al., 2023). Individuals who prefer a higher level of acceptance of same-sex couples may vote for the Democratic party, and individual opinions may also be influenced by their political party affiliation (Bartels, 2002; Levendusky, 2009; Goren and Chapp, 2017). Thus, the Democratic vote share serves as a proxy for acceptance of same-sex couples.

However, people in different areas could support the same party for different reasons. Therefore, I include the number of evangelicals as another proxy for the acceptance. As discussed in Chapter 1, in recent decades, evangelical churches have been known to have some of the most conservative views on same-sex relationships, and literature on American religion also suggests the critical role of evangelical churches in transmitting conservative ideology (Wald et al., 1988; Steensland et al., 2000).

2.3.3 Basic empirical patterns

The first two rows of Table 2.1 show that same-sex households earn more income than different-sex households on average, with the exception that younger, married lesbian couples earn less than their different-sex counterparts. The next two rows of the same table show a possible reason for these income differences. People in same-sex relationships are more likely to have a college degree and more likely to work full-time. These differences in their skill levels and labor force participation can lead to income differences. The last two rows show that same-sex couples are much less likely to have children than different-sex couples, consistent with the common perception.

Figure 2.1 shows the percentage of partnered people living downtown by income, presence of children, and couple type. Income quintiles are calculated within each CBSA. "1" represents the lowest quintile and "5" represents the highest quintile. Overall, same-sex couples disproportionately live in central cities, which is consistent with what the model in the previous section predicts. The figure also shows that, in general, people who do not have children are more likely to live in central cities. Among subgroups without a child, the central city share of same-sex male couples tends to increase with income. For same-sex female couples, there is a decrease followed by an increase associated with income. Among different-sex couples, there is a slow decline in association with income, with a slight upturn noted in the highest quintile. Among subgroups with children, the downtown shares for different-sex couples tend to decrease with income faster than their without-children counterparts, then increase slightly at the highest income quintile. For same-sex male couples, the share decreases with income as well but then increases at the highest income quintile by a much larger magnitude. For same-sex female couples with children, the pattern is not so obvious.

2.4 Empirical evidence on the model of location choice

The theoretical framework suggests there are two main ways through which same-sex couples are inclined to live in downtown areas of CBSAs: the lower income elasticity of demand for housing and the different valuations of local amenities. The lower income elasticity is due to their lower tendency to have children. The different valuations of local amenities are due to their smaller preferences for child-related amenities and greater preferences for acceptance of same-sex couples. The model also suggests that these mechanisms are magnified by the fact that same-sex couples have a higher average income and that the effect of an increase in income might differ for same-sex and different-sex couples.

I begin this empirical section by estimating the income elasticities of housing demand, providing evidence that income elasticities are indeed different for same-sex and different-sex couples, potentially affecting their location choice. Next, I estimate a regression of downtown residency to show the effect of the presence of children, income, and various downtown amenities, separately for different-sex, same-sex male, and same-sex female couples.

2.4.1 Income elasticity of housing demand

By estimating the income elasticity of housing demand using the sample of different- and same-sex couples, I test whether (i) the income elasticity of housing demand is far less than one, providing support that $\varepsilon_{H,I} - \varepsilon_{t,I}$ in equation (6) is less than 0 and hence becoming one mechanism that pulls high-income people to downtown, and thus same-sex couples to downtown, and (ii) whether same-sex couples indeed have a lower income elasticity of housing demand that is attributed to the lower tendency to have children, which amplifies the effect from (i). To test these hypotheses, I run a housing demand regression following the literature (Goodman, 1988; Zabel, 2004; Ceritoğlu, 2020). The

regression equation is as follows:

$$\begin{aligned}\log(\text{rent}_i) = \alpha + \beta \log \hat{I}_i + \beta_{child}\, child_i \log \hat{I}_i + \beta_{sm}\, sm_i \log \hat{I}_i + \beta_{sm,child}\, sm_i\, child_i \log \hat{I}_i \\ + \beta_{sf}\, sf_i \log \hat{I}_i + \beta_{sf,child}\, sf_i\, child_i \log \hat{I}_i + Z_i' \gamma + \varepsilon_i \end{aligned} \tag{7}$$

where rent_i is the rent of a housing unit household i is living in, and $\hat{I}_i$ is household permanent income, which is a predicted value from an income regression. $child_i$ is a dummy variable for the presence of children, and sm_i and sf_i are same-sex male and female couple dummies, respectively. Their interactions with log permanent income are included to capture the different income elasticities depending on the presence of children and whether they are in same-sex relationships. β is the income elasticity of housing demand for different-sex couples without children, and β_{child} denotes how the income elasticity differs for couples with children. β_{sm} and β_{sf} indicate how the income elasticity differs for same-sex couples relative to their different-sex counterparts. $\beta_{sm,child}$ and $\beta_{sf,child}$ represent how it might further differ when same-sex couples have children above what is captured by β_{child}, β_{sm}, and β_{sf}. Z_i is a vector of other controls, including sex, age, age squared, race, college education, marriage status, years in the U.S., state fixed effects, and same-sex dummies. Also, quality-adjusted rent for each PUMA j ($\text{rent}_{\text{PUMA}_j}$) is obtained from a rent hedonic regression and included in the controls.[20] I run this regression equation (7) using household heads among partnered people, separately for owners and renters of their dwellings. For the owners, house values are converted to rents using an annual discount rate of 7.85 percent as in Blomquist et al. (1988).

To get permanent income, I run a regression of individual income on demographic characteristics. On the right-hand side, I include age, age squared, sex, race, college education, marital status, presence of children, same-sex male and female couple dummies, years in the U.S., PUMA fixed effects, occupation fixed effects, interaction terms between

[20] See Appendix B for the details of the rent regression.

age and other variables, and interaction terms between sex and other variables. Same-sex male and female couple dummies are included to account for the income difference between different- and same-sex couples shown in Table 2.1. The predicted incomes from the regression are individuals' permanent incomes. The sum of the permanent incomes of two individuals in a relationship is the household permanent income used in the regression.

Table 2.2a shows the results of the regression. Consistent with the housing demand literature, the income elasticity is far less than one, with 0.395 and 0.200 for different-sex owners and renters without children, respectively. Having a child increases the income elasticity of demand for housing both for owners and renters by 0.193 and 0.117, respectively. For same-sex owner-occupied households, the only statistically significant difference from their different-sex counterparts is when same-sex male households have children, with an additional elasticity of 0.166. This means that, for same-sex male households, the difference between households with and without children is larger than that for different-sex couples and same-sex female couples, which might be attributed to the higher expectations for children of different-sex couples and same-sex female couples when they do not have children. The income elasticity of same-sex male households who are renters is not significantly different from their different-sex counterparts, while that of their female counterparts is lower by 0.073. Table 2.2b summarizes the results.

Overall, having a child increases the income elasticity of housing demand of both owners and renters. Therefore, the income elasticity of same-sex couples is smaller than that of different-sex couples on average since they are less likely to have children. Hence, the bid function slope of same-sex couples is steeper than that of different-sex couples, as shown in equation (6) in Section 2.2. This provides evidence for one channel through which same-sex couples are more likely to live downtown than different-sex couples.

2.4.2 The effect of the presence of children and income

In the rest of this section, I show how some variables of interest affect people's location decisions to live in downtown areas of CBSAs. I estimate a set of regressions of whether an individual i in CBSA j is living downtown as follows:

$$downtown\ residency_{ij} = \alpha + X_i'\beta + \theta_j + \varepsilon_{ij} \tag{8}$$

where X_i is a vector of characteristics of individual i, including income, presence of children, whether having a college degree, sex, age, age squared, race, and years in the United States. θ_j denotes CBSA fixed effects. I estimate this regression equation separately for different-sex, same-sex male, and same-sex female couples, restricting the sample to household heads among partnered people aged 25 to 60.

In this set of regressions, I am first interested in how the presence of children, one of the major sources of different valuations for local amenities between different- and same-sex couples, is related to people's location decision to live in downtown areas of CBSAs. The coefficient for the presence of children will show the average effect of the presence of children on the probability of living downtown. This captures the overall slope change of the bid function in (5) due to different valuations in downtown and suburban amenities when having a child.

