Same-Sex Couples and the Child Earnings Penalty[1]

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Abstract

Existing work has shown that the entry of a child into a household results in a large and sustained increase in the earnings gap between male and female partners in opposite-sex couples. Potential reasons for this include work-life preferences, comparative advantage over earnings, and gender norms. We expand this analysis of the child penalty to examine earnings of individuals in same-sex couples in the U.S. around the time their first child enters the household. Using linked survey and administrative data and event-study methodology, we confirm earlier work finding a child penalty for women in opposite-sex couples. We find this is true even when the female partner is the primary earner pre-parenthood, lending support to the importance of gender norms in opposite-sex couples. By contrast, in both female and male same-sex couples, earnings changes associated with child entry differ by the relative pre-parenthood earnings of the partners: secondary earners see an increase in earnings, while on average the earnings of primary and equal earners remain relatively constant. While this finding seems supportive of a norm related to equality within same-sex couples, transition analysis suggests a more complicated story.

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1 Introduction

When a woman living in the United States has a child, her earnings fall by on average 21-61% depending on her state of residence (Kleven 2022). This phenomenon, known as the "child penalty," has been observed in various countries and is significant and persistent even in places where safety nets and job protections are robust (Kleven, Landais, and Søgaard 2019). Although the child penalty results in a large and sustained increase in the earnings gap within opposite-sex couples (Angelov, Johansson, and Lindahl 2016; Chung et al. 2017), less is known about the child penalty for same-sex couples.[2] By comparing the earnings dynamics of opposite-sex and same-sex couples, we aim to understand the extent to which the child penalty is driven by earnings and/or work-life preferences versus by societal gender norms or equality norms that impact the labor and home production decisions when childcare responsibilities are introduced.

Based on our naïve a priori assumptions, we expect that the earnings and work-life preferences of same-sex couples will be comparable to those of opposite-sex couples. However, we expect that the dynamics of gender norms within same-sex couples will differ from those within opposite-sex couples. This difference allows us to focus on the household bargaining framework and explore how pre-parenthood earnings, as a measure of expected post-child earnings, are related to the labor/home production tradeoffs of the partners. Specifically, we explore whether one member of a same-sex couple assumes a primary caregiver role, resulting in an increase in the earnings gap after the child enters the household, or whether the additional demand on their time is more equally shared than in opposite-sex couples.

In addition to examining how individuals' earnings change, we also explore the effect of a child on the combined earnings of the couple. We aim to determine if household earnings trends change with the arrival of a child. Although most studies on the child penalty do not explicitly measure this, if male partners experience no change in their earnings after having a child and female partners experience a significant decrease, we would expect to see a decrease in household earnings in opposite-sex households. Our study explores whether this potential decrease in household earnings also exists for same-sex couples. Furthermore, the path of household earnings when a child enters has not been documented for same-sex couples in the U.S. and may depend on how the couple distributes home and market production within the household bargaining framework.

We develop a simple theoretical model to explore the factors that influence the division of time between home production and paid work when a child enters a household. This simple model abstracts away from the differences in preferences for children and constraints across opposite-sex, male same-sex, and female same-sex couples. We consider four possible decisions regarding the allocation of additional child-related home production work: allocation based on equality, allocation based on comparative advantage of earnings, allocation based on work-life preferences, and allocation based on societal gender norms.

We use an event-study design to estimate the earnings trends around the entrance of the first child. Following the methodology of Kleven, Landais, and Søgaard (2019), Andresen and Nix (2022), and others, we compare earnings in quarters after a child enters the household to

[2] Throughout the paper, we adopt the naming convention from the American Community Survey (ACS) of "same-sex" and "opposite-sex" couples. Thus our convention defines the experience, for example, of a gay male with a female partner as being part of an opposite-sex couple. We acknowledge that this convention cannot capture the full range of complex identities and behaviors.

earnings six quarters before the first child. In our main specification, we use inverse propensity weights to ensure that same-sex couples and opposite-sex couples have similar background characteristics, enabling us to compare couples whose income trajectories should be the same if not for the introduction of a child.

Our empirical analysis uses data from the American Community Survey (ACS) to obtain measures of couples (both spouses and unmarried partners), their identifying characteristics, and their children. We supplement the ACS data with date of birth data from the Census Numident and Internal Revenue Service (IRS) 1040 tax returns. This supplementary data allows us to be more precise about the date of birth of the first child or the date when an adopted child first enters the household. Finally, we define our outcomes of interest using individual quarterly earnings from the Longitudinal Employer-Household Dynamics (LEHD) dataset covering years 2005-2021. These data include quarterly earnings records collected by state unemployment insurance (UI) programs and provide coverage for over 95% of private-sector workers, as well as almost all state and local government employment (Abowd et al. (2009)).

To preview our results, we find that the child penalty in opposite-sex couples applies almost exclusively to the female partner even if she was the primary earner before parenthood. In contrast, neither partner in same-sex male or same-sex female couples experiences as strong or persistent a drop in earnings as females in opposite-sex partnerships. If anything, our results are suggestive of a trend of equalization of earnings post-child, with the primary earners experiencing no change in earnings and the secondary earners increasing earnings. However, we also see that among same-sex equal earners, there is a shift toward specialization after the child enters. At the household level, we find that both opposite-sex and same-sex households experience a reduction in earnings in the year following the child's arrival, regardless of how the earnings losses are distributed across partners.

Disaggregating the results into intensive and extensive margins of earnings changes, we see that the sustained losses of women in opposite-sex couples primarily come from movement out of the labor force. For those that stay in the labor force, earnings recover within a year of the child's arrival. For men in opposite-sex couples, the upwards earnings trend post-child is even greater for primary and equal earner men when only considering the intensive margin. Secondary earner men are more likely to be employed post-child than pre-child, so the growth at the extensive margin is larger for them than the growth at the intensive margin.

For both male and female same-sex couples, we see growth in earnings at the intensive margin for primary earners, while the trend in total earnings remains close to zero. This is also true of equal earners in same-sex couples. For secondary earners in same-sex couples, the change in earnings at the intensive margin is very close to the overall change in earnings, suggesting that there is limited extensive margin adjustment amongst secondary earners in same-sex couples after a child enters the household.

The paper is organized as follows: Section 2 provides a literature review and describes our contributions to that literature; Section 3 outlines our theoretical framework; Section 4 describes our data and methodology; Section 5 presents our results; and Section 6 provides discussion of the implications of our results and possible future research directions.

2 Literature Review

We contribute to two strands of literature by examining the earnings impact of the first child

for same-sex (both female and male) versus opposite-sex couples in the United States. First, we provide a novel view of parental earnings penalties in the U.S., estimating effects for both members of the couple. Second, we contribute to the growing literature describing the characteristics of same-sex couples. Our paper builds on previous work combining these two threads that uses Scandinavian data; we analyze the earnings dynamics in the U.S. context, where the social safety net for new parents is more porous both with respect to parental leave and childcare. The larger U.S. population also allows us to separately explore the patterns in earnings of same-sex *male* couples with children which was not possible in the Scandinavian countries studied.

Much of this work builds on insights from Becker's (1965) classic household comparative advantage model. According to this model, we would expect the partner with higher earnings to specialize in paid market work and the partner with lower earnings to assume greater responsibility for home production work. It becomes challenging to disentangle the effects of gender norms from those of comparative advantage when higher earnings tend to accrue to one sex.

Previous studies have shown that the earnings gap widens among individuals in *opposite-sex* couples when they have children (Chung et al. 2017 in the U.S.; Angelov, Johansson, and Lindahl 2016 in Sweden). Kleven, Landais, and Søgaard (2021) find that the child penalty exists even when couples adopt. Other studies focus on mothers and show that their earnings decline, presumably leading to an increase in the earnings gap within couples (Byker 2016; Hotchkiss, Pitts, and Walker 2017; Kleven, Landais, and Søgaard 2019; Kuziemko et al. 2018; Neumeier, Sørensen, and Webber 2018; Sandler and Szembrot 2019). Kleven et al. (2019) show that opposite-sex couples in Scandinavian countries experience smaller child penalties than in the United States.

Our analysis comparing patterns between opposite-sex couples and same-sex couples highlights the role of gender norms, which Kleven (2022) shows has an important role in the geographical distribution of the child penalty across the U.S. Using both spatial and temporal variation, he finds that gender norms are an important determinant of the presence and magnitude of a child penalty. For example, in Utah the earnings penalty is 61% while in Vermont it is only 21%.

Most of the evidence regarding the parental earnings gap for same-sex couples comes from Scandinavian countries. However, these studies have been unable to investigate *male* same-sex couples with children due to their small numbers. Therefore, this paper makes another important contribution by investigating parental earnings gaps among male same-sex couples. Andresen and Nix (2022) explore the differences between three groups of couples (opposite-sex adopting; opposite-sex not adopting; and female same-sex) to better understand the mechanisms underlying the child penalty. Using Norwegian data, they find that females in opposite-sex couples experience a substantial child penalty upon the birth of the child, but males in opposite-sex couples do not. Both parents in female same-sex couples experience a child penalty, but it is larger for the birth mother. They conclude that the long-term child penalty is not driven by giving birth or male labor market advantage, since there is recovery in even the birth-mother's earnings in same-sex couples. Instead, they suggest that preferences, gender norms, and discrimination play a significant role.

A number of studies have identified characteristics of same-sex couples that lead us to anticipate differences in the child penalty between opposite-sex and same-sex couples, as well as

to anticipate differences within same-sex couple by gender. Same-sex couples are more likely to assortatively match on some dimensions, leaving less opportunity for specialization within couple. For example, Ciscato, Galichon, and Gouse (2020) examine homogamy in couples over race, age, and education using 2008-2012 ACS data for California. They find that same-sex couples, especially female same-sex couples, are more likely to have similar educational attainment. Black, Sanders, and Taylor (2007) similarly note that, based on Becker's (1991) theory of specialization, "we expect to observe less household specialization in gay and lesbian couples." (p. 61) On the other hand, same-sex couples are less similar on other dimensions; Ciscato, Galichon, and Gouse (2020) document that they are more likely to be different races and ages than opposite-sex couples.

Relatedly, same-sex couples are more likely to have smaller earnings gaps compared to opposite-sex couples. Antecol and Steinberger (2013) and Jepsen and Jepsen (2015) use data from the 2000 Decennial Census to show that same-sex couples in the U.S. have smaller earnings gaps than opposite-sex couples, mostly due to differences in the presence and number of children. Black, Sanders, and Taylor (2007) find that same-sex couples are more likely to be dual-earner households than opposite-sex couples. Though when they are not dual-earner households, the "stay-at-home" partner is more likely to be the one with lower education for both opposite-sex and same-sex partners. Both same-sex and opposite-sex couples are more likely to be single-earner households once they have children.[3] In terms of empirical evidence of specialization, Hofmarcher and Plug (2021) use the ATUS and find that opposite-sex couples tend to specialize more than same-sex couples. This difference is driven by strongly specializing couples where the female partner is out of the labor force. Giddings et al. (2014) use ACS and Decennial data and find that there is less specialization in same-sex couples as compared to opposite-sex couples, but this gap is shrinking over time.

Traditional gender norms that place the time cost of childcare on the female partner will function differently, if at all, in same-sex couples. However, other norms may take their place. For example, in female same-sex couples, there could be a norm that the birth mother takes on more of the childcare duties, as Andresen and Nix (2022) find in the short run for same-sex female couples in Norway. Similarly, in male same-sex couples, there could be a norm where one partner takes on more of the childcare if they are genetically related to the child. Bauer (2016) summarizes the findings of Blumstein and Schwartz's book (1983) succinctly capturing the defining patterns of all three couple types for distribution of household tasks: "The overall workload from household duties was more equally distributed within same-sex than within different-sex childless married couples." (p. 100) This equality is attained in male same-sex couples through specialization by tasks and in female same-sex couples by jointly undertaking tasks or alternating tasks.

Prickett, Martin-Storey, and Crosnoe (2015) use the American Time Use Survey (ATUS) to examine how parents spend time with children. They find that women in both same-sex and opposite-sex couples and men in same-sex couples spend significantly more time with children than men in opposite-sex couples. Additionally, there may be a stronger culture of coparenting in

[3] Additional evidence from Hansen, Martell, and Roncolato (2019) shows that marriage equality laws increased specialization within same-sex female households. Since married same-sex couples are more likely to have children than unmarried, that increase in specialization could be in line with Black, Sanders, and Taylor's (2007) application of Becker's theory.

female same-sex couples. Genadek, Flood, and Roman (2020) use the ATUS to examine the amount of time couples spend together and find that female same-sex couples spend more time together overall and coparent more than opposite-sex couples, who in turn coparent more than male same-sex couples.[4] Using international data and focusing on four household tasks (not including childcare), Bauer (2016) finds that female same-sex couples share housework tasks more than male same-sex couples and more than opposite-sex couples (the percent of shared housework tasks are 41%, 33%, and 28% respectively).

Another difference between same-sex and opposite-sex couples is their family structure. Same-sex couples tend to have fewer children and the children they have are typically older. The children of same-sex couples are more likely to have come from earlier relationships (Genadek, Flood, and Roman (2020)). Same-sex couples are also more likely to have adopted children or stepchildren than opposite-sex couples (Badgett, Carpenter, and Sansone (2021)). Walker and Taylor (2021) estimate that 17.2% of married same-sex couples (5.9% of unmarried) live in households with only adopted children, compared to 1.7% of married opposite-sex couples (0.6% of unmarried). Same-sex couples are also more likely to foster children, with 1.7% of married same-sex couple households (1.2% for unmarried partners) fostering children compared to 0.2% of married opposite-sex couple households (0.1% for unmarried partners).

3 Theoretical Framework for Household Choice after Entry of First Child

We develop a theoretical framework for understanding household choices made around the arrival of the first child in a household. Our focus is on decisions made after the entry of the child, so we do not model differences in preferences for having children. Since we do not have information on the identity of the birth parent, we do not model differences based on this important, but omitted, characteristic.[5] We also do not explicitly model any additional constraints that same-sex couples may face in becoming parents, which may differ from those faced by opposite-sex couples.[6]

We define two types of people, male (M) and female (F), who each receive a random initial draw from earnings distributions with mean $\overline{W_M}$ and $\overline{W_F}$ where $\overline{W_M} > \overline{W_F}$. Earnings are distributed normally except for a wage floor at zero; variance is equal across the two types. After the initial wage draws from their respective earnings distribution, individuals' wages increase annually based on the number of hours they work.[7] Full-time workers see a larger growth in their

[4] Both studies using the ATUS caution about interpretation given the very small sample sizes for same-sex couples.
[5] Like opposite-sex couples who face fertility issues, same-sex couples also face biological issues that can affect which, if either, of the members of the couple will be biologically related to the child and, for female same-sex couples, if either member of the couple carries the child through pregnancy. For couples who adopt, the timing and age of the child at adoption are also potential choice variables.
[6] Some of these additional constraints reflect existing laws that treat parental rights differently for same-sex couples. For example, while all 50 states allow same-sex couples to adopt children, 17 states have no explicit protections against discrimination based on sexual orientation or gender identity, and 12 states allow state-licensed child-welfare agencies to refuse to place children in families if doing so conflicts with their religious beliefs (according to the Movement Advancement Project, see https://www.lgbtmap.org/equality-maps/foster_and_adoption_laws). In addition, since same-sex couples are less likely to live near their places of birth (Black, Sanders, and Taylor (2007)), they may be less able to rely on extended family resources for childcare, limiting their choice set.
[7] A more complicated model would allow for wages to vary with flexibility (i.e., a lower paying job that provides greater time flexibility). For now, we think of our model as proxying for the choice of lower pay/more flexibility by simply modeling the adjustment in total hours.

wages than part-time workers each year. We consider three types of couples consisting of different combinations of types M and F individuals: opposite-sex couples (MF), male same-sex couples (MM), and female same-sex couples (FF).

The utility function for the household can be represented as:

$$U = U(C, l, h) \tag{1}$$

Where:

C is the household's consumption level

l is the household's leisure time

h is the household's pre-child home production hours

The household faces a time constraint given by the change in household production, which can be represented by the following equations:

$$k_1 + k_2 + (h_T + Z) + s_1 + s_2 + l_1 + l_2 = 48 \tag{2}$$

$$h_T + Z = h_1 + Z_1 + h_2 + Z_2 \tag{3}$$

Where:

subscripts refer to adult individuals i = 1 and 2 in the couple

k_1 and k_2 are the hours worked per day

s_1 and s_2 are the hours used for sleeping

l_1 and l_2 are the hours per day used for leisure

h_T is the household's pre-child home production hours

$h_T + Z$ is the household's post-child home production hours

Z_1 and Z_2 are the additional hours per day used for home production after the child's arrival

48 represents the maximum available hours per day at the household level

The household maximizes its utility subject to the time constraint above and to the budget constraint:

$$W_1 k_1 + W_2 k_2 = C \tag{4}$$

Prior to the arrival of their first child, both type M and type F individuals work k_i hours per day, resulting in annual earnings of $Earnings_i = w_i * k_i * 5 * 52$. The remaining time is allocated to sleeping (s hours, assumed to be fixed for both M and F at 8 hours), home production (h hours), and leisure (l hours). In the pre-parenthood period, the joint contribution of each couple to household production is $h_T = h_1 + h_2$ hours.

When the first child enters the household, the amount of time required for household production increases. The joint household production that occurred pre-parenthood can be reduced or performed concurrently with childcare some of the time, so the total household production required after having a child is $h_T + Z$ hours where $Z < 24 - s_i$. Parents may use their leisure time for some of this extra production, but even if the leisure time were non-overlapping between the members of the couple and could be used efficiently for childcare, there will still be a deficit of home production that will need to be compensated for by reducing the number of hours spent on paid work.

The couple will choose how to allocate the additional household production hours among themselves using one of four possible scenarios. 1) Split Equally: both partners reduce their work

hours equally by switching to a part-time work schedule. 2) Specialization in Earnings: the higher-earning partner maintains their full-time job while the lower-earning partner performs all of the extra household production. 3) Specialization in Preferences: the partner with the stronger preference for home production or weaker preference for work, regardless of their earnings, performs all the extra household production. 4) Gender Norms: the couple follows traditional gender norms to determine which partner takes on the extra household production.[8] These four scenarios are further formalized below.

Scenario 1: Split Equally

In this scenario, the couple will reduce their work hours by the same amount and allocate the additional time to home production.

The constraint for this scenario can be represented as:

$$k_1' = k_1 - \frac{Z}{2} \tag{5a}$$

$$k_2' = k_2 - \frac{Z}{2} \tag{5b}$$

Which reduces the budget constraint so that

$$W_1 k_1' + W_2 k_2' = W_1 \left(k_1 - \frac{Z}{2}\right) + W_2 \left(k_2 - \frac{Z}{2}\right) = C - \left(\frac{W_1 Z}{2} + \frac{W_2 Z}{2}\right) \tag{5c}$$

This scenario predicts that earnings of both members of the couple decrease as does the total household budget after the child enters the household.

Scenario 2: Comparative Advantage in Earnings

In this scenario, the partner with the lower earnings will take on all the additional home production, while the other partner's hours will remain unchanged.

The constraint for this scenario can be represented as:

$$k_1' = k_1 \tag{6a}$$

$$k_2' = k_2 - Z \tag{6b}$$

The household budget constraint is reduced to

$$W_1 k_1' + W_2 k_2' = W_1 k_1 + W_2 (k_2 - Z) = C - W_2 Z \tag{6c}$$

Where $W_1 > W_2$.

This scenario predicts that the earnings of only the partner with lower pre-child earnings will decrease.

Scenario 3: Specialization in Work-Life Preferences

In this scenario, the partner with a larger preference for home production or smaller preference for work, regardless of earnings level, will take on all of the additional home production, while the other partner's hours will remain unchanged.

Let $i = 1, j = 2$ if $U_1(h) > U_2(h)$, otherwise $i = 2, j = 1$. The constraint for this scenario can be represented as:

$$h_T + Z = h_i + Z_i + h_j \tag{7a}$$

[8] If we had information on birth parent or donor parent, we could broaden this to include other social norms such as the birth parent being more likely to leave the labor market (relevant for FF couples) or the donor parent being more likely to leave the labor market (relevant for MM couples).

And the household budget constraint is reduced to

$$W_i(k_i - Z) + W_j k_j = C - W_i Z \quad (7b)$$

This scenario predicts that the earnings of only the partner with lower preference for work will decrease. The total household budget will be reduced by the wages of the individual with higher household production preferences for every hour of time that is used for household production rather than labor.

Scenario 4: Gender Norms

In this scenario, the couple will follow gender norms in allocating additional home production hours. We assume that this scenario applies only to opposite-sex couples.

Let $i = W$ if the individual is female. The constraint can be represented as:

$$h_T + Z = h_t + Z_i \quad (8a)$$

And the household budget constraint is reduced to

$$W_i(k_i - Z) + W_j k_j = C - W_i Z \quad (8b)$$

This scenario predicts that the earnings of only the female individual in the MF couple will decrease. The total household budget will be reduced by the wages of the female individual.

Expansion to Dynamic Model

In a two-period model (before and after child), all four scenarios result in earnings losses at the household level if the two spouses earn the same amount. When individual 1 earns more than individual 2 and earnings are not perfectly correlated with preference for work or gender, the second scenario results in the smallest household earnings loss.

To expand beyond the two-period model into a dynamic setting, we simulate this model using a synthetic set of 2,000 individuals with $\overline{w_M} = 30, \overline{w_F} = 25$, $\sigma_M = \sigma_F = 10$. The individuals are categorized such that there are 1000 men, 1000 women, 500 opposite-sex couples, and 250 each of male same-sex and female same-sex couples. We categorize individuals within a couple as primary or secondary earners based on their initial earnings draw. We simulate the four scenarios for all three couple types with the exception of Scenario 4 which we only simulate for opposite-sex couples.

After the first year, those couples that earn enough (in our simulations, determined by earnings being larger than average earnings in that period) can opt to pay for childcare. Childcare can cover half of the hours deficit in the second through fourth years and the full deficit starting in the fifth year. Thus, the initial increase in required number of hours for household production that was brought on by the child declines over time when childcare can be purchased (and as long as the household does not add other children). Some families choose not to use childcare, even if they can afford it, if the partner working less than full time has a high preference for home production and/or a low preference for work. In this model, a high preference for home production can also be conceptualized as a distaste for paid childcare.

Figure 1 shows results from our simulation exercises for both opposite-sex and same-sex couples (panel A and panel B, respectively). The overall trends are similar across same-sex and opposite-sex couples. In Scenario 1 (Split Equally), all individuals experience a small decrease in earnings after having a child, with a subsequent recovery once childcare becomes available. In Scenario 2 (Comparative Advantage in Earnings), primary earners (both male and female) maintain their pre-parenthood earnings trajectory, while secondary earners suffer large earnings

losses that do not fully recover. In Scenario 3 (Specialization in Preferences) there is a decrease in average earnings for all groups, with a somewhat smaller decline for secondary earners (relative to pre-parenthood earnings). The recovery in earnings is steadier than in the equal split scenario, since one member of the couple continues to earn full-time wages and experiences earnings growth each period. Finally, in Scenario 4 (Gender Norms) among opposite-sex couples both primary and secondary earner women experience a decline in earnings. The earnings growth for secondary earner men is slower than that for primary earner men, as earnings growth is based on pre-parenthood earnings levels.

In our empirical exercises, we are able to test for Scenarios 1, 2, and 4. Unfortunately, we do not have a good measure to determine which member of a couple has a stronger preference for market work versus household work, so we are unable to explicitly test for Scenario 3. Since preference over market work is likely correlated with pre-parenthood earnings, simply comparing the empirical trends to the simulation results does not provide a strong test of Scenario 3. For example, the model predicts that earnings would decrease for all groups, but if empirically those who have a lower preference for market work are more likely to be secondary earners, seeing a larger drop in earnings for secondary earners would also be consistent with Scenario 3.

The model presented here focuses on the choices made by couples, rather than the choices of employers, except through the lower average pre-parenthood wage for women. However, discrimination in the labor market, particularly against women and individuals in same-sex couples, has been well-documented in the literature. This and other factors could drive a wedge between the patterns we see in the actual data and the results from this simple model of household decision-making.

4 Data and Methodology

We rely on two primary data sources, the American Community Survey (ACS) and the Longitudinal Employer-Household Dynamics (LEHD) dataset. The ACS provides us with demographic and relationship information, while the LEHD gives us administrative earnings data used to construct our outcome variables. We also use administrative data from Internal Revenue Service (IRS) 1040 forms and the Census Numident to verify key variables from the survey data, in particular the date of birth and date of child entry into the household. We link these various sources of data using unique identifiers called Personal Identification Keys (PIKs) to construct a comprehensive dataset, as we detail in the appendix.

4.1 American Community Survey (ACS)

For our analysis, we focus on a sample of couples with children from the 2013-2019 ACS. The ACS is sent to approximately 290,000 addresses each month, totaling about 3.5 million addresses annually. Statistics from the ACS are currently published in annual formats of 1-year and 5-year estimates; we use the 1-year estimates for 2013-2019. The ACS collects detailed information for up to 5 people in the household and less detailed information for up to 7 additional household members.