Additionally, I am interested in how the income level is related to different- and same-sex couples' location choices to live downtown differently. The coefficient for income shows whether people would be more or less likely to live downtown when their income increases. This captures both the differences in the income elasticity of housing demand and different valuations for downtown and suburban amenities as shown in equation (6). The model in Section 2.2 predicts that the sign of the coefficient can be different for same-sex and different-sex couples if their valuations for downtown and suburban

amenities are different enough.

Panel A of Table 2.3 shows the results. The coefficients of the presence of a child dummy show that having a child decreases the probability of living downtown by 5.5 pp, 12.7 pp, and 8.0 pp for different-sex, same-sex male, and same-sex female couples, respectively. These results represent an overall increase in preferences for suburban amenities when having a child for all three couple types. The reason why the coefficient of same-sex couples, especially male couples, is larger compared to different-sex couples could be because the decision of residency is a long-term decision. Different-sex couples who do not have children have higher expectations of having children than same-sex couples, making the effect of the actual presence of a child smaller among them. Also, same-sex couples who have children are more likely to have planned their children before they had children, and when parents had planned a child, they are more likely to locate in neighborhoods with better child-related amenities, which are more likely to be the suburbs. The coefficients of log income for same-sex male and female couples are 0.030 and 0.017, respectively. These coefficients suggest that if household income increases by 10%, the probability of living downtown increases by 0.3 pp and 0.17 pp, respectively. The coefficient of log income for different-sex couples is negative, although it is not statistically significant.

To see the relationship between downtown residency and income more clearly, I estimate the same regression separately for couples with and without children. The results in Panel B of Table 2.3 show a clearer distinction in the coefficient of log income between same-sex and different-sex couples. The coefficients of log income for male and female couples without children are 0.034 and 0.025, respectively. For different-sex couples without children, the coefficient is -0.002, although it is not statistically significant. The noisy, negative coefficient for different-sex couples might reflect the high expectations for children even though they do not have children. The coefficient for different-sex couples with children is -0.011, while it is noisy for same-sex couples with children. These differences in the coefficients of log income between different-sex and same-sex couples

reflect the differences in the income elasticity of housing demand shown in Section 2.4.1 and also the different valuations of local amenities between same-sex and different-sex couples. The fact that subgroups with children all have smaller coefficients than their without-children counterparts supports the model prediction that having a child will make the effect of an increase in income more favorable for suburban areas than downtown. Additionally, the results show that the gap in the coefficients of log income for same-sex couples and different-sex couples decreases when they have children, which suggests that a large part of the differences comes from the different tendencies to have children and associated preferences for amenities. The remaining differences might reflect different preferences for other downtown amenities, such as acceptance of same-sex couples.

One might be concerned that there can be a simultaneity of downtown residency and income level. For example, some people might try to earn a higher income to afford housing in downtown areas. In this case, there can be a positive bias in the coefficient. Therefore, one should not interpret the coefficients as causal. However, to the extent that the directions of the biases are the same and the magnitudes are similar across same-sex and different-sex couples with and without children, the interpretation of the income coefficients in this section still holds.

In these regressions, the coefficient of having a child shows the overall effect of having children. While it is interesting to see the coefficient of each amenity by including amenities, the coefficient of having a child could be a better way to infer the aggregated effect of having children on the decision to live downtown. In Section 2.4.3, I show the correlations of amenities with downtown residency.

2.4.3 Relationship with downtown and suburban amenities

In this subsection, I show how amenities are related to the decision to live in downtown areas. To do so, I conduct similar regression analyses to equation (8), except that now I

substitute the CBSA fixed effects with a set of downtown amenities relative to the suburbs while also controlling for CBSA-level attributes.

For consumption amenities, I include the number of restaurants and bars per capita. I also include the National Walkability Index, which captures some urban amenities in an area. Government spending on K-12 education and student-teacher ratio are included to account for school quality. For acceptance of same-sex couples, I include both the Democratic vote share in the 2016 Presidential election and the number of Evangelical churches per capita in 2010.

Figure 2.2 presents the coefficients of amenities from the regression. For couples without children, a notable positive correlation is observed between the number of restaurants per capita in downtown areas and the preference for downtown residency. However, the appeal of restaurants seems to diminish for couples with children, showing rather noisy coefficients. The presence of bars per capita downtown does not have a statistically significant impact on the residency decisions of any couple type. This indicates that bars as an amenity do not distinguish downtown living from suburban life in a way that consistently affects couples' residential choices. The National Walkability Index can capture some other consumption amenities in downtown areas, and it is correlated with a higher tendency to live downtown for same-sex couples without children, while the correlation is negative for different-sex couples with children.

Education-related amenities exhibit varied influences: K-12 spending per student has a positive correlation with the choice to live downtown for different-sex couples, both with and without children. On the other hand, the estimates for the student-teacher ratio tend to be noisy.

Political and religious landscapes that can be related to the acceptance of same-sex couples also play a role in residential preferences. A higher share of Democratic votes in downtown areas is correlated with a decreased tendency for different-sex couples to live downtown. Conversely, a higher number of Evangelical churches per capita is

associated with a lower likelihood of downtown residency among same-sex couples, both with and without children, although the results are slightly noisy, suggesting a preference for communities accepting same-sex relationships.

2.5 Conclusion

This chapter provides insight into why individuals in same-sex relationships disproportionately live in central cities in the United States. I propose two mechanisms through which central cities attract them: income elasticity of housing demand and different preferences for downtown and suburban amenities. Empirical analysis shows that same-sex male and female couples have smaller income elasticities of housing demand than different-sex couples due to their lesser tendency to have children. The results of the regression of downtown residency show that the presence of children negatively affects the probability of living downtown, and amenities that are typically prevalent in downtown areas positively affect the probability. The effect of income has been found to have different directions for same-sex and different-sex couples on their probabilities of living downtown, as the theoretical framework suggests.

It is important to consider a caveat regarding the empirical strategy employed in this study. This chapter relies on straightforward regression analysis without employing methods to address potential endogeneity issues. The simultaneity of downtown residency and income level may introduce a positive bias in the coefficients, suggesting that some individuals might try to earn a higher income to afford housing in downtown areas. Future research could use instruments or natural experiments to identify causal effects of income on housing demand and downtown residency.

Despite this limitation, the findings presented in this chapter give insights into the location choice of individuals who openly identify as gay, lesbian, and bisexual, a sizable minority group that has grown significantly in recent years. In the next chapter, I will

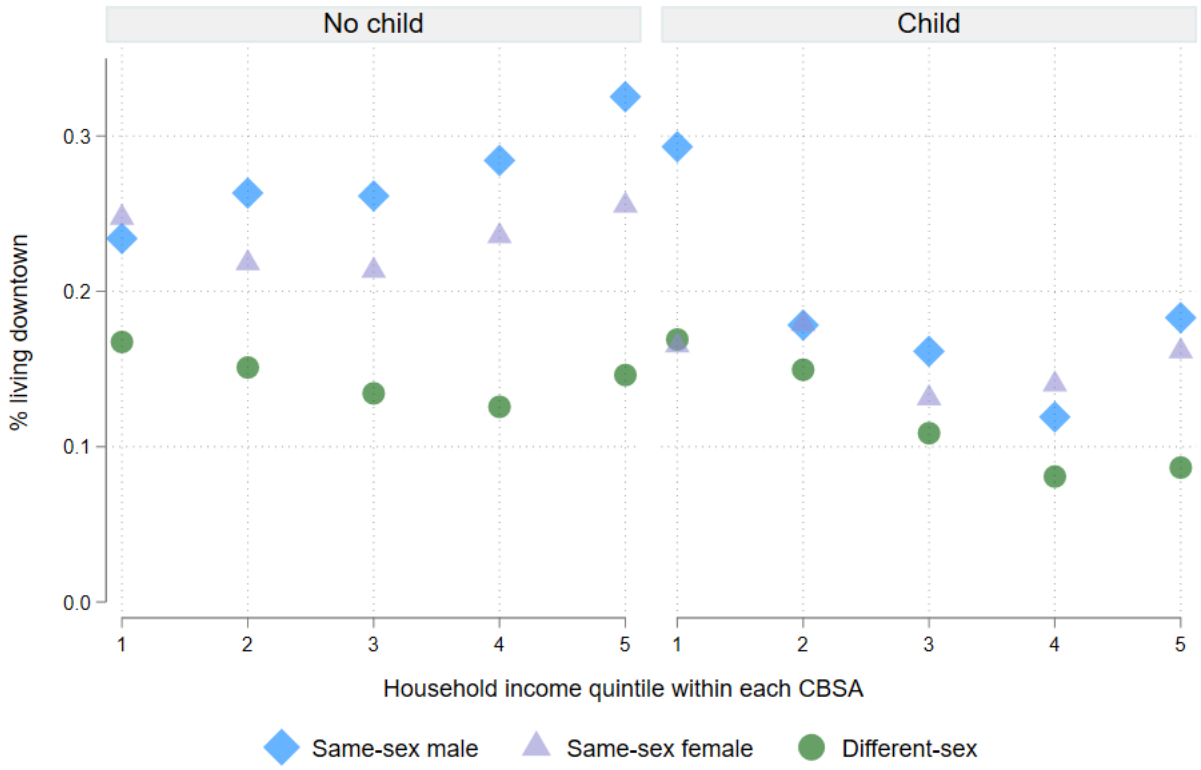
explore the effects of the presence of same-sex couples in downtown areas.