We identify couples and children in the ACS using question 2, which asks about the relationship to "Person 1". The question includes 15 checkbox responses for 2013-2018, with the options "Husband or wife" and "Unmarried partner" for identifying couples. From 2019 onward, the relationship question responses are disaggregated into further categories: "Opposite-

sex" and "Same-sex" (see Appendix, and especially Figure A1, for a detailed discussion of this question over time). Thus, prior to 2019 we determine "opposite-sex" and "same-sex" using the relationship question combined with the question about sex, while in 2019 we can simply use the relationship question.[9] In all years, we define a couple as "spouses" or "unmarried partners." This definition is based on a point-in-time indicator of couplehood, as we do not have a longitudinal measure of couple status. This means we cannot confirm that couples are together during the entire earnings period in our sample.[10]

The question about sex (question 3) provides checkboxes for male and female. We are concerned that survey errors may lead to discrepancies between the survey-reported same sex couple status and actual same-sex couple status. Kreider, Bates, and Mayol-García (2017) note "When two groups are related, and a very small proportion of the large group makes mismarks, their answers can affect the estimates of the smaller group." However, we decided not to use a second source to identify sex of individuals in our sample - the Census Numident, which sources sex from Social Security Administration (SSA) administrative records – due to other concerns.[11]

The ACS relationship question includes four checkbox responses for children (biological, adopted, step, and foster children). In our analyses, we include biological, adopted, and stepchildren, but exclude foster children due to difficulties identifying when they enter and exit a household, as well as the different relationship dynamics involved. We use birth dates in the ACS to identify the timing of the child's birth for up to three children per household[12] and we validate those birth dates using the Census Numident. To accurately identify when the child enters the household in the case of adoption, we use IRS 1040 data, using the year in which the child is first claimed by the head and/or partner as the year of entry for our empirical strategy.[13]

According to data from the 2019 ACS,[14] there are around 66 million couples in the U.S., with the majority being married couples (58 million as compared to 8 million unmarried partners). Of these 66 million couples, 65 million are opposite-sex couples. The remaining one million are same-sex couples, comprised of 462,215 male same-sex couples and 518,061 female same-sex couples. This means opposite-sex couples account for roughly 98.5% of couples, with male same-sex couples and female same-sex couples comprising 0.7% and 0.8% respectively. It is important to note that our sample will differ from the above estimates because we are only including couples with children, we pool our sample over multiple ACS years, and we only include couples who both match to the LEHD employment data pre-parenthood. Table 1

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[9] Until 2013, people of the same sex who reported themselves as married in the American Community Survey were edited to be unmarried partners.

[10] In order to pin down partners in the household during the period around the entrance of the child, we could narrow our focus to married couples and use the date of marriage question in the ACS. However, this is not a viable strategy at this time because of the insufficient same-sex married couple sample size.

[11] Note in both survey and administrative data, the concept collected is sex, not gender. By including only those people who have both survey-reported and administrative sex that match, we would likely exclude a subsample of transgender couples. Without more detailed questions on sexual orientation and gender identity (SOGI), these individuals, as well as LGBTQIA+ individuals that are not part of a couple at the time they are surveyed, are difficult to identify in the data. An excellent overview of current research into this measurement question is the National Academies of Sciences, Engineering, and Medicine report: https://www.nationalacademies.org/our-work/measuring-sex-gender-identity-and-sexual-orientation-for-the-national-institutes-of-health.

[12] Question 4 of the ACS asks about the age of the person and their date of birth. Since we are constraining our sample to couples, the couple accounts for two of the five persons about which detailed questions are asked.

[13] See Appendix A2 for more details about the measurement of child-timing for adopted children.

[14] Same-Sex Couples Publications (census.gov)

provides the number of same-sex male, same-sex female, and opposite-sex couples in our ACS sample. It shows that opposite-sex couples account for about 99.4% of couples in our sample, with 0.1% male same-sex couples and 0.4% female same-sex couples.

Fisher, Gee, and Looney (2018) show that only 0.48% of joint tax filers are same-sex couples, but ACS survey data shows a higher rate. There are several reasons why we would expect survey data to yield a higher number of same-sex couples than joint tax filings. First, one member of the couple may not earn taxable income. Second, they may choose not to file jointly; they may have to file separately for their state taxes and choose to file federal taxes separately as well for logistical ease. They also may be following a practice of filing separate taxes that they established before 2013 when they could not file federal taxes jointly. Fisher, Gee, and Looney study tax filings from 2013 to 2015; those years do not fully capture the additional time it takes couples to adjust their filing practices after the legalization of same-sex marriage, which did not happen at the federal level until 2015.

Fisher, Gee, and Looney (2018) also find that 7% of male same-sex joint tax filers and 28% of female same-sex joint tax filers have dependents. Interestingly, given the differences in the total percentages, the rate of same-sex couples with children in the tax data is roughly similar to the 10% of male and 22% female same-sex couples with children in the 2008-2018 ACS survey data (Badgett, Carpenter, and Sansone, 2021). Joint tax filers may overrepresent couples with children, since there are several tax breaks that make filing jointly more beneficial for those with dependents. On the other hand, in couples with dependents, one of the partners is more likely to not have taxable income (Black, Sanders, and Taylor, 2007).

4.2 Longitudinal Employer-Household Dynamics (LEHD) Data

We use data from the Census Bureau's Longitudinal Employer-Household Dynamics (LEHD) to measure earnings. These data provide quarterly earnings records collected by state unemployment insurance (UI) programs, linked to establishment-level data from the Quarterly Census of Employment and Wages (QCEW). LEHD data cover over 95% of private-sector workers and almost all state and local government employment (Abowd et al. (2009)). We use LEHD data for all private-sector and public-sector employers from 2005-2021. The earnings measure we use throughout the paper is aggregate earnings from all employers in a given quarter and are real (2010) earnings. We winsorize earnings at the 99th percentile.

Our sample of parental earnings is an unbalanced panel. We include births as early as 2000 in our sample and as late as 2019 the last year of ACS available to us. We estimate 20 quarters (5 years) forward, so couples with children born in 2016-2019 will not be represented in all quarters. The analysis using a balanced panel, excluding these partially covered couples, gives qualitatively similar results.

4.3 Estimating the Earnings Path

We adopt the identification strategy used by Kleven, Landais, and Søgaard (2019), Andresen and Nix (2022), and other researchers estimating the child penalty. We rely on the exact timing of the event, namely, the year in which the first child enters the household, which creates a sharp discontinuity in household production requirements. Our identifying assumption is there are no other factors that would cause a discontinuous change in earnings when the child arrives, except for the additional household production required by the arrival of the child itself. In the

following discussion of our strategy, we use the term "arrival" or "entrance." It represents date of birth for biological and stepchildren, but for adopted children the relevant event is when the child becomes part of the household.

$$y_{it} = \sum_{k=T_l}^{T_u} \alpha_k (t - eventquarter_i = k) + age_i + quarter_t + u_{it} \quad (9)$$

We estimate Equation (9), where the summation term represents a series of dummy variables indicating the distance in time from the quarter in which the first child arrives. We set the lower bound to be more than 2 years before the arrival of the child (quarter -9) and the upper bound to be more than 5 years after the arrival of the child (quarter 21). The "treatment" of becoming a parent is absorbing, so that those who have a child remain treated. This both matches our perception of reality and avoids the measurement error from using those who have already been treated as controls for those currently being treated, as discussed in Goodman-Bacon (2021). We omit quarter -6 so that our estimates represent total earnings relative to earnings a year and a half before the arrival of the first child. To control nonparametrically for life-cycle and time trends we include age of parents at child arrival and fixed effects for each quarter. Our identifying variation then comes from variation in the ages of the parents and the exact quarters in which their children join the household. The disruption from having a child comes at different points in their age/earnings trajectory and at different calendar times.

For easier interpretation, we transform earnings levels into the percentage of the counterfactual earnings in the absence of a child. We use this approach instead of using log earnings to retain those in the sample who have zero quarterly earnings after the entrance of the child. Following Kleven, Landais, and Søgaard (2019), we define

$$P_t = \frac{\widehat{\alpha_t}}{E[\widetilde{y_{it}}|t]} \quad (10)$$

where $E[\widetilde{y_{it}}|t]$ represents the average predicted earnings from a regression without the event dummies, t refers to the event time (measured in quarters since arrival of first child), and $\hat{\alpha}_t$ is the estimated coefficient on the respective event time dummy taken from estimating equation (9) above.

4.4 Defining Comparable Within-Couple Earner Types

We estimate Equations (9) and (10) separately for twelve different groups, as identified in Table 1. We first separate individuals into two groups based on their relationship status: opposite-sex couples and same-sex couples. This allows us to compare the earnings trends for these two types of couples, which is the focus of this paper. Our method for identifying same-sex individuals does not allow us to impute sexual orientation of uncoupled individuals, so we do not include uncoupled individuals in our analysis. Among each couple type, we further distinguish the partners by their *pre*-parenthood earnings, creating another three groups each.

By separating couples by pre-parenthood specialization patterns, we can test the model introduced in Section 3, since the predicted patterns vary by whether couples divide the child-induced additional household labor by equal allocation (Scenario 1), comparative advantage in earnings (Scenario 2), work-life preferences (Scenario 3), or following gender norms (Scenario 4). As discussed in Section 3, because we do not have a reliable measure of preferences over market work, we can provide only suggestive evidence regarding Scenario 3. As a proxy for the specialization that has occurred in the partnership in advance of the child, we identify the partner with the higher earning potential based on their earnings before the entrance of the child. This

split by earnings potential can also proxy for the bargaining power each partner has at the point when the child enters the household. We characterize individuals as the primary or secondary earner using their annual earnings from two years prior to the entrance of the child (that is, quarters -7 to -4). Primary earners are defined as those who make at least 10% more than their partner; secondary earners are those who make at least 10% less than their partner. Partners who make within 10% of each other in the period before the entrance of their first child are defined as equal earners. The size of these relative groups is shown in Table 1.

The higher earnings potential designation based on pre-parenthood earnings is preferred over other approaches to differentiate between partners in same-sex couples such as using the Census-designated householder or the birth mother as the primary/secondary partner. The former is highly correlated with the earnings-based designation for opposite-sex couples but only minimally correlated for same-sex couples (Antecol and Steinberger (2013)), while the latter, though used by Moberg (2016) and Andresen and Nix (2022), is only applicable to female same-sex couples and does not address the many couples who adopt or male same-sex couples. A simpler version of our measure, without the equal earner category, has been used by Antecol and Steinberger (2013) to study earnings gaps among same-sex and opposite-sex couples; by Hansen, Martell, and Roncolato (2020) to investigate marriage premiums among gay and lesbian couples; and by Martell and Nash (2020) to examine the effect of legalized marriage on hours worked.

Table 2 is a transition matrix showing how many individuals move from being in a specialized couple to being in an equal-earner couple after the entrance of the child. We define pre-child specialization using the earnings in the one-year period starting one and a half years before the child enters; similarly, we define post-child specialization using the earnings in the one-year period starting one year after the child enters. For both same-sex and opposite-sex couples, the majority of individuals do not switch earner type. About 86% of same-sex couples and about 88% of opposite-sex couples remain specialized or remain equal earners.

If our measure of higher earnings potential was highly variant over time, we might be concerned about relying on such a definition by which to differentiate partners. However, the opposite is true: our measure is fairly constant over time, lending support to our use of this measure to proxy for pre-parenthood specialization. Though most do not change, there are some transitions between specialized and equal earner types brought on by the entrance of a child. Among opposite-sex couples, slightly more individuals would be defined as equal earners after the entrance of the child (5.30% as compared to 6.45%). Among same-sex couples, the opposite is true: individuals are slightly more likely to be specialized after the entrance of the child (8.51% as compared to 5.92%).

4.5 Propensity Score Weighting

Individuals in same-sex couples differ from those in opposite-sex couples in various ways as discussed in Section 2. Table 3 provides summary statistics for four groups: men in opposite-sex couples, women in opposite-sex couples, men in same-sex couples, and women in same-sex couples. Men in same-sex couples are more likely to have a college degree than men in opposite-sex couples (62% versus 53%). Females in same-sex and opposite-sex couples are about equally likely to have a college degree (61% versus 63%). Women and men in same-sex couples are more likely to be Hispanic or Black than their counterparts in opposite-sex couples. Women and men in same-sex couples also earn more than their counterparts in opposite-sex couples. However, women and men in opposite-sex couples are much more likely to be married, with about 90% of

individuals in opposite-sex couples being married, compared to 78% of men and 65% of women in same-sex couples.[15] On average, individuals in same-sex couples have fewer children (about 1.7 compared to 1.9 for opposite-sex couples) and are older when their first child enters the household (about 2 years older than their opposite-sex counterparts).

Table 4 shows the pre-parenthood values of our main outcome variables, earnings and employment, disaggregated further into our twelve analysis subsamples defined by sex, couple type, and earner type. All earner types in same-sex couples have higher average earnings than their counterparts in different-sex couples. Primary and equal earners of both sexes and couple type have employment rates at 6 quarters before the birth of over 90%, highlighting that this is a selected sample of parents that are generally highly attached to the labor force pre-birth. However, secondary earner men in opposite-sex couples are the least likely to be employed pre-birth, at 68%.

We have described several ways in which opposite-sex and same-sex couples differ based on characteristics that are observable in our data. For our analysis, we want to verify that any differences in earnings trends that we find are not due to same-sex couples simply being different from opposite-sex couples in pre-parenthood characteristics that are related to their income paths after their child's arrival. In other words, we want to ensure that same-sex couples and opposite-sex couples have similar background characteristics so that we are comparing couples whose income paths ought, other than for the introduction of a child, to be the same as one another. Therefore, we weight our main results by inverse propensity scores, which creates a sample of opposite-sex couples that is more similar to our sample of same-sex couples.

We first predict the likelihood of being in a same-sex couple using the following observable characteristics of couples: the oldest age among the couple, the gap in ages within the couple, the highest years of education, the gap in years of education, race, whether the couple is multi-racial, ethnicity, whether the couple is multi-ethnic, marital status, the gap in pre-child earnings, and the highest pre-parenthood income among the two. Using this predicted probability, we assign weights to give more predictive power to individuals who are more like individuals in the other type of couple. Opposite-sex couples who are more like same-sex couples are more highly weighted; same-sex couples who are more like opposite-sex couples are likewise more highly weighted. Specifically, the weight is calculated as the inverse of the predicted probability for same-sex couples and the inverse of one minus the predicted probability for opposite-sex couples. We combine these inverse propensity weights with ACS sample weights to form the final weights used in our regressions. Results that do not control for differences between same-sex and opposite-sex couples (that is, with no propensity weights) are presented in the appendix (Figure A2) and yield qualitatively similar results.

5 Results

We start by presenting the percent change in earnings results for opposite-sex couples and same-sex couples. For each of the two main types of couples, we show the percent change in earnings after the entrance of the first child for each of the two partners. We extend the analysis

[15] Same-sex marriage was only available nationwide during part of our sample, with the Obergefell decision in 2015, which may explain much of this difference in marriage rates. The most recent cohorts, who had marital rights for a longer period before our sample period, may look more similar on this margin.

to consider the impact at the household level. We then explore intensive and extensive margin responses and discuss various ways in which our results are robust to observable differences between opposite-sex and same-sex couples. Finally, we highlight implications for our theoretical model.

5.1 Opposite-Sex Couples Earnings

Figure 2 Panel A shows the percent change in earnings after the entrance of the first child for opposite-sex couples. These earnings changes are relative to 6 quarters before the entrance of the child. The solid lines correspond to men and dotted lines correspond to women, while the color-symbol pairs (red circle, green square, and blue triangle) differentiate the earner types (primary, secondary, and equal). First focusing only on the difference between the male and female lines and not the earner types, we can see support for the findings of the previous literature. Men in opposite-sex couples continue their upward pre-parenthood earnings trajectories, while women experience a significant decrease after the entrance of their first child followed by a partial recovery of earnings. One year after the child's entrance, women's earnings are about 20% lower than they were before the arrival of their first child and even after five years their earnings remain about 18% lower than before their first child. This "motherhood penalty" has been well-documented in previous studies on the parental earnings gap.

We extend that literature by showing that the penalty exists across the split into earner types. All three types of opposite-sex female earners - primary, secondary, and equal -experience a decrease in earnings. In contrast, secondary earner opposite-sex men experience an increase in earnings beginning just before their child arrives, while primary and equal earner men see a consistent upward trend in their earnings that appears unchanged by the child entry.

The percent change in earnings is very similar in magnitude across earner types for women but varies more for men. Secondary earner men experience the largest increase in earnings in percent change terms relative to before the arrival of their child. By one year after the child joins the household, primary and equal earner men are earning 4% and 10% more than they were earning pre-child, respectively, whereas secondary earner men are earning about 30% more. That increase in earnings starts slightly before the child arrives; by the time the child enters the household, secondary earner men are already earning about 25% more than they were earning before the child. By five years after, though all men have a positive trend in earnings, secondary earner men are earning about 40% more than they were before their first child, while primary earner men are earning about 10% more, and equal earner men are earning about 20% more.

We find no evidence of a fatherhood earnings premium, or a discontinuous increase in earnings around child arrival, among primary and equal earner men in opposite-sex couples, but some evidence among secondary earner men. This finding adds to the existing literature on the circumstances under which a fatherhood premium arises. While previous research has documented the existence of a fatherhood premium (Yu and Hara (2021), Glauber (2018), Pal and Waldfogel (2016)), much of that work uses either cross-sectional analysis or small samples, making it difficult to control for selection into fatherhood. Mari (2019) shows that the impact of parenthood on fathers' earnings varies by country with wage premiums found in the U.S. and Canada but not in Norway or Denmark. Our findings suggest that in addition to heterogeneity in fatherhood premiums by country, there is also heterogeneity by household earner dynamics. We find that the fatherhood premium exists for fathers whose female partners earned at least 10% more than they did before the arrival of their first child. Similarly, Killewald (2013) uses panel

data in the U.S. to explore heterogeneity in the fatherhood premium between different types of fathers and finds that the fatherhood premium exists only for married, residential, biological fathers whose wives do not remain full-time workers.[16]

Secondary earner fathers in our sample are significantly less attached to the labor force before the entrance of their first child, as Table 4 shows. We require individuals in our sample to have positive earnings at some point in the two years before the arrival of the child, but secondary earner men in opposite-sex couples are the least likely to be employed in our reference quarter (6 quarters before the entrance of the child). 68% of secondary earner men in opposite-sex couples are employed in that quarter. In comparison, 94% of primary earner men in opposite-sex couples are employed. Even among secondary earners, men in opposite-sex couples are less often employed than women in opposite-sex couples (81%), men in same-sex couples (79%), and women in same-sex couples (74%). In addition, secondary earner men in opposite-sex couples are earning the least six quarters before the entrance of the child. They earn on average $5,206, less than half of their primary earner counterparts ($12,250). That could explain why we see such an increase in earnings among secondary earner men in opposite-sex couples after child arrival. We explore this idea more in Section 5.4.

5.1.1 Opposite-Sex Couples Earnings Household

At the household level, Figure 3 Panel A shows a similar drop in total labor market earnings at the time of child arrival for all three types of opposite-sex couples. However, male-primary couples experience a slightly smaller decline. In the first quarter after child arrival, their household earnings decrease by about 8% compared to before the child. Female-primary and equal-earner couples face a larger drop of about 16%. In all cases, earnings begin to recover two quarters after the first child arrives and fully recover by the end of our study period, five years later. By that time, equal-earner couples are earning approximately the same as before their child, male-primary couples are earning about 5% more, and female-primary couples are earning about 18% more. Based on the trends in individual earnings, it is likely that female-primary couples experience the largest increase in their total household earnings due to the large increase in earnings among secondary-earner men.

5.2 Same-Sex Couples Earnings

Figure 2, Panels B and C, present the percent change in earnings after the entrance of the first child for female and male same-sex couples, respectively. Our estimates are less precise for same-sex couples due to the much smaller sample sizes, especially for men in same-sex couples. While our sample includes about 1.5 million opposite-sex couples, we only have about 6,000 female same-sex couples and about 2,000 male same-sex couples. We highlight two main differences between the earnings trends for same-sex couples and those for opposite-sex couples.

First, while men and women in opposite-sex couples have very different trends in earnings, men and women in same-sex couples have very similar trends. This result was not necessarily expected as previous literature suggests that male and female same-sex couples are different in ways that could be important to our analysis. For example, they enter parenthood at different

[16] Our current definition of primary earner does not differentiate between primary earners whose partners are not in the labor market and those that are. In future work as we explore labor force participation, we can look at this distinction and compare to the existing literature.

rates (Badgett, Carpenter, and Sansone (2021)). In our sample, men in same-sex couples earn more than women in same-sex couples (about $30,000 more on average) and are more often married (about 14 percentage points more). There are more Black women in same-sex couples than Black men (8% versus 6%) and fewer Hispanic women in same-sex couples than Hispanic men (10.8% versus 12.6%). Nonetheless, the trends across sex of same-sex couples appear very similar.

Second, in contrast to opposite-sex couples we observe significant differences in same-sex couples when we look across earner types. There is a drop in earnings after the entrance of the child for both male and female individuals in same-sex couples of all earner types of around 2 to 15%, which is small relative to the 40% decline we see for opposite-sex women, but also does not follow the pattern of increasing earnings seen in opposite-sex men. However, after the initial drop, earnings trends diverge for primary, secondary, and equal earners. Same-sex secondary earners experience a quick increase in earnings relative to pre-parenthood, while primary and equal earners have no change in long-run earnings relative to pre-parenthood. By five years after the entrance of the first child, male and female secondary earners earn about 20% more than they did before the child and male and female equal earners earn about 5% more than they did before the child. Male and female primary earners are earning about the same as they were before the child.

As primary earners do not on average increase their earnings while secondary earners do increase their earnings, it appears that for same-sex couples, the response to parenthood among those who were specialized pre-child-entrance is toward an equalization of earnings rather than a divergence. The transition matrix in Table 2 shows that 6.5% of those who were specialized before the child would be categorized as equal earners after the child, which provides further evidence that same-sex couples who are specialized before the child on average move toward equalization after the child. However, Table 2 also shows that overall, same-sex couples are slightly less likely to be equal earners after the child than before (10.21 before versus 7.26 after). Figure 2 uses only pre-child earnings to define the earner categories for the analysis. This means that some of the individuals in the equal earner group would actually be categorized as primary or secondary earners based on post-child earnings. Because both of the individuals in a given equal-earner couple contribute to our estimate of the trend in earnings for that group, when one individual increases earnings and the other decreases earnings, those trends could net out to the zero change in earnings that we see in Figure 2. That suggests that the overall effect of child entrance on equalization of earnings among same-sex couples is unclear.

5.2.1 Same-Sex Couples Earnings Household

Figure 3 presents the results for household earnings which show similar changes in household earnings across same-sex versus opposite-sex couples, despite the differences at the individual level. Same-sex couples, like opposite-sex couples, experience a drop in household earnings of about 15% one quarter after their first child enters the household. By the second quarter, the drop lessens to about 5% less than earnings before the first child and household earnings fully recover by the end of the sample period (five years after the first child). In opposite-sex couples, the household earnings trends we see are a result of increases in male earnings which just about offset the decreases in female earnings, regardless of earner type. At the household level, the earnings trends for same-sex couples follow a similar pattern to those of opposite-sex couples, but the earnings trends within the couples that create these aggregate household trends are very

different. Instead of a gap in earnings between individuals that aggregates to zero change at the household level, the relatively constant household earnings in same-sex couples are the result of the equalization of earnings between different earner types within the couple.

5.3 Intensive and Extensive Margins

To understand the contribution of changes in employment to the overall changes in earnings, we analyze the extensive and intensive margins of earnings. Specifically, we examine the percentage change in earnings due to changes in employment versus the percentage change in earnings from within employment. To achieve this, we replace quarterly earnings with the individual's pre-child earnings whenever the quarterly earnings are zero. This technique transforms our variable measuring changes in earnings from a negative to a 0 value in any period where the individual has no earnings, relative to the baseline earnings level. This method is akin to that used by Groen et al. (2020) in their analysis. This substitution of earnings for zero values only works for levels of earnings, not percentage changes, so the results discussed in this section are in levels.

Figure 4 displays two lines: the change in total earnings for the entire sample and the change in earnings for the intensive margin. The gap between the total earnings and the intensive margin earnings is the extensive margin earnings, or the loss in earnings from those who experienced a change in their employment status from baseline.

For primary earner men in opposite-sex couples, we observe an increasing trend in earnings after the entrance of their child. However, this increasing trend would have been even higher if some men had not left their jobs during that period. Earnings one year after the child for primary earner men are $1700 higher if just including the intensive margin, but only $700 higher for all earnings. At 5 years the gap is larger, with growth to $3700 at the intensive margin and only $1800 for all earnings. The earnings of equal earner men also exhibit an increasing trend that would have been even higher if not for those who experienced periods of zero earnings post-child. In contrast, the total earnings line is above the intensive margin line for secondary earner men reflecting that secondary earner men are more likely to be employed after their child's arrival than at baseline. The increase in their earnings is partially due to an increase in earnings on the intensive margin and partially due to an increase in employment.

For women in opposite-sex couples, we observe a dip in both the total and intensive margin earnings after child arrival. However, the intensive margin earnings losses are smaller, -$1400 versus -$3000 losses measured for all earnings for primary earner women. They also recover to the previous level after just a couple of quarters such that primary earner women have had earnings *growth* at the intensive margin of $400 after one year, whereas the extensive margin earnings do not recover and are pulling down the total earnings level to a loss of -$1600 at one year. The pattern holds for women in opposite-sex couples, regardless of whether they are the primary, secondary, or equal earner in the couple, suggesting that a major contributor to the depressed earnings of women in opposite-sex couples after child arrival is decreased employment.