Table 2.1: Income, educational attainment, full-time status, and tendency to have children by couple type

		Younger (25-44)			Older (45-60)		
		Different	Same M	Same F	Different	Same M	Same F
Income ($)	Married	114,094	146,231	105,704	133,209	181,325	139,777
	Not married	81,829	129,209	84,449	95,240	156,438	121,224
College degree (%)		41.3	50.0	44.1	35.1	51.7	48.4
Working full-time (%)		73.9	79.2	77.3	70.2	74.7	71.1
Having a child (%)		74.4	12.5	38.5	53.9	11.8	26.4
Number of children		1.59	0.24	0.68	0.94	0.20	0.41

Note: (a) The sample is restricted to partnered people aged 25-60 years. (b) Income is household level and standardized to 2019 dollars. (c) Full-time employment is defined as working 35 hours or more a week. Source: ACS 2015-2019 5-year sample.

Figure 2.1: Percentage living downtown by income, presence of child, and sexual orientation



Note: (a) The sample is restricted to household heads among partnered people aged 25-60. (b) Household income quintiles are calculated within each MSA. "1" represents the lowest quintile and "5" represents the highest quintile.
Source: ACS 2015-2019 5-year sample.

Table 2.2a: Income elasticity of demand for housing

	Dependent variable: log(rent)	
	Owners	Renters
log ($\hat{I}$)	0.395***	0.200***
	(0.012)	(0.010)
child*log ($\hat{I}$)	0.193***	0.117***
	(0.014)	(0.016)
Same-sex male $\times$ log ($\hat{I}$)	0.002	-0.012
	(0.028)	(0.018)
Same-sex male $\times$ child $\times$ log ($\hat{I}$)	0.166*	-0.022
	(0.097)	(0.076)
Same-sex female $\times$ log ($\hat{I}$)	0.028	-0.073***
	(0.040)	(0.026)
Same-sex female $\times$ child $\times$ log ($\hat{I}$)	0.075	0.078
	(0.062)	(0.054)
Other controls	✓	✓
R-squared	0.4351	0.4586
N	1562548	478516

Note: (a) The sample is restricted to household heads among partnered people aged 25-60. (b) For the owners, house values are converted to rents using an annual discount rate of 7.85 percent as in Blomquist et al. (1988) (c) Other controls include sex, age, age squared, race, college education, marriage status, presence of children, years in the U.S., quality-adjusted rent for each PUMA, state fixed effects, and gay/lesbian dummies. (d) Standard errors are bootstrapped.
Source: ACS 2015-2019 5-year pooled sample. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 2.2b: Summary: Income elasticity of demand for housing

		Owners		Renters	
Without children	Different-sex	0.395	(0.012)	0.200	(0.010)
	Same-sex male	0.395	(0.012)	0.200	(0.010)
	Same-sex female	0.395	(0.012)	0.127	(0.028)
With children	Different-sex	0.588	(0.018)	0.317	(0.019)
	Same-sex male	0.754	(0.099)	0.317	(0.019)
	Same-sex female	0.588	(0.018)	0.244	(0.032)

Table 2.3: The effect of income and presence of child on downtown residency

Panel A: Aggregated sample

	Dependent variable: Downtown residency		
	Different-sex	Same-sex Male	Same-sex Female
	(1)	(2)	(3)
ln(household income)	-0.006	0.030**	0.017*
	(0.005)	(0.012)	(0.010)
presence of child	-0.055***	-0.127***	-0.080***
	(0.006)	(0.019)	(0.011)
Other controls	✓	✓	✓
CBSA fixed effects	63	63	63
Observations	1523028	15501	14076

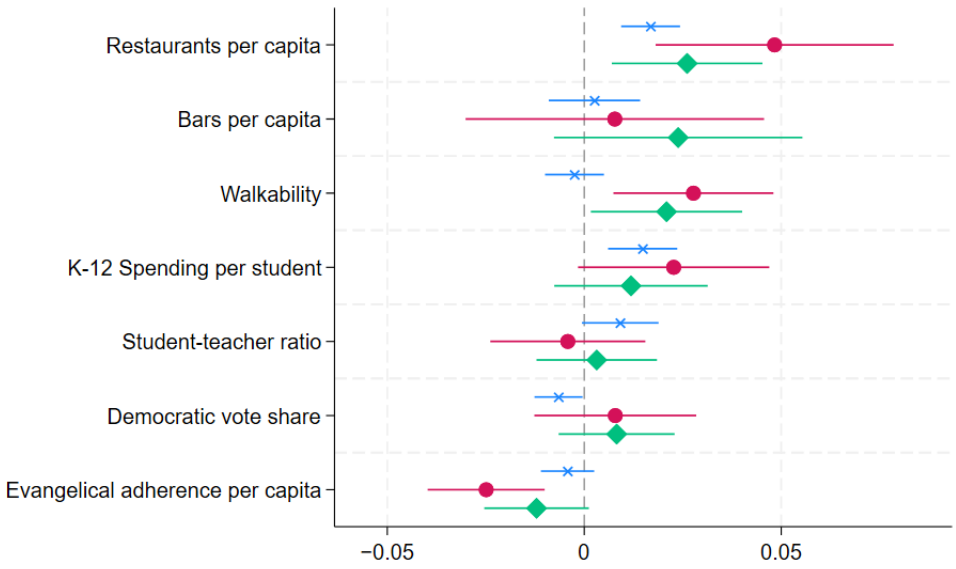
Panel B: By presence of children

	Dependent variable: Downtown residency					
	Without children			With children		
	Different	Same M	Same F	Different	Same M	Same F
	(1)	(2)	(3)	(4)	(5)	(6)
ln(household income)	-0.002	0.034***	0.025**	-0.011***	-0.003	0.003
	(0.006)	(0.011)	(0.011)	(0.004)	(0.025)	(0.013)
Other controls	✓	✓	✓	✓	✓	✓
CBSA fixed effects	63	63	63	63	63	63
Observations	564442	13811	9763	958586	1690	4313

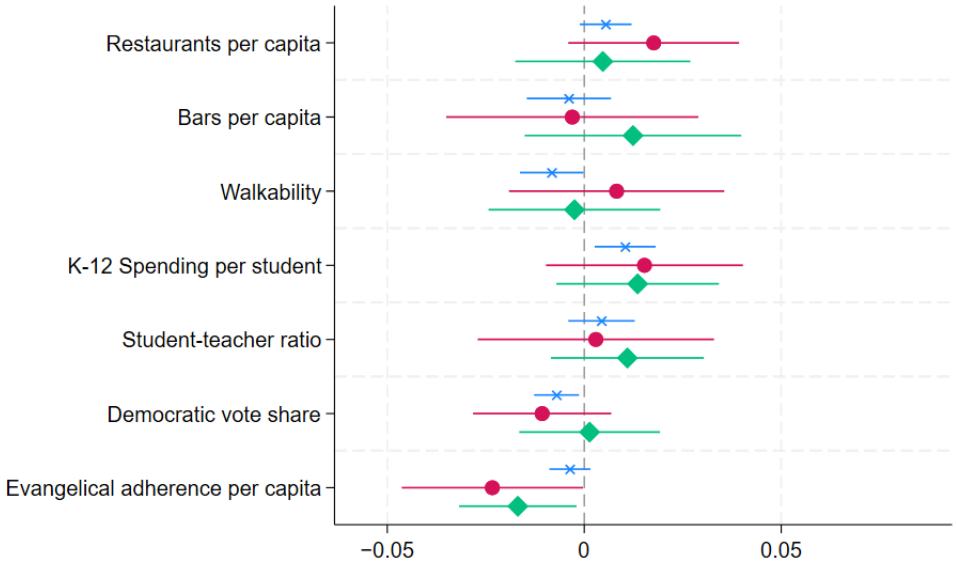
Note: (a) The sample is restricted to household heads among partnered people aged 25-60. (b) Other controls include sex, age, age squared, race, and years in the U.S. Source: ACS 2015-2019 5-year pooled sample. Standard errors are clustered at the CBSA level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Figure 2.2: Coefficient of amenities from the regression of downtown residency

(a) Couples without children



(b) Couples with children



× Different-sex ○ Same-sex male ◇ Same-sex female

Note: For each amenity, the downtown level is divided by the suburban level to obtain the variable.