In comparison, men and women in same-sex couples have small drops in earnings after child arrival on both the intensive and extensive margins. But after the first or second quarter, we see increasing trends in earnings at the intensive margin for all 6 groups. For primary and equal

earners, there is a larger gap between total and intensive margin earnings with larger losses due to a change in employment, in comparison to secondary earners for whom there appears to be little change in employment status. For primary earners, the gap between intensive and extensive margin earnings is around $2000 for both men and women five years after their child, while for secondary earners it is $900 for men and $600 for women. In this, the secondary earners of either sex in same-sex couples follow a pattern more like that of secondary earner men in opposite-sex couples than any of the other groups.

5.4 Implications for Our Model

In our model, we find that only when the division of childcare responsibilities is driven by gender norms would we observe the significant decrease in earnings of all female partners, including those with higher earning potential than their male partners, that we see in the data. This result aligns with Weeden, Cha, and Bucca (2016) who argue that the wage gap is perpetuated by social norms that lead to gender-based differences in hours worked, and consequently earnings. Furthermore, Kleven (2022) shows that the average child penalty varies across space in the U.S. in line with local social norms around gender roles. Scenario 2 (comparative advantage in earnings) predicted that primary earners would not see a drop in earnings while secondary earners of both sexes would, but empirically we see that primary earner women do experience a drop in their earnings and secondary earner men do not. Scenarios 1 (equal allocation) and 3 (work preferences) predicted that all sexes and earner types would see a small drop in earnings, whereas empirically we see that opposite-sex men of all earner types do not see a drop in their earnings and opposite-sex female earners see a large drop. As mentioned in Section 3, the implications of our analysis for Scenario 3 are speculative at best, because we do not have a measure of preferences over market work that is uncorrelated with pre-parenthood earnings and gender norms. We can say, however, that the implications of Scenario 4 (gender norms) are consistent with the observed outcomes in our empirical exercises.

One inconsistency between the model and the observed outcomes is the pattern of earnings for secondary earner men in opposite-sex couples. In the model, when they follow a strategy of specialization based on gender norms, the earnings growth for these men is lower than that for primary earner men, because the earnings growth is entirely based on initial earnings. However, in the data we see that secondary earner men earn more to compensate for the loss of household income when their higher-earning partners experience a child penalty.

The results for same sex couples suggest an equal allocation of post-child household production and reject specialization based on potential earnings. However, the model does not fully capture some of the patterns seen in the data, particularly the secondary earner growth and the lack of growth for the primary earner. This may mean there are more complicated household bargaining dynamics at play that are not captured by our simple model.

The disaggregation into intensive and extensive margins shows some of those dynamics. In same-sex couples, the secondary earners are not adjusting their labor at the extensive margin. The intensive margin and total earnings lines run nearly parallel. However, the primary earners in same-sex couples are making extensive margin adjustments. We also see extensive margin adjustments among equal earners in same-sex couples, which may be why we see some shifting from the equal earner group to the specialized group in Table 2. This could be evidence that the same-sex couples are specializing according to work preferences, as in Scenario 3, if those preferences are not strongly correlated with the earnings categories.

5.5 Robustness Checks

We present three empirical analyses in this subsection as robustness checks on the results above. First, we look at results without propensity score weighting. Second, we consider results for adopted children. Third, we present results where we use future parents as a control group.

5.5.1 Without Propensity Score Weighting

We have so far shown that when a child enters the household, the earnings of women and men in opposite-sex couples respond differently than the earnings of women and men in same-sex couples. However, we have also shown in Table 3 (summary statistics; see Section 4.5) that women and men in opposite-sex couples are different from women and men in same-sex couples on many dimensions. Thus another interpretation of our results could be that the differences in earnings trends we identify are due to different rates of marriage, different rates of educational attainment, or different likelihoods of having a second child in the household. If that were the case, then controlling for those differences we should see no difference in the earnings trends of individuals in opposite-sex and same-sex couples.

In our main results, we use the propensity weights discussed in section 4.5 to create a sample of opposite-sex couples that are similar to same-sex couples on observable characteristics. This suggests that the differences we observe between the two groups are due to the gender mix of the couples and not to other factors. We perform two additional exercises to evaluate the influence of observable characteristics, both of which suggest that they have little influence on the differences we see.

First, we provide results without using propensity weights. Figure A2 shows that our results remain almost identical; for individuals in both female and male same-sex couples, the unweighted earnings trends are slightly less positive than the weighted earnings trends. Earnings of primary earners more clearly show a slight decrease after the child enters the household, which remains constant over time at about 2% lower earnings than before the child for both men and women in same-sex couples. In comparison, the weighted estimates suggest no change or even an increase in earnings of about 2% for primary earners. The similarity between our results with and without weights suggests that the difference in earnings trends that we see are not driven by differences in characteristics of individuals in same-sex versus opposite-sex couples.

Second, we add controls one by one to our specifications to see which variable is driving the differences between opposite-sex and same-sex couples. We consider similar controls to those that create the propensity score: age, difference in age, education, difference in education, race, difference in race, ethnicity, difference in ethnicity, pre-child earnings, household earnings, and age of the child upon entrance to the household. We find that no variable makes a notable difference in the results. This is consistent with our comparison of earnings trends with and without propensity score weighting. Just as the propensity score did not significantly affect the overall patterns, the results with the controls added separately also show no differences in the patterns we identify.

5.5.2 Adoptive parents

Adoption is another dimension on which opposite-sex and same-sex couples differ. In

Figure 5, we explore whether the difference in earnings trends can be explained by the differential rates of adoption among opposite-sex and same-sex couples. The analysis excludes biological children to focus solely on those whose first child was adopted, which includes same-sex and opposite-sex couples with adopted children. Kleven et al. (2019) found that adopting parents experience a similar long-term gender gap in earnings as biological parents, and our results confirm this finding. We go further to demonstrate that male and female same-sex couples both experience a drop in earnings after the entrance of their adopted child. Those results are consistent with the trends we see in our full sample, suggesting that adoption cannot explain the differences in earnings we observe between opposite-sex and same-sex couples.

While there are some small differences between the adoptive parent and full sample results, qualitatively the patterns are very similar. Individuals in male and female same-sex couples see a drop in earnings after the child enters, but their earnings quickly recover fully, with secondary earners seeing the largest increase in earnings relative to before the child. There is suggestive evidence that adoptive parent secondary earners in male same-sex couples see less of an increase in earnings after the child enters the household than their full-sample counterparts, but the confidence intervals do not reject that the trends are the same.

Like our main results, men in opposite-sex couples do not see a drop in earnings around the quarter in which the child enters, but instead see a steady positive trend in earnings. Secondary earner men in opposite-sex couples see the largest increase in earnings, though that increase is slightly smaller than in the full sample. The biggest visual difference between the adoptive and full samples is in the size of the drop in earnings for opposite-sex women. By five years after the entrance of the child, their earnings are about twenty percent lower than before the child, which is the same as in the full sample. But, as in Kleven et al. (2019), the initial drop in earnings is much smaller than the drop in the full sample; adoptive parent women may experience different parental leave patterns than biological parent women .

5.5.3 Future parents as control group

In all our specifications we treat the entrance of a child as an absorbing state, so already treated parents do not serve as controls for those who are not yet treated. In Figure A3, we provide a robustness check that uses parents who have a child after our observation window as a control. We do this by shortening our observation period: we only include earnings up to 2014, although we continue to use births through 2019 from the American Community Survey (ACS). Parents whose children enter their households between 2014 and 2019 serve as controls for individuals who become parents before 2014. We argue that this is a better control group than individuals who never become parents. As in our main specification, we include couple type, age, and calendar quarter fixed effects so that the earnings effects are measured relative to individuals of similar age and couple type over time. We find that the patterns of earnings after the child's arrival remain similar when we use this control group.

6 Conclusion and Future Work

We show that same-sex couples experience different earnings trajectories after a child enters their household than opposite-sex couples. This suggests different couple types follow different decision rules on how to allocate the additional time burden of caring for a young child. Specialization in childcare and market work, with the choice of who specializes driven strongly

by gender norms, seems to be the typical response of opposite-sex couples, while we see more complicated dynamics in earnings of same-sex couples.

As we have noted, same-sex couples face the same constraints as other working parents in the U.S., including lack of affordable childcare, lack of universal parental leave, and lack of mandated sick leave, which all make working and caring for children challenging, but same-sex couples may also face additional constraints. Moreover, we have made the simplifying assumption that work-life preferences across opposite-sex and same-sex couples are the same. Keeping in mind these potentially confounding factors, it is noteworthy that same-sex couples allocate their time differently than opposite-sex couples. These differences in behavior over the sex composition of couples provides suggestive support for the findings in Kleven (2022) that gender norms are one of the most important drivers of the child penalty for mothers, both in the U.S. and likely worldwide.

Future work will extend the current analysis to look at changes in the earnings gap within couples, in addition to the current analyses of individual and household level trends. Future extensions include using alternate measures of primary and secondary earners that predict potential earnings based on pre-parenthood characteristics such as education and age, rather than using pre-parenthood earnings alone.[17] We could also explore other potential characteristics of couples. One promising avenue could be to examine differences by more or less family-friendly occupations which could possibly be used as a rough proxy for differences in work-life preferences as captured in Scenario 3. Finally, we appreciate the improvements in the concepts collected in the ACS that enable us to produce this detailed analysis and look forward to other possible changes in the future that could help expand this knowledge.

[17] We would like to include occupation here as well, but using the ACS would not allow to identify the occupation prior to the child's entrance into the household.

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Table 1: Sample Sizes

Opposite-Sex Couples 1,519,000					
Male Primary	Male Secondary	Male Equal	Female Primary	Female Secondary	Female Equal
848,000	383,000	114,000	547,000	688,000	114,000
Male Same-Sex Couples 2,200			**Female Same-Sex Couples 6,500**		
Male Primary	Male Secondary	Male Equal	Female Primary	Female Secondary	Female Equal
2,000	1,400	350	5,900	4,300	850

Table 2: Specialization Before and After Child

	Opposite-Sex Couples			Same-Sex Couples		
	Specialized Pre	Equals Pre	Total	Specialized Pre	Equals Pre	Total
Specialized Post	86.72	5.30	92.03	83.87	8.51	92.38
Equals Post	6.45	1.52	7.97	5.92	1.70	7.62
Total	93.18	6.82	100.00	89.79	10.21	100.00
N	2,820,582			15,706		

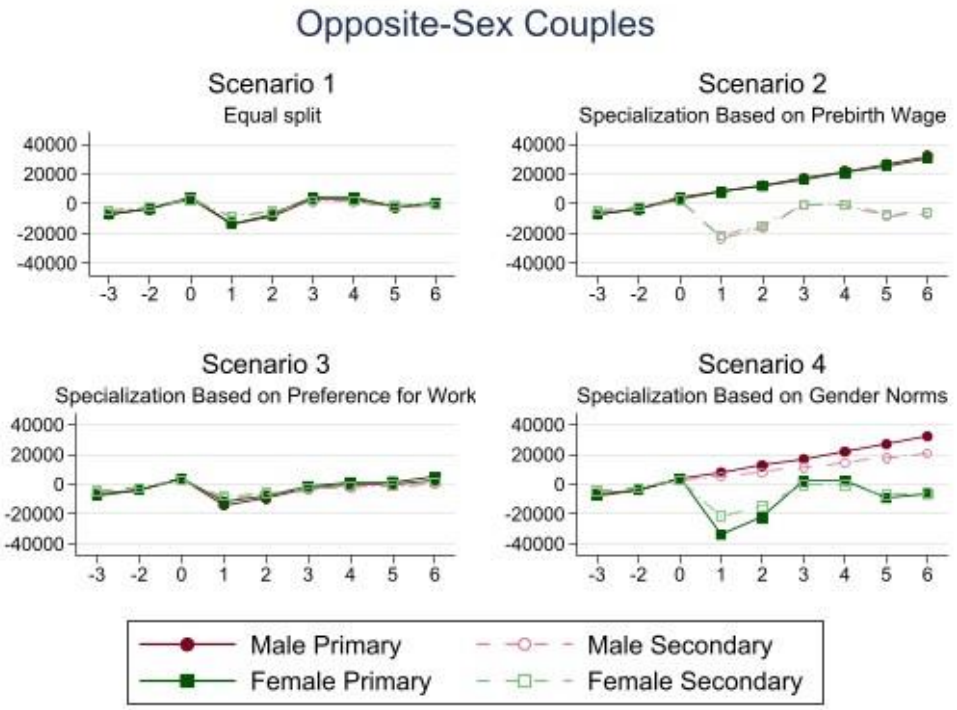
Table 3: Summary Statistics for Individuals

	Opposite-Sex Couples		Same-Sex Couples	
	Men	Women	Men	Women
Age at Entrance	30.31	28.26	32.33	30.83
	(6.346)	(5.805)	(7.501)	(7.682)
Age of Child at Entrance	0.044	0.031	0.368	0.226
	(0.527)	(0.446)	(1.696)	(1.242)
Adopted Child	0.024	0.024	0.289	0.210
	(0.153)	(0.153)	(0.454)	(0.407)
Number of Children	1.903	1.902	1.750	1.649
	(0.895)	(0.894)	(0.843)	(0.827)
Prebirth Earnings	94,230	68,710	111,700	84,440
	(88,010)	(68,390)	(116,300)	(92,650)
Primary Earner	0.721	0.486	0.623	0.610
	(0.540)	(0.575)	(0.570)	(0.564)
Secondary Earner	0.364	0.598	0.468	0.469
	(0.558)	(0.574)	(0.583)	(0.572)
Equal Earners	0.085	0.085	0.090	0.079
	(0.278)	(0.278)	(0.287)	(0.270)
Married	0.905	0.905	0.782	0.647
	(0.293)	(0.293)	(0.413)	(0.478)
Black	0.056	0.046	0.060	0.080
	(0.229)	(0.210)	(0.238)	(0.271)
Hispanic	0.095	0.094	0.126	0.108
	(0.293)	(0.293)	(0.332)	(0.311)
Less than HS	0.053	0.031	0.056	0.043
	(0.225)	(0.174)	(0.231)	(0.202)
HS	0.414	0.338	0.327	0.353
	(0.493)	(0.473)	(0.469)	(0.478)
College	0.533	0.631	0.616	0.605
	(0.499)	(0.483)	(0.486)	(0.489)
Observations	1,345,000	1,350,000	3,800	11,000

Table 4: Earnings and Employment Before Child

	Opposite-Sex Couples					
	Male Primary	Male Secondary	Male Equal	Female Primary	Female Secondary	Female Equal
Average Earnings	12,250	5,206	10,460	9,253	5,559	10,340
Percent Employed	94.1%	68.2%	96.2%	92.3%	80.5%	97.6%
	Male Same-Sex Couples			Female Same-Sex Couples		
	Male Primary	Male Secondary	Male Equal	Female Primary	Female Secondary	Female Equal
Average Earnings	15,270	7,321	13,410	11,390	5,610	11,420
Percent Employed	94.5%	79.0%	96.4%	92.9%	73.6%	95.8%

Figure 1. Theoretical Model Predictions
A. Opposite-Sex Couples



B. Same-Sex Couples

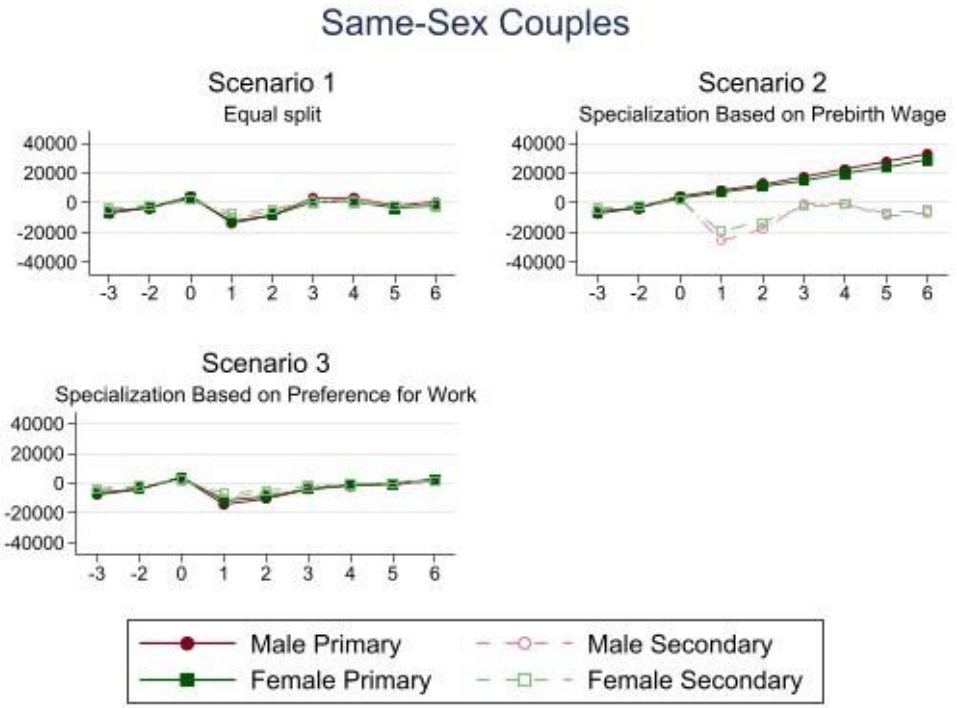
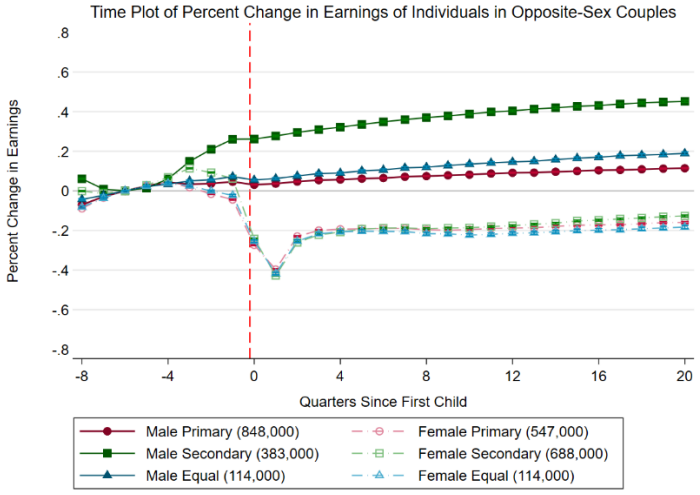
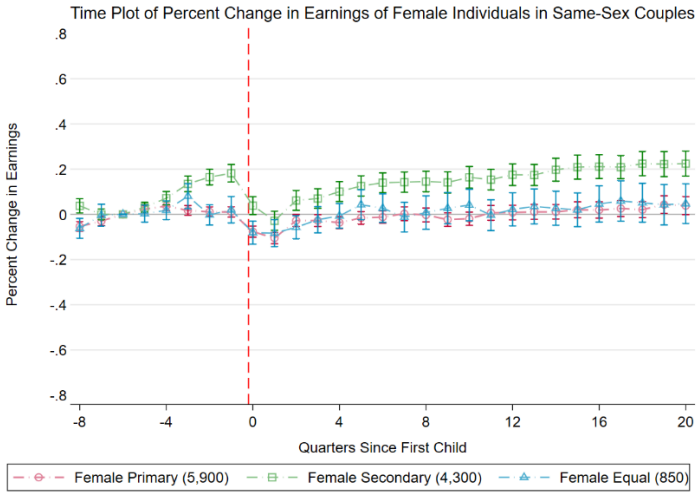


Figure 2. Individual Earnings after Entry of First Child

A. Individuals in Opposite-Sex Couples



B. Individuals in Female Same-Sex Couples



C. Individuals in Male Same-Sex Couples

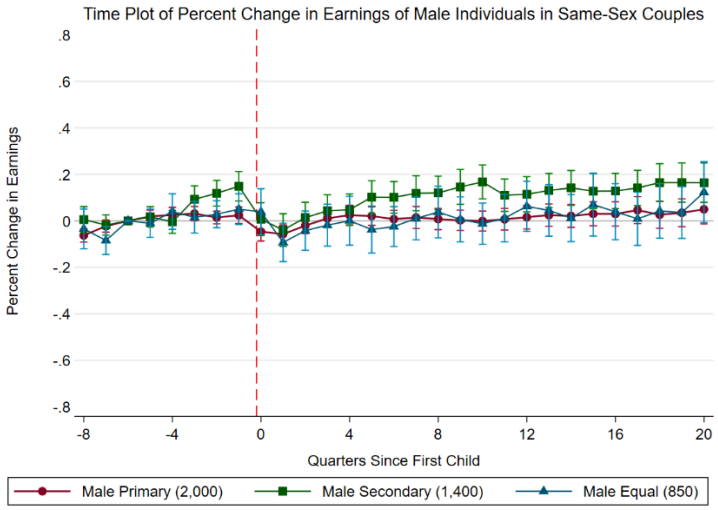
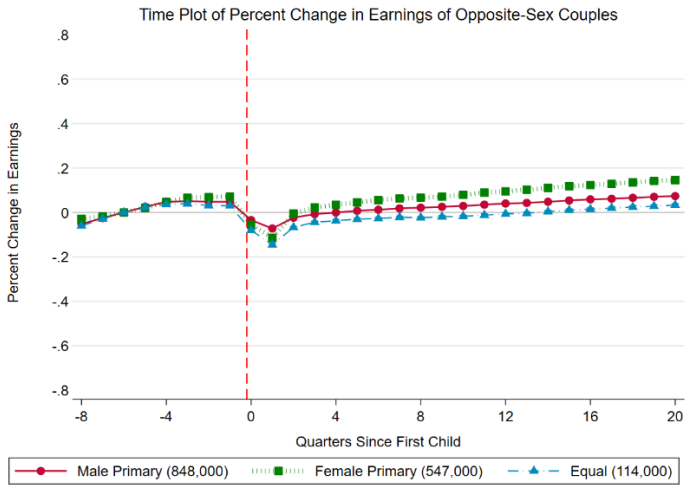
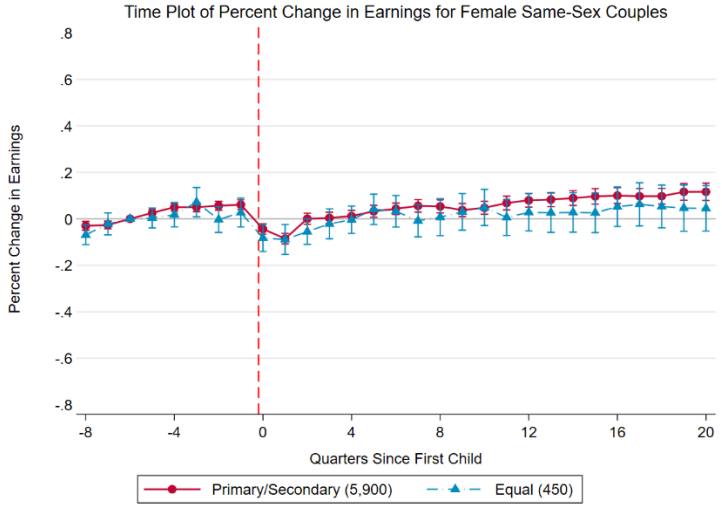


Figure 3. Household Earnings after Entry of First Child

A. Opposite-Sex Couples



B. Female Same-Sex Couples



C. Male Same-Sex Couples

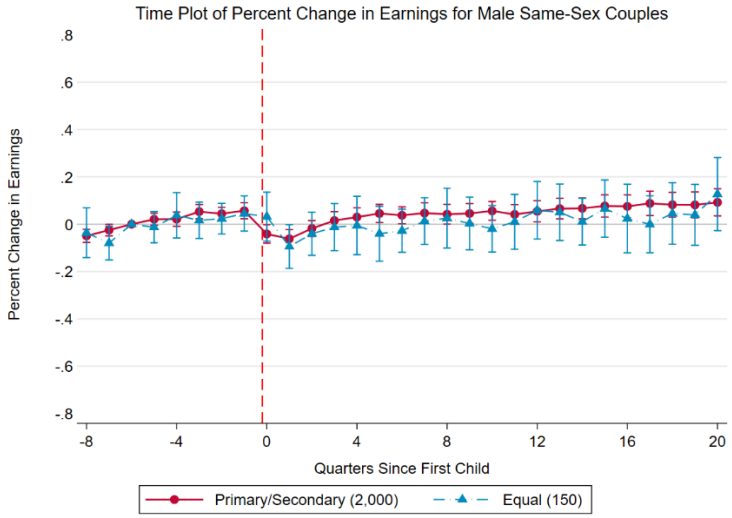
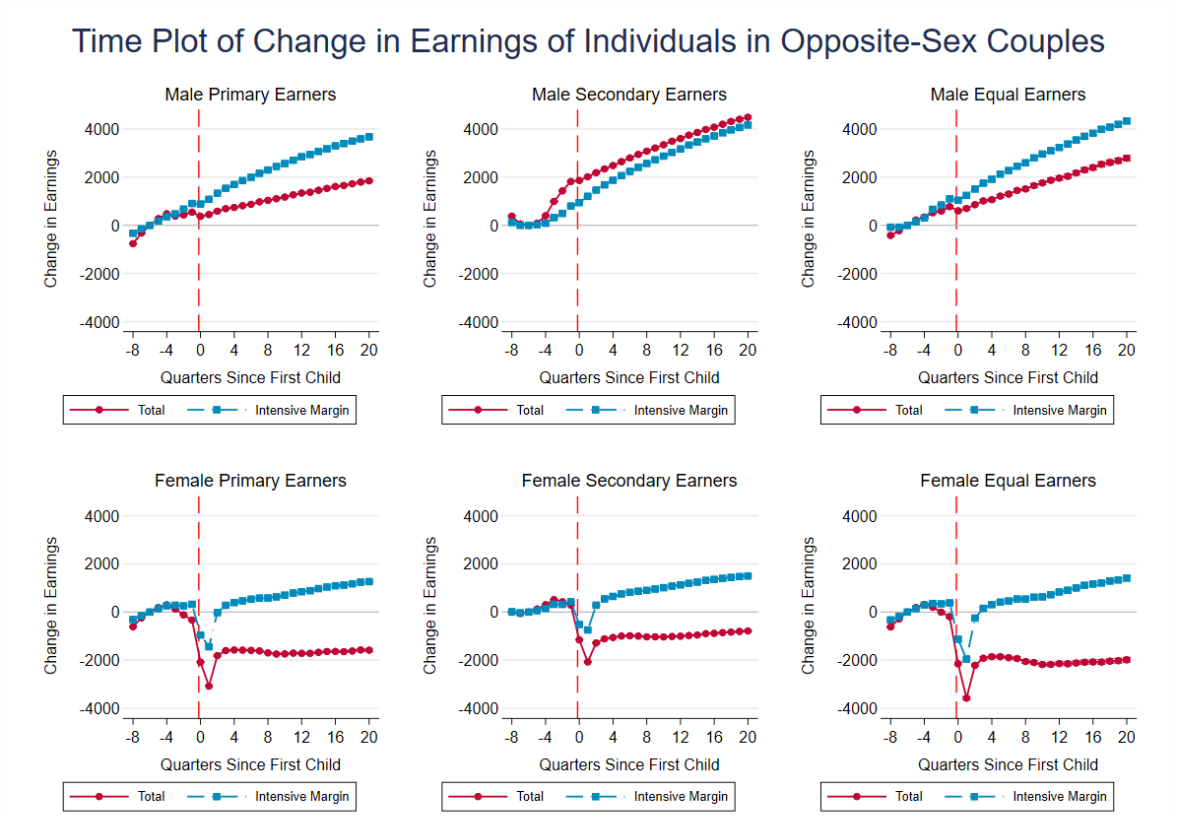