Chapter 3.

Do same-sex couples improve central areas of CBSAs?

3.1 Introduction

In Chapter 2, I have shown the sorting of same-sex couples into downtown areas of CBSAs and its mechanisms. Given that they disproportionately live in central cities, a natural question is what their effects on downtown areas are. It also has been reported that concentrations of gay and lesbian populations in an area are an indicator of imminent urban renewal or gentrification in the area (Forsyth, 2001; Lauria and Knopp, 1985; Florida and Mellander, 2009; Christafore and Leguizamon, 2018; Goodnature et al., 2022). In this chapter, I show that the presence of same-sex couples downtown affects the economic outcomes in downtown areas.

The higher presence of same-sex couples might contribute to improving downtown areas since they have a higher average income, are more likely to have attained college education, have greater preferences for consumption amenities, and have higher labor force participation than different-sex couples. Additionally, the preferences for cultural tolerance have been increasing, especially among highly educated people, since 1990 (Figure 3.1). This preference for tolerance toward minorities among college-educated people could affect their location choice, making them sort into areas with higher cultural tolerance (Downey and Liu, 2023). Hence, if the higher presence of same-sex couples in downtown areas signals higher tolerance, it might work as a pull factor for those with higher productivity.

Looking at the effect of presence of same-sex couples can bring some endogeneity

concerns due to the demographic characteristics of same-sex couples. They are less likely to have children and more likely to have attained higher education. This means they would sort into areas with higher consumption amenities and better business environments, and these areas could be the ones that are more likely to experience economic growth in the near future. To address the endogeneity issue and establish causality, I use a shift-share instrument constructed by the initial shares and migration flows of same-sex couples (Card, 2001; Tabellini, 2020; Derenoncourt, 2022).

As in Chapter 2, I use the census tract-level data obtained from the National Historical Geographic Information System (NHGIS). I also use the 2000 Census and the American Community Survey from 2005 to 2010 to get initial shares of same-sex couples and migration flows and construct the shift-share variable.

The results using the shift-share instrument show that one standard deviation increase in the same-sex couples share increases median tract income and house value by 3.4% and 4.5%, respectively. The validity of the empirical strategy using the shift-share relies on exogeneity of the shares in relation to location characteristics that could affect the change in economic outcomes. I provide some shift-share diagnostics to support this assumption.

The analysis in this chapter belongs to the literature working to understand the mechanisms driving urban renewal. It has long been suggested that concentrations of gay populations in a neighborhood lead to urban renewal (Forsyth, 2001; Lauria and Knopp, 1985; Florida and Mellander, 2009; Christafore and Leguizamon, 2018; Goodnature et al., 2022). Regarding gentrification and same-sex couples in the U.S., Florida and Mellander (2009) show that the gay and lesbian population is associated with higher average housing prices in metropolitan areas. They argue that gays, lesbians, and bohemians increase local amenities in the area because they are "creative class". Using census tract-level data from the 30 largest MSAs, Christafore and Leguizamon (2018) find that a greater presence of same-sex couples in 2000 is positively correlated with income growth between 2000 and 2010. They show that the correlation does not disappear even when they control for

family size, household income, the presence of different-sex, unmarried couples, and local amenities. Goodnature et al. (2022) instrument the gay population by tolerance levels in each location proxied by the percentage of a census tract that voted no on the Defense of Marriage Act in 2004 to find the causal link. They find that an additional same-sex couple per 1,000 households increases median income by $1,997.86 and median house price by $4,520.08. The analysis in this chapter supports the hypothesis that the concentration of same-sex couples contributes to the economic growth of central cities.

The rest of the chapter proceeds as follows. Section 3.2 explains the empirical method to identify the causal effect. Section 3.3 shows the main results for the effect of the presence of same-sex couples. Section 3.4 provides shift-share diagnostics. Section 3.5 discuss the mechanisms. Section 3.6 concludes.

3.2 Empirical method

To see the effect of the presence of same-sex couples in downtown areas of CBSAs, I run a set of regressions of economic outcomes of downtown tracts as follows:

$$y_{cj,17} = \alpha + \beta S_{j,10} + X'_{cj,10}\delta + Z'_{j,10}\gamma + \varepsilon_{cj}, \tag{9}$$

where $y_{cj,17}$ is an economic outcome of downtown tract c in 2017. For economic outcomes, I focus on income level and housing prices. $S_{j,10}$ is the share of same-sex couples downtown CBSA j in 2010. $X_{cj,10}$ and $Z_{j,10}$ are vectors of tract-level and CBSA-level controls, respectively. Tract-level controls include the respective lagged outcome in 2010, tract population, distance to the central business district, shares of jobs within 3 miles and 10 miles, average slope, and Census region fixed effects. By including the lagged outcome, β is supposed to capture the effect of same-sex couples on the growth of the outcome in downtown tracts. CBSA-level controls include total population, median household income, median rent, percentage of college-educated, percentage of people working full-time, and weather

variables.

In this regression, however, there are endogeneity concerns. First, there can be sorting on unobservables. The location choice of same-sex couples might simply reflect the location choice of people with high productivity since they possess characteristics similar to those with higher productivity. Although I control for the lagged outcome, which captures many unobserved factors, there still can be unobserved characteristics that are correlated with the share of same-sex couples and that can affect the economic outcome.

The second source of endogeneity is related to city characteristics that might affect economic outcomes. Individuals in same-sex relationships have greater preferences for consumption amenities and higher educational attainment and are more likely to supply labor; hence, they could have been disproportionately drawn to rising, high-income, productive cities. Cities with these characteristics might experience faster income growth for residents. On the other hand, same-sex households would demand fewer amenities that families value, such as quality schools and overall safety downtown, which might be correlated with different trends in the growth of economic status. Although I control for some CBSA characteristics, there are still likely to be other unobserved characteristics of CBSAs that affect the imminent growth of their downtowns. If the growth or improvement of a city is correlated with these unobserved city characteristics that are correlated with the imminent growth of cities, then the OLS estimate would be biased.

To deal with this endogeneity problem and provide causal estimates of the effect of same-sex couples, I employ a shift-share instrument. There would be correlated origin (state) - destination (CBSA) flows among individuals with same-sex sexual orientation. Generally, people from the same state share some preferences for location characteristics (Boustan, 2010). Additionally, individuals in same-sex relationships can share their experience as sexual minorities in their destination CBSA with other sexual minorities living in

their birth state (origin). The shift-share instrument is constructed as follows:

$$B_j = \sum_k s_{kj,2000} \cdot m_{k,2005-10} \cdot \frac{1}{P_{j,2000}}$$

where $s_{kj,2000}$ is downtown CBSA j share of same-sex couples from state k living downtown areas in the U.S. in 2000. In other words, $s_{kj,2000}$ is the number of same-sex couples born in state k living downtown CBSA j in 2000 divided by the number of same-sex couples born in state k living downtown areas in the US in 2000. $m_{k,2005-10}$ is the number of same-sex couples who migrated to other states from 2005 to 2010 from state k, and $P_{j,2000}$ is the population downtown CBSA j in 2000.[21]

3.3 The effect of presence of same-sex couples

Panel C of Table 3.1 shows the reduced form results. The predicted migration inflow of same-sex couples has a positive relationship with median income level and house value.