Figure 4. Individual Earnings After Entry of First Child, Intensive Margin

A. Opposite-Sex Couples



B. Same-Sex Couples

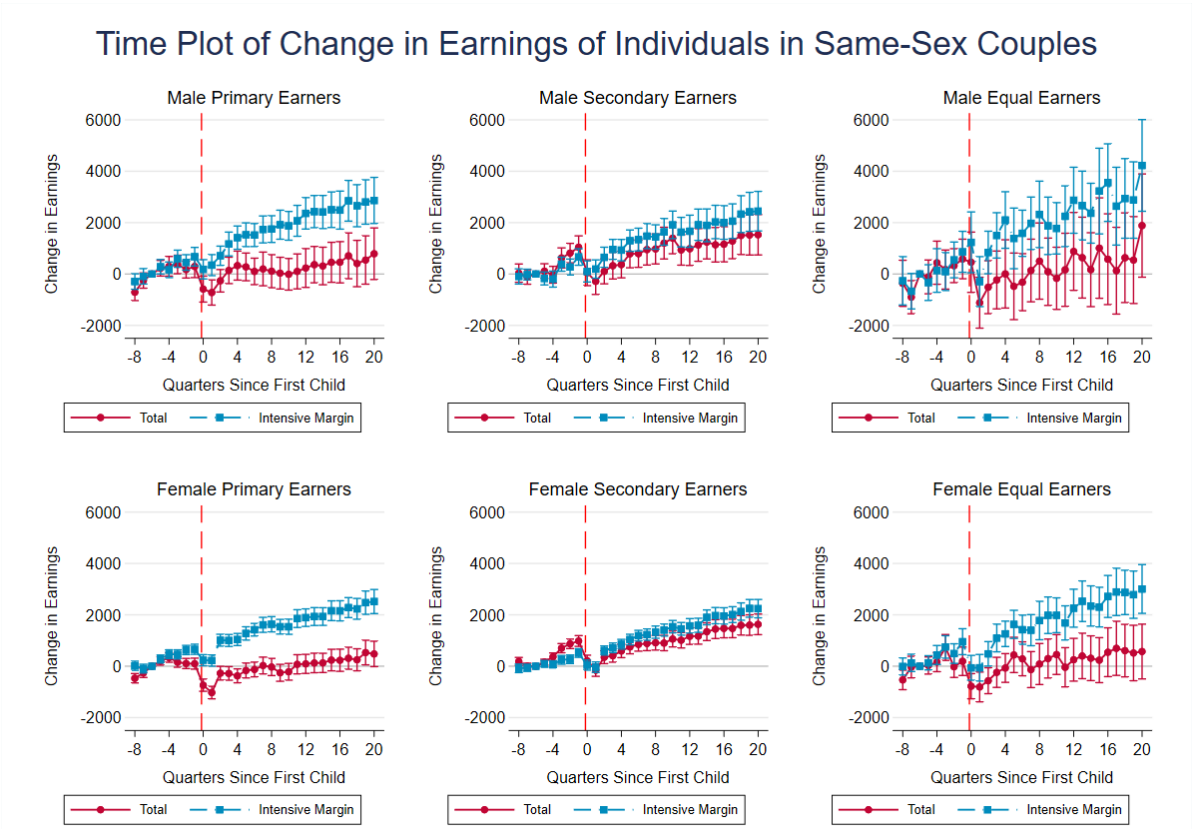
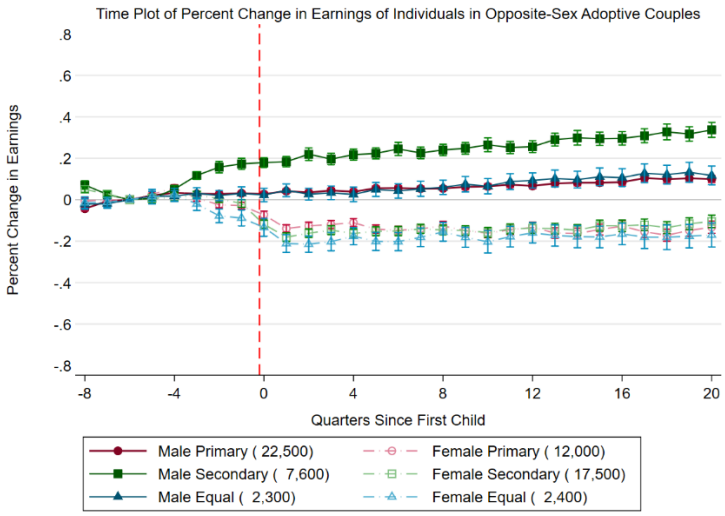
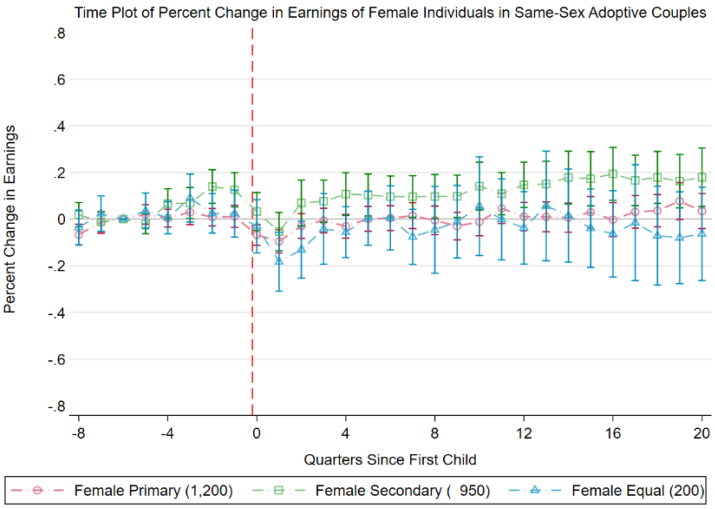


Figure 5. Individual Earnings After Entry of First Child, Among Adoptive Parents

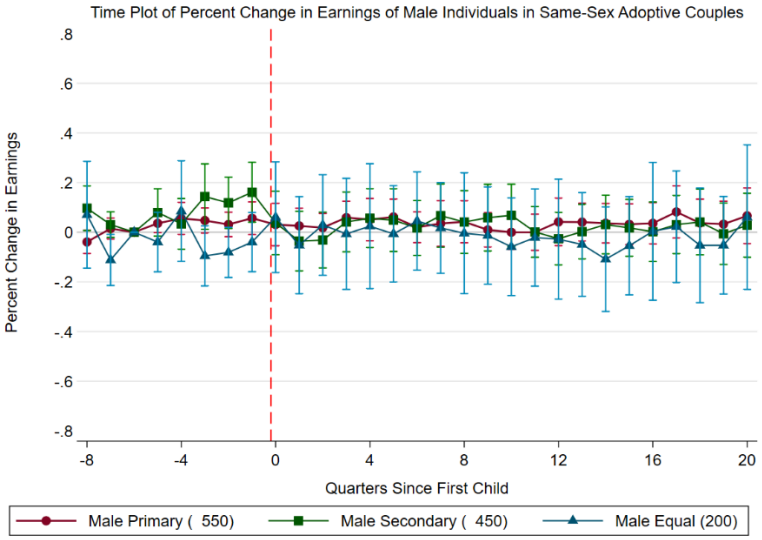
A. Opposite-Sex Couples



B. Female Same-Sex Couples



C. Male Same-Sex Couples



Appendix: Measurement Details

A1. Identifying Same-Sex Couples

The ACS collects detailed relationship information relative to Person 1 for up to 4 other people in the household through question 2. Up through 2018 in our sample, question 2 has 15 checkbox responses. Starting in 2019, question 2 has 16 responses. Figure A1 below shows the question 2 for both 2013 and 2019 and provides the instructions from 2013. To summarize, the following changes occur between 2013-2018 and 2019: (1) Husband-wife is disaggregated into opposite-sex and same-sex; (2) Unmarried partner is disaggregated into opposite-sex and same-sex and appears earlier in responses; (3) Roomer or boarder is dropped; and (4) ordering of phrase "Housemate or roommate" is switched.

A number of papers address the measurement of same-sex couples in available U.S. data. Starting with survey data, Badgett, Carpenter, and Sansone (2021) compare results from the ACS to results from the National Health Interview Survey (NHIS) and Behavioral Risk Factor Surveillance System (BRFSS) and note consistencies across the sources. The NHIS and BRFSS are notable in that they have a question asking about sexual orientation, whereas in the ACS same-sex status can only be inferred by the sexes of the individuals in a couple until 2019 when it is explicitly collected. The NHIS (2013-2018) identifies 1.4% of women as same-sex and 1.8% of men; in comparison the ACS (2008-2018) identifies 1.2% of women as same-sex and 1.1% of men. When limiting the ACS to years 2013 and beyond, the share of all couples who identify as same-sex is between 1.2% and 1.6%; in comparison the BRFSS (2014-2018) identifies 1.7% of all couples as same-sex.

Turning to administrative data, Fisher, Gee, and Looney (2018) combine tax records from 2013 to 2015 with the SSA Numident for information on sex and find that 0.48% of joint tax filers are same-sex, or about 59% of the number of same-sex partners identified in the ACS. There are many possible reasons for this mismatch, including misreporting on the survey, inaccuracies in the sex reported in the Social Security information, and differences in the likelihood to file jointly. Fisher, Gee, and Looney (2018) argue that the most compelling reason for the mismatch is the difference in how marriage is defined for tax versus survey purposes. In particular, in states where same-sex marriage had just been legalized, couples might not have been legally married on their tax returns but might identify as being in a marriage-like relationship, or might have been able to legally marry by the time of the survey.[18]

A2. Identifying Child Timing

Note that we do not have birth records unlike in Moberg (2016) and Andresen and Nix (2022), who use data from several Scandinavian countries. Thus we cannot determine which of

[18] The counts tabulated from the three surveys and the administrative tax data discussed above pertain only to adults in relationships. For an overall tabulation of individuals identifying as same-sex in the United States, Gates (2011) finds that about 3.5% of adults identify as lesbian, gay, or bisexual. He uses the National Epidemiological Survey on Alcohol and Related Conditions (2004-2005), National Survey of Family Growth (2006-2008), General Social Survey (2008), California Health Interview Survey (2009), and National Survey of Sexual Health and Behavior (2009) for his calculations.

two female same-sex partners gave birth. In a similar fashion, we do not know if one of the partners in a same-sex male couple is genetically related to the child. In the ACS data, all relationships are defined relative to the reported head of household. In our main results we combine three categories of children: biological children, adopted children, and stepchildren, and do not attempt to separately identify the birth and non-birth parent.

Several studies have provided information on the differences between same-sex couples and opposite-sex couples in terms of the timing, amount, and likelihood of having children. Using the 2019 ACS, Walker and Taylor (2021) find that same-sex couples have far fewer children than opposite-sex couples (about 59% of opposite-sex couples are childless, while about 86% of same-sex couples are childless). Badgett, Carpenter, and Sansone (2021) come to similar conclusion using both the 2008-2018 ACS and 2013-2018 NHIS. From the ACS they calculate that about 44% of women in opposite-sex couples have children in the household (38% of men), whereas only 22% of women in same-sex couples have children (10% of men). Using the NHIS they can identify same-sex individuals even when they are not in a couple, so their calculations are for all adults rather than only those in couples. They find that 33% of straight women have children (31% of men), while 20% of lesbian women have children (5% of gay men).

Since adoption is an important component of family formation for same-sex couples, we needed to correct for potential timing differences between the child's date of birth and the date the child joined the ACS household we observe them in. We first identified the population of adopted children in the 2013-2019 ACS using relationship type 3 (adopted child) to the head of household. We only kept those who could be matched to Census data, or had a Protected Identity Key (PIK) for both the parent (either household head or spouse) and the child. We then cleaned up duplicates, which mostly seemed to consist of the same household being surveyed in the ACS multiple times in the 2013-2019 span. In cases of duplicate parent-PIK and child-PIK pairs, we kept the earliest ACS record. But we otherwise did not deduplicate on child or adult PIK, so duplicate child PIKs remain when they match to more than one parent PIK and duplicate parent PIKs remain when they match to more than one adopted child. We used records from up to 6 children in each ACS household, starting with the eldest.

We then merged the parent PIKs from the ACS adopted children file to the IRS 1040 data for years 2000-2018. We did this as a many-to-many match, since there were duplicates on both sides. On the ACS side, duplicates occurred because there were duplicates parent PIKs when parents had more than one adopted child; on the IRS side, duplicates occurred when the parent PIK had multiple 1040 records.

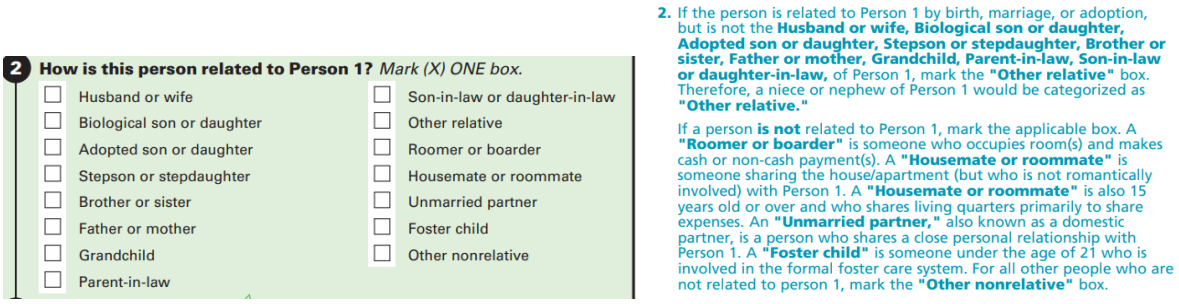
For those records where a parent PIK matched, we then did a match to the child PIK, creating an indicator if the child PIK matched any of the (up to) 6 PIKs on the 1040 record. We then deduplicated the records within year. If there were 1040 records for a PIK that both included the child and did not include the child, we chose the ones with the child PIK. We also chose records where the spouse PIK appeared rather than ones where the spouse PIK did not. After those two targeted deduplications, we randomly dropped the remaining duplicates of parent-PIK, child-PIK pairs within year.

We then merged all of the IRS years 2000-2018 together, assigned a first year observed to each child-PIK, parent-PIK pair to get a year from the IRS data. To find an estimated age at adoption we combined the child-birth year from the Census Numident, if available (or the ACS date of birth if not) with this first year observed in the IRS. If the parent PIKs never appear in the IRS 1040 data, then both the parent and the child will not appear in this final file, and the

ACS birth date is then used as a default, instead of the estimated adoption date.

Figure A1: Relationship Question in the ACS 2013 and 2019

Panel A: 2013



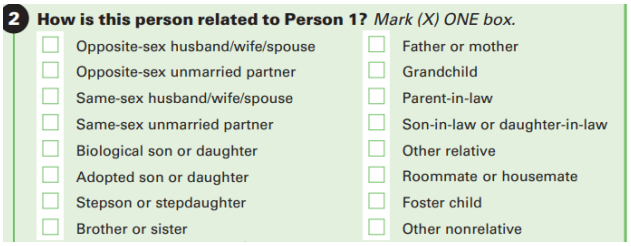
2 **How is this person related to Person 1?** *Mark (X) ONE box.*

- ☐ Husband or wife
- ☐ Biological son or daughter
- ☐ Adopted son or daughter
- ☐ Stepson or stepdaughter
- ☐ Brother or sister
- ☐ Father or mother
- ☐ Grandchild
- ☐ Parent-in-law
- ☐ Son-in-law or daughter-in-law
- ☐ Other relative
- ☐ Roomer or boarder
- ☐ Housemate or roommate
- ☐ Unmarried partner
- ☐ Foster child
- ☐ Other nonrelative

2. If the person is related to Person 1 by birth, marriage, or adoption, but is not the **Husband or wife, Biological son or daughter, Adopted son or daughter, Stepson or stepdaughter, Brother or sister, Father or mother, Grandchild, Parent-in-law, Son-in-law or daughter-in-law,** of Person 1, mark the **"Other relative"** box. Therefore, a niece or nephew of Person 1 would be categorized as **"Other relative."**

If a person **is not** related to Person 1, mark the applicable box. A **"Roomer or boarder"** is someone who occupies room(s) and makes cash or non-cash payment(s). A **"Housemate or roommate"** is someone sharing the house/apartment (but who is not romantically involved) with Person 1. A **"Housemate or roommate"** is also 15 years old or over and who shares living quarters primarily to share expenses. An **"Unmarried partner,"** also known as a domestic partner, is a person who shares a close personal relationship with Person 1. A **"Foster child"** is someone under the age of 21 who is involved in the formal foster care system. For all other people who are not related to person 1, mark the **"Other nonrelative"** box.

Panel B: 2019



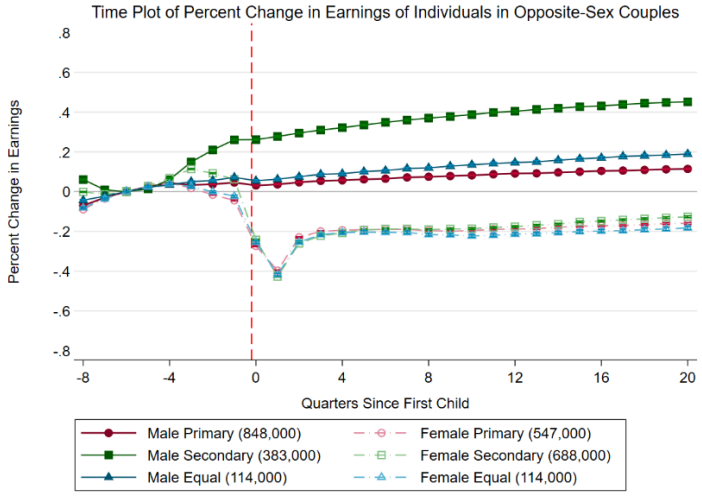
2 **How is this person related to Person 1?** *Mark (X) ONE box.*

- ☐ Opposite-sex husband/wife/spouse
- ☐ Opposite-sex unmarried partner
- ☐ Same-sex husband/wife/spouse
- ☐ Same-sex unmarried partner
- ☐ Biological son or daughter
- ☐ Adopted son or daughter
- ☐ Stepson or stepdaughter
- ☐ Brother or sister
- ☐ Father or mother
- ☐ Grandchild
- ☐ Parent-in-law
- ☐ Son-in-law or daughter-in-law
- ☐ Other relative
- ☐ Roommate or housemate
- ☐ Foster child
- ☐ Other nonrelative

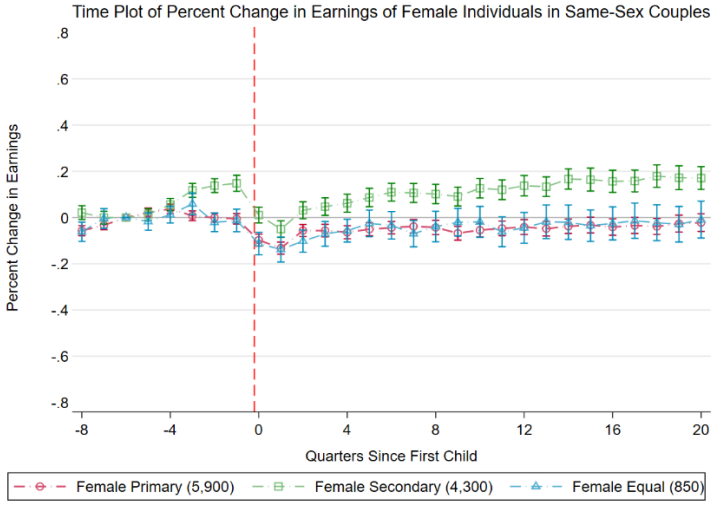
Source: ACS website: Sample ACS & PRCS Forms and Instructions (census.gov)

Figure A2: Individual Earnings after Entry of First Child, Without Propensity Weights

A. Individuals in Opposite-Sex Couples



B. Individuals in Female Same-Sex Couples



C. Individuals in Male Same-Sex Couples

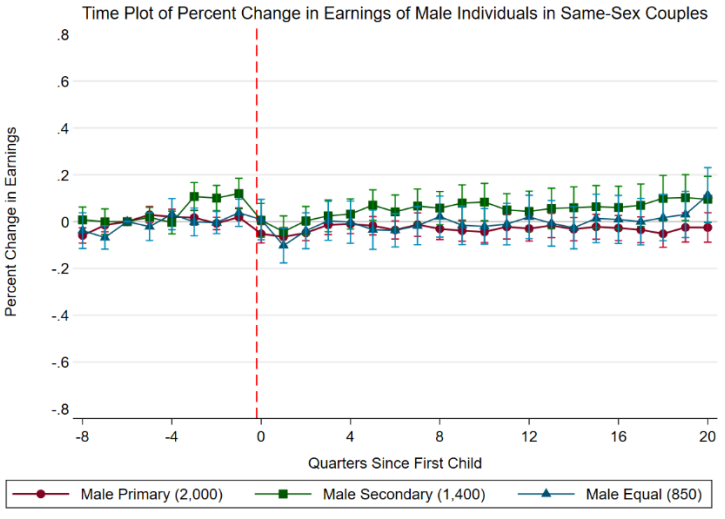
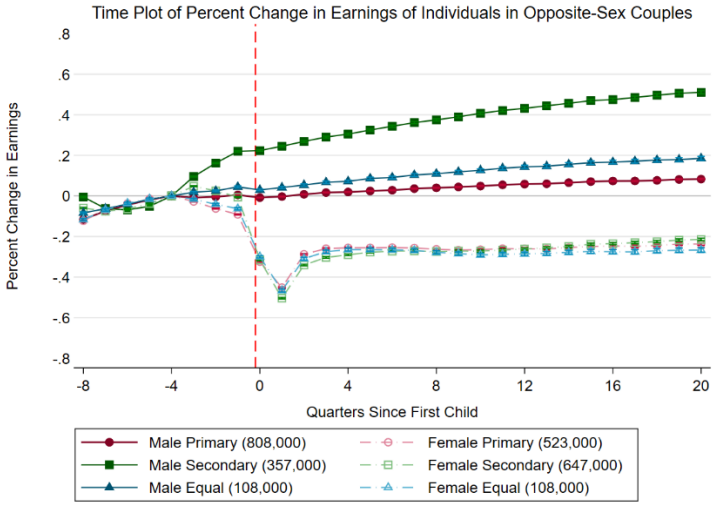
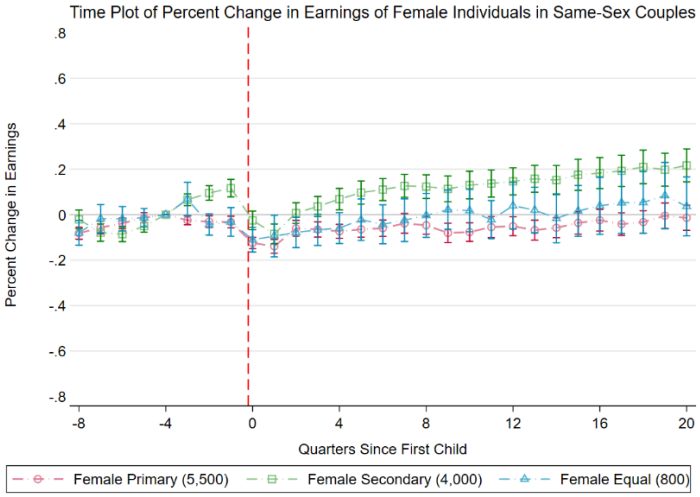


Figure A3: Individual Earnings after Entry of First Child, Parents-To-Be as Controls

A. Individuals in Opposite-Sex Couples



B. Individuals in Female Same-Sex Couples



C. Individuals in Male Same-Sex Couples