Panel D of Table 3.1 reports 2SLS estimates of the relationship. A 1 pp increase in the share of same-sex couples in central areas of CBSAs increased median tract income by 8.4%. Scaling this effect by one standard deviation (0.4 pp) increase in the same-sex couples share, the estimated coefficient represents a 3.4% increase in median tract income. For housing prices, a 1 pp increase in the share increased house value by 11.2%. Scaling this effect by one standard deviation increase in the same-sex share, it is equivalent to a 4.5% increase in house value. There was no statistically significant effect on rent. The OLS estimate on median tract income is similar to the 2SLS estimate. The positive OLS estimate in the rent regression shows that there is a positive bias.

The results are comparable to the findings of Goodnature and Neto (2021) who found that an additional same-sex couple per 1,000 households between 2000 and 2010 led to an increase in median income of about $1997.86 and an increase in median house price of

[21]The information on the residence a year ago is available from the 2005 survey year in the ACS.

about $4,520.08. Although it is not directly comparable, Christafore and Leguizamon (2018) found that a 1 pp increase in the number of same-sex coupled households is associated with a 2% to 3% increase in the probability of gentrification.

While there was a positive effect on median income, there was no effect on the percentage of people in poverty (column 2). This means that the effect is inclined towards the upper end of the income distribution. This may be because the effect is more pronounced among individuals with higher incomes who were already living in the area. It is also possible that the presence of same-sex couples attracted people with higher incomes to move into the area.

3.4 Shift-share diagnostics

The recent advances in the literature on shift-share instruments suggests researchers should choose between the assumptions of the exogeneity of shares and the exogeneity of shifts (Goldsmith-Pinkham et al., 2020; Borusyak et al., 2022). I assume that the shares are exogenous since the shifts view is only consistent when the number of shifting units is large. Given that the shifting units, in this case, are U.S. states, it is more appropriate to choose the shares view.

I follow Goldsmith-Pinkham et al. (2020) and identify the sending states driving the out-migration of individuals in same-sex relationships. The eight states in Table 3.2 drive 44% of state out-migration of individuals in same-sex relationships between 2000 and 2010. In the table, I report the results from regressing origin state shares on median downtown income, total population, and college share downtown in 2000. The results suggest that the shares are not correlated with median downtown income and college-educated share downtown in 2000. There are some correlations with the total CBSA population. This is expected since CBSAs with larger populations are more likely to have more people in general. I include the total population as one of the CBSA-level controls in the results in

Table 3.1. In the next section, I further show correlations with tract-level characteristics.

3.5 Evidence on mechanisms

How does the presence of same-sex couples affect the economic outcomes of a central city? As explained earlier, one reason why the presence of same-sex couples could affect the area is related to their demographic characteristics—being less likely to have children and more likely to have attained higher education. These characteristics make them more inclined towards consumption amenities and more likely to supply labor, potentially increasing the economic outcomes in the central area. In this section, I further examine how the presence of same-sex couples affects other potential mechanisms such as demographic compositions and housing situation in an area.

I estimate the following reduced-form relationship between the shift-share instrument and mechanisms:

$$m_{cj}^{t} = \mu + \eta\, B_j + X'_{cj,10}\psi + Z'_{j,10}\,\phi + v_{cj}, \tag{10}$$

where m denotes the mechanism of interest, and t indicates the period the mechanism is measured. I standardize the units of all mechanism variables and the shift-share instrument to one standard deviation. I estimate the regressions of 2000 mechanisms to check for trends prior to the predicted migration. This provides a further diagnostic test analogous to the one in the previous section 3.4. When estimating 2017 mechanisms, I include the respective level in 2010 so that the coefficient for B_j, η, captures the effect of predicted migration on the growth of the mechanism variables.

Figure 3.2 summarizes the results from these regressions. Panel (a) of Figure 3.2 shows that while there is no clear association between the shift-share instrument and many of the 2000 mechanisms, there seem to be some correlations for racial composition and the percentage of owner-occupied housing. Although the directions of the correlations are

not typically indicative of future economic growth, I control for these correlated 2000 mechanisms when analyzing 2017 mechanisms.

Panel (b) of Figure 3.2 shows the effect of the predicted migration on 2017 mechanisms. Tracts with higher predicted in-migration of same-sex couples exhibit higher populations, lower unemployment rates, fewer vacancies, and newer housing units. I find suggestive evidence that these tracts also have more people with professional occupations and owner-occupied housing units.

By contrast, I do not find significant relationships between the instrument and the racial composition, the percentage of college-educated, and the percentage of households that moved into the unit less than 10 years ago. The positive effect of the predicted migration on the total tract population and no effect on the percentage of newcomers suggest that it had an effect that made incumbent residents remain in the area, making the percentage of newcomers break-even even when the total population was increasing.

3.6 Conclusion

This chapter provides empirical evidence on the economic impact of the presence of same-sex couples in downtown areas. By employing a shift-share instrument to address endogeneity concerns, the analysis shows that the concentration of same-sex couples in central city areas has significant positive effects on local economic outcomes.

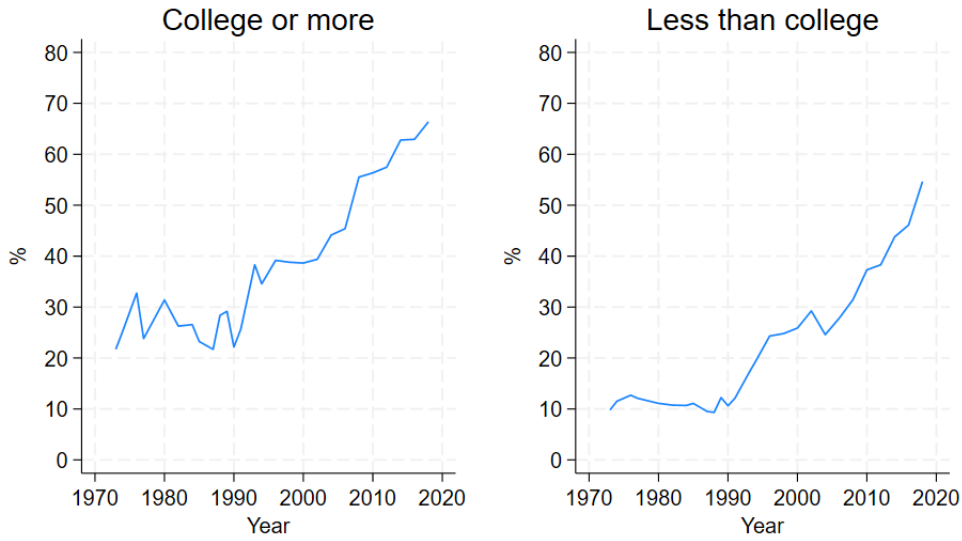
The evidence presented in this chapter supports the hypothesis that the presence of same-sex couples contributes to urban renewal and economic growth in central cities. This underscores the importance of fostering an inclusive and tolerant environment, as it not only supports the well-being of same-sex couples but also promotes broader economic benefits for urban areas.

However, it is important to acknowledge a limitation in the empirical strategy. While the shift-share instrument helps mitigate endogeneity concerns, it assumes that the forma-

tion of same-sex couples is exogenous. This assumption may not fully hold if unobserved factors simultaneously influence both the likelihood of individuals forming same-sex relationships and their migration to central city areas. For example, Makdissi (2023) shows that a significant number of gay and lesbian individuals choose their location in pursuit of a better marriage market. The exogeneity assumption can be violated if individuals form same-sex relationships as a result of moving to more tolerant areas, thereby confounding the effect of same-sex couple concentration on economic outcomes.

Despite this limitation, the results can still be considered reliable under the assumption that any bias introduced by the endogeneity of couple formation is not strongly correlated with the economic outcomes of interest. In other words, if the primary factors driving the economic impact of same-sex couples, such as consumer spending, cultural diversity, and human capital, are not the same factors influencing their formation and migration patterns, and area characteristics included as controls explain enough variation of the endogenous formation, the results in this chapter remain informative.

Figure 3.1: Attitudes toward same-sex relationship by educational attainment



Note: Respondents were asked what they think about same-sex relationships. Options are 1) Always wrong 2) Sometimes wrong 3) Not wrong at all.
Source: General Social Survey 1973-2020, National Opinion Research Center.

Table 3.1: Presence of same-sex couples and downtown economic outcomes

Panel A. First stage				
Shift-share	0.107***	0.108***	0.107***	0.107***
	(0.012)	(0.013)	(0.012)	(0.012)
F-stat	74.22	73.65	78.36	76.11
	Income level		Housing price	
	Median	% Poverty	House value	Rent
	(1)	(2)	(3)	(4)
Panel B. OLS				
% same-sex couples	0.091***	-0.017***	0.111***	0.047**
	(0.019)	(0.006)	(0.035)	(0.021)
R^2	0.8490	0.6768	0.9244	0.8500
Panel C. Reduced form				
Shift-share	0.009***	-0.001	0.012**	0.003
	(0.003)	(0.001)	(0.005)	(0.003)
R^2	0.8482	0.6758	0.9240	0.8494
Panel D. 2SLS				
% same-sex couples	0.084***	-0.006	0.112**	0.024
	(0.024)	(0.008)	(0.046)	(0.026)
Baseline controls	✓	✓	✓	✓
Census region FE	✓	✓	✓	✓
Observations	6329	6329	6329	6329

Note: (a) This table shows the regression results of Equation 9. (b) The level of observation is at the census tract level. (c) Outcomes in columns 1, 3, and 4 are logged. (c) Tract-level controls include respective lagged outcomes in 2010, tract population, distance to the central business district, shares of jobs within 3 miles and 10 miles, and average slope. CBSA-level controls include total population, median household income, median rent, percentage of college-educated, percentage of people working full-time, and weather variables. Standard errors are clustered at the CBSA level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

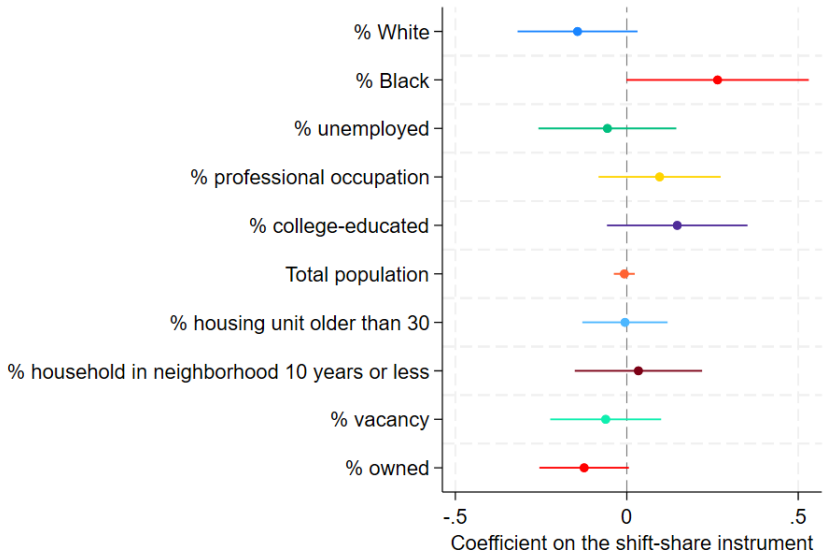
Table 3.2: Correlation of origin state shares with location characteristics in 2000

	(1) CA	(2) NY	(3) FL	(4) TX
Median downtown income, 2000	0.083	-0.060	-0.027	0.047
	(0.125)	(0.122)	(0.085)	(0.118)
College share downtown, 2000	0.092	0.087	0.076	-0.022
	(0.110)	(0.107)	(0.075)	(0.104)
Total population, 2000	0.595***	1.102***	0.206**	0.302**
	(0.146)	(0.141)	(0.099)	(0.137)
N	63	63	63	63
	(5) GA	(6) IL	(7) MD	(8) AZ
Median downtown income, 2000	-0.003	0.039	0.435	0.035
	(0.185)	(0.136)	(0.296)	(0.196)
College share downtown, 2000	0.116	0.073	-0.331	0.012
	(0.163)	(0.119)	(0.260)	(0.172)
Total population, 2000	0.278	0.519***	0.611*	0.184
	(0.216)	(0.158)	(0.345)	(0.228)
N	63	63	63	63

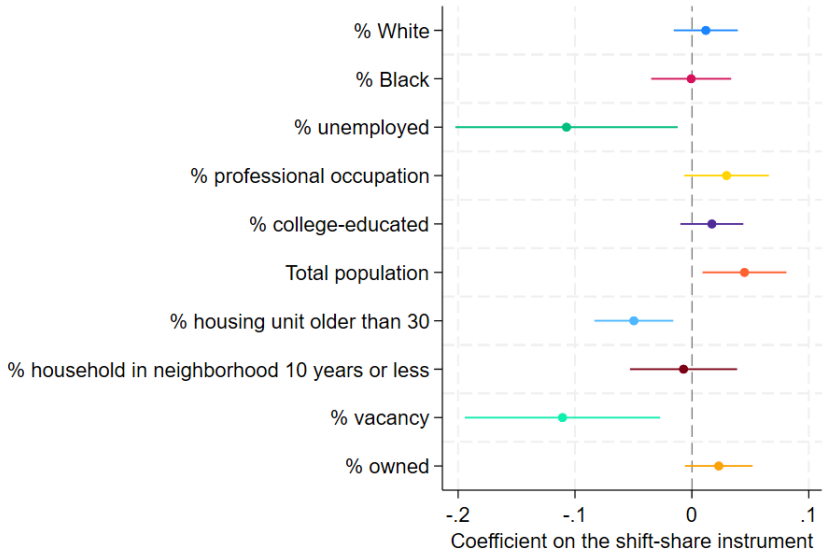
Notes: (a) This table shows results from regressing origin state shares on median downtown income, total population, and college share downtown in 2000. Eight states in the table take up 44% of state out-migration of individuals in same-sex relationships. (b) The unit of median income is $1,000. The unit of total population is 1 million. College share is 0-100 scale. (c) The samples are composed of the sample of CBSAs used in Section 3.3. Source: 2000 Census, ACS 2001-2010 1-year files. Standard errors are clustered at the CBSA level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Figure 3.2: Mechanisms

(a) 2000 mechanisms



(b) 2017 mechanisms



Note: This figure shows the results of the regressions of Equation 10. Each row represents one regression. All variables are standardized to have a standard deviation of 1.
Standard errors are clustered at the CBSA level. Source: Census 2000, ACS 2015-2019.

A Appendix

A.1 Same-sex partners in the Census (based on Goodnature and Neto (2021))

Beginning with the 1990 Decennial Census, respondents were able to choose "unmarried partner" as a response option to describe how they are related to their household head. In 1990, same-sex marriages were not allowed so an edit was necessary for responses that said that the head of the household lived with their same-sex spouse. If the same-sex married couple's marital status indicated that they were "currently married" then the Census edited the sex of the spouse to make the couple an opposite-sex married couple. As the Census considered this a "logical edit," the Census does not flag these allocations.

While the 1990 Census changed the sex to record same-sex married couple households as opposite-sex married households, the 2000 Census changed the relationship to the household head, so that these households are recorded as same-sex unmarried partners. Again, the Census considers this a "logical edit" so the Census does not flag these allocations (Black et al., 2007).

The ACS used the 2000 Census method to deal with same-sex married couples until 2013. The ACS in 2013 and later finally allowed same-sex married couples to be recorded as same-sex married couples.

A.2 Deriving the derivative of bid function with respect to income

Individuals live in a city that has a central business district at the center of the city. All jobs are assumed to be concentrated in the central business district. Suppose there are four types of households: same-sex with and without kids, and heterosexual with and without kids. They decide how far they would live from the center of the city. Each city is assumed to be equivalent to a commuting zone. Hence, in the model, individuals do not have to consider job availability when deciding where to live. Individual i with income y gets utility from composite good Z, housing H, and local amenities. The level of local amenities, $a(x)$, varies with the distance from the city center, x. The maximization problem of an individual i is as follows:

$$\max u^i(Z, H, a(x)) \text{ s.t. } I = Z + p(x) \cdot H + tx.$$

where $p(x)$ is the price of a unit of housing that varies with the distance from the city center, t is the transportation cost, and I is the income level of individual i. $p(x)$ can also be considered as a bid function of the individual i for each location x.

Then, the Lagrangian is

$$L = u^i\left(Z, H, a(x)\right) - \lambda\left[\, Z + p(x)H + tx - I \,\right].$$

Differentiating the Lagrangian with respect to Z and x, respectively, we have

$$\begin{aligned}
\frac{\partial L}{\partial Z} &= \frac{\partial\, u^i}{\partial Z} - \lambda = 0 \\
\frac{\partial L}{\partial x} &= \frac{\partial\, u^i}{\partial\, a} a'(x) - \lambda\left[\, p'(x)H + t \,\right] = 0.
\end{aligned}$$

Solving for $p'(x)$ yields

$$\begin{aligned} p'(x) &= \frac{\left[\frac{\partial u^i/\partial a}{\partial u^i/\partial Z}\right] a'(x) - t}{H} \\ &= \frac{v_a^i\, a'(x) - t}{H}. \end{aligned} \tag{11}$$

In equation (11), the marginal rates of substitution are rewritten as the amenity derivatives of the indirect utility function, $v^i(Z, a(x), p(x))$. Note that v_a^i gives the marginal valuations of amenities after optimal adjustment of housing consumption.

Taking the derivative with respect to income I,

$$\begin{aligned} \frac{\partial\, p'(x)}{\partial I} &= \frac{\partial v_a^i}{\partial I} a'(x) \frac{1}{H} - v_a^i a'(x) \frac{1}{H^2} \frac{\partial H}{\partial I} - \frac{\partial t}{\partial I} \frac{1}{H} + t \frac{1}{H^2} \frac{\partial H}{\partial I} \\ &= \frac{a'(x)}{H} \left[\frac{\partial v_a^i}{\partial I} - \frac{1}{H} v_a^i \frac{\partial H}{\partial I} \right] - \frac{t}{I\, H} \left[\frac{I}{t} \frac{\partial t}{\partial I} - \frac{I}{H} \frac{\partial H}{\partial I} \right] \\ &= \frac{a'(x)\, v_a^i}{I\, H} \left[\frac{I}{v_a^i} \frac{\partial v_a^i}{\partial I} - \frac{I}{H} \frac{\partial H}{\partial I} \right] - \frac{t}{I\, H} \left[\frac{I}{t} \frac{\partial t}{\partial I} - \frac{I}{H} \frac{\partial H}{\partial I} \right] \\ &= \frac{a'(x)\, v_a^i}{I\, H} \left[\varepsilon_{v_a, I} - \varepsilon_{H, I} \right] - \frac{t}{I\, H} \left[\varepsilon_{t, I} - \varepsilon_{H, I} \right] \\ &= -\frac{a'(x)\, v_a^i}{I\, H} \left[\varepsilon_{H, I} - \varepsilon_{v_a, I} \right] + \frac{t}{I\, H} \left[\varepsilon_{H, I} - \varepsilon_{t, I} \right]. \end{aligned}$$

A.3 Center of a city

To determine the geographical coordinates of city centers, Fee and Hartley (2013) find the spatial centroid of the census tracts listed in the 1982 Census of Retail Trade for the central city of the metropolitan area. If a metropolitan area is not included in the 1982 Census of Retail Trade, the latitude and longitude for its central city is obtained using ArcGIS's 10.0 North American Geocoding Service.

B Calculating quality-adjusted rent

Using ACS 2015-2019 5-year pooled data, I run the following regression:

$$\log r_{s,j} = \alpha + \gamma_j + \theta X_s + u_{s,j}$$

where $r_{s,j}$ is rent of the housing unit of household s in PUMA j, γ_j is PUMA fixed effects, and X_s is a vector of structural characteristics of the individual housing units.

From this regression, I obtain a vector of coefficients, $\hat{\theta}$, and PUMA fixed effects $\hat{\gamma}_j$. Sample average values, $\bar{X}$, are then used to define a quality-adjusted rent. The nationwide quality-adjusted rent is calculated as follows:

$$\bar{r} = \exp\left[\hat{\alpha} + \bar{\hat{\gamma}} + \hat{\theta}\bar{X}\right] \tag{12}$$

where $\bar{\hat{\gamma}}$ is the population-weighted average PUMA fixed effects.

Given $\bar{r}$, quality-adjusted rent for each PUMA are obtained by scaling $\bar{r}$ by the exponential of the regression PUMA fixed effects,

$$r_{\text{PUMA}_j} = \bar{r} \exp\left[\hat{\gamma}_j\right].$$

Table A.1: Denominations categorized as evangelical

American Baptist Convention
Lutheran Church - Missouri Synod
Southern Baptist Convention
Wisconsin Evangelical Lutheran Synod
Advent Christian Church
Amish
Apostolic Christian
Assembly of God
Brethren Church, Brethren
Brethren, Plymouth
Christian Reformed
Churches of God (Except with Christ and Holiness)
Church of Christ
Church of God of Prophecy
Evangelical Congregational
Evangelical Free Church
Evangelical United Brethren
Four Square Gospel
Free Methodist
Mennonite
Mennonite Brethren
Missionary Church
Mission Covenant
Nazarene
Open Bible
Pentecostal Church of God
Pentecostal
Pilgrim Holiness
Seventh Day Adventist
Wesleyan

Note: The selection of evangelical denominations followed the categorization provided by Steensland et al. (2000).

Table A.2: First stage: Acceptance and number of evangelical churches

Dependent variable: Log acceptance (log a_j)	
Number of evangelical churches, 1952	-0.015***
(per 10,000 population)	(0.002)
log (population)	-0.014**
	(0.006)
% college	0.057***
	(0.018)
% working fulltime	-0.033
	(0.032)
% Black	-0.078***
	(0.010)
% Hispanic	-0.013
	(0.017)
% Asian	-0.004
	(0.021)
% Having children	0.021
	(0.037)
average age	-0.003
	(0.003)
% born in the US	-0.060**
	(0.028)
Observations	223
Adj. R^2	0.7610
First stage F-statistic	38.32
Kleibergen-Paap LM, p-value	0.001

Note: (a) The dependent variable is the log estimated percentage of people who think same-sex relationships are not wrong. (b) The unit of evangelical churches is per 10,000 population. (c) Evangelical denominations are defined based on Steensland et al. (2000). (d) The first stage F-statistic is to test the hypothesis that the instrument is unrelated to the endogenous regressor. (e) Kleibergen-Paap LM p-value corresponds to the Kleibergen-Paap LM test whose null hypothesis is that the equation is underidentified. Standard errors are clustered at the state level. *** $p < 0.01$
Source: ACS 2015-2019 5-year pooled file, 2018 GSS, 2016 presidential election results.

Table A.3: Evangelical churches and share of same-sex cohabiting partner/friends in 1940

Dependent variable:	Share of same-sex cohabiting partners/friends/roommates (1940)	
	(1)	(2)
Evangelical churches per capita, 1952	-0.0004	-0.0006
	(0.014)	(0.011)
Household size		-0.420***
		(0.078)
Census division FE	✓	✓
Other county characteristics	✓	✓
Number of counties	3068	3068
Adj. R^2	0.3142	0.3544

Note: Evangelical denominations are defined based on Steensland et al. (2000). Standard errors are clustered at the state level.
*** $p < 0.01$
Source: IPUMS complete count 1940 U.S. Census, Boustan (2016).

Table A.4: Correlation between 2017 amenities and 1952 evangelical churches

	(1) Highway traffic	(2) Non-highway traffic	(3) Walkability	(4) Student -teacher ratio	(5) Govt. K-12 spending per student	(6) Employment rate	(7) Violent Patents per capita	(8) Property crimes per capita	(9) crimes per capita	(10) Restaurants per capita	(11) Coffee shops per capita	(12) Bars per capita
Evangelical churches per capita, 1952	0.056	0.007	-0.008	-0.005	0.002	0.058**	0.002	0.018	0.025	-0.055***	-0.017	-0.132***
	(0.037)	(0.035)	(0.021)	(0.010)	(0.007)	(0.027)	(0.022)	(0.016)	(0.022)	(0.018)	(0.017)	(0.039)
log (population)	0.054	0.198**	0.214***	-0.004	0.173	0.006	-0.256***	0.018	0.042	0.013	-0.029	-0.020
	(0.082)	(0.078)	(0.073)	(0.045)	(0.121)	(0.062)	(0.071)	(0.066)	(0.060)	(0.055)	(0.064)	(0.048)
% college	0.748	0.834	0.195	-1.567*	-0.924	6.284**	5.182*	3.215*	4.542**	4.859**	5.759**	3.425
	(3.179)	(4.034)	(2.566)	(0.887)	(2.109)	(2.446)	(2.714)	(1.710)	(2.161)	(2.300)	(2.719)	(3.642)
% working fulltime	6.574**	-5.161*	-1.129	1.161	-2.744	19.132***	-3.924	2.432	1.419	2.149	1.634	4.806
	(2.462)	(2.603)	(3.664)	(1.702)	(1.773)	(2.989)	(2.648)	(3.448)	(3.320)	(2.847)	(3.509)	(3.681)
% Black	0.514	-1.907	1.138	0.612*	0.272	0.733	-0.651	-0.654	-0.196	-0.038	-1.058	-3.062***
	(1.081)	(1.599)	(0.848)	(0.339)	(0.570)	(0.857)	(0.608)	(1.152)	(0.948)	(0.635)	(0.721)	(1.045)
% Hispanic	1.578***	-1.442	0.351	0.692**	0.518	1.789***	1.279	-1.368*	-1.052*	2.359**	1.197	0.076
	(0.574)	(1.029)	(1.103)	(0.273)	(0.682)	(0.520)	(1.316)	(0.738)	(0.606)	(0.929)	(1.472)	(0.859)
% Asian	-0.452	-2.011	0.501	-0.271	0.935	-1.317	15.425***	-1.205	-0.239	0.362	-0.840	-0.755
	(2.144)	(3.775)	(1.834)	(0.432)	(0.836)	(1.599)	(2.377)	(2.524)	(2.953)	(3.172)	(3.989)	(2.111)
% having children	4.732	10.489*	-0.417	2.778**	-6.217*	-1.787	5.454*	-5.159	-5.972	-2.187	-1.823	-1.037
	(4.510)	(5.677)	(4.179)	(1.256)	(3.218)	(4.837)	(3.003)	(6.069)	(6.266)	(4.354)	(5.666)	(3.673)
Average age	0.008	0.007	0.053*	-0.002	-0.014	0.050	0.024	0.023	0.010	0.104***	0.067*	0.124***
	(0.035)	(0.026)	(0.029)	(0.026)	(0.028)	(0.039)	(0.024)	(0.045)	(0.040)	(0.035)	(0.036)	(0.035)
% born in the US	3.750**	-2.525	-0.542	-0.062	-0.504	-0.184	1.410	-3.540	-2.930	3.522	5.275	1.923
	(1.841)	(1.886)	(1.978)	(1.001)	(1.288)	(1.933)	(1.490)	(2.256)	(2.227)	(3.812)	(5.515)	(1.678)
State FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	195	195	221	220	223	221	217	221	221	221	221	221
Adj. R^2	0.4546	0.5231	0.7237	0.9394	0.8826	0.6019	0.5737	0.2714	0.2364	0.7240	0.5798	0.6833

Note: (a) The unit of evangelical churches is per 10,000 population. (b) Evangelical denominations are defined based on Steensland et al. (2000). Standard errors are clustered at the state level.
*** $p < 0.01$
Source: ACS, ARDA, FBI, EPA, NaNDA, USPTO, US Census Bureau.

Table A.5: Regression of difference in same-sex acceptance between destination and origin (Movers)

Dependent variable: Δ % same-sex acceptance ($a_{idt} - a_{iot}$)			
	(1)	(2)	(3)
College degree	1.256***	-0.040	0.032
	(0.082)	(0.076)	(0.074)
Same-sex relationship	1.058***	0.386	-0.202
	(0.342)	(0.321)	(0.311)
College $\times$ Same-sex relationship	1.365***	1.626***	1.485***
	(0.446)	(0.421)	(0.409)
Origin-year fixed effects (μ_{ot})	✓	✓	✓
Individual level controls (X_{it})	✓	✓	✓
Destination characteristics (Z_{dt})		✓	✓
% same-sex couples in destination			✓
Observations	188674	188674	188674
Adj. R^2	0.3504	0.4357	0.4572

Note: (a) The sample is restricted to partnered people aged 25 to 55 who have migrated from one Metropolitan Statistical Area (MSA) to another within the last 12 months. (b) Other controls include income, sex, age, age squared, race, presence of child, and years in the U.S.
Standard errors are clustered at the origin-year level.*** $p < 0.01$
Source: ACS 2005-2019.

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Jooyoung Kim

Syracuse University
Department of Economics
043 Eggers Hall
Syracuse, NY 13210

Email: jooyoung.j.kim@gmail.com
Phone: +1 (315) 751-5368
Website: https://www.jooyoungkim.org

Education

Ph.D. in Economics, Syracuse University, 2024.
Dissertation: "Location Choice of Same-Sex Couples"
Dissertation committee: Alexander D. Rothenberg, Gary Engelhardt, Stuart Rosenthal, Thomas Pearson, and Jun Li.

M.A. in Economics, Korea University, 2019.

B.A. in Economics and Korean Law, *summa cum laude*, Handong Global University, 2016.

Research Fields

Labor Economics, Urban Economics.

Working Papers

"Acceptance and Educational Sorting of Same-sex Couples" (*Job market paper*)

"How Do Same-sex Couples Affect Central Cities?"

Work in Progress

"Beyond Bandaids: Why Mega-Scale Financial Incentives Won't Cure South Korea's Fertility Woes" (joint with Hugo Jales)

"The Impact of Charter Schools on Segregation by English Learner Status"

Presentations

AEA Economics of LGBTQ+ Individuals Virtual Seminar, April 2024.

Halle Institute for Economic Research (IWH), April 2024.

Korea Institute for International Economic Policy (KIEP), January 2024.

Korea Institute for Industrial Economics and Trade (KIET), January 2024.

Applied Micro Seminar, Syracuse University, November 2023.

The Western Economic Association International (WEAI) 98th Annual Conference, San Diego, July 2023.

12th European Meeting of the Urban Economics Association (UEA), Milan, May 2023.

Graduate Student Seminar, Center for Policy Research (CPR), Syracuse University, April 2023.

Labor Group Meeting, Syracuse University, 2022-2023.

Research Experience

Graduate Associate, Center for Policy Research (CPR), Syracuse University, 2022-2024.

Research Assistant to Prof. Maria Zhu, 2024.

Research Assistant to Prof. Monica Deza, Syracuse University, 2023-2024.

Research Assistant to Prof. Stuart Rosenthal, Syracuse University, 2022-2023.

Researcher, Korea Small Business Institute, 2019.

Teaching Experience

Instructor, Syracuse University

Intermediate Microeconomics, Summer 2021.

Teaching Assistant, Syracuse University

Introduction to Microeconomics, Spring 2020, Summer 2023.

Introduction to Stats and Econometrics, Spring 2021.

Economic Statistics, Fall 2020.

Economic Ideas and Issues, Fall 2019.

Teaching Assistant, Korea University

Microeconomic Theory I (*graduate*), Spring 2018.

Microeconomic Theory, Fall 2018, Fall 2017.

Teaching Assistant, Handong Global University

Introduction to Economics, Fall 2016.

Theory of Games and Information, Fall 2015.

Macroeconomics, Fall 2014.

Awards and Honors

Summer Training Stipend Winner, Syracuse University, 2022.

Brain Korea 21 Research Scholarship, Korea University, Fall 2017, Fall 2018.

Jang Eung-bok Scholarship Award, Handong Global University, 2016.

Global Leader Scholarship, Handong Global University, 2010-2016.

Languages

English (fluent), Korean (native)

Computer Skills

Python, R, Stata, SQL, ArcGIS, LaTeX

References

Professor Stuart Rosenthal
Paul Rubacha Department
of Real Estate
Cornell University
(607) 253-2391
sr784@cornell.edu

Professor Alexander Rothenberg
Department of Economics
Syracuse University
(315) 443-3114
adrothen@syr.edu

Professor Gary Engelhardt
Department of Economics
Syracuse University
(315) 443-4598
gvengelh@syr.edu