Early-Life Health Impacts of Affordable Housing in Higher-Income Areas: Evidence from Massachusetts Chapter 40B*

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Abstract

Desegregation-focused housing policies aimed at reducing disparities in neighborhood conditions may also reduce disparities in health outcomes. This paper examines the effects of one such policy on the health of pregnant people and their newborn infants. Specifically, I study the impact of Massachusetts Chapter 40B, a major civil rights-era housing policy that increases the supply of affordable ownership and rental housing in higher-income areas to facilitate moves for lower-income households to those areas. Using a difference-in-differences approach that compares the health outcomes of birthing parents who move to 40B housing to those of demographically-matched birthing parents who move from similar origin neighborhoods, I find that moving to 40B housing produces meaningful improvements in birth outcomes and some gains in birthing parents' health only among 40B renters. I find no evidence of health effects among 40B owners. Among renters, improvements in birth outcomes are largest among Black beneficiaries, and are driven largely by people moving from neighborhoods with higher levels of poverty, more Black residents, and higher male incarceration rates. These results suggest that desegregation-focused housing policies like 40B could help improve racial and economic disparities in early-life health among certain populations.

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Despite substantial government investment aimed at reducing health disparities, large differences in health persist across geographic and racial lines in the United States (Orsi et al., 2010; Department of Health and Human Services, 2013; Thornton et al., 2016; Mathews, 2017). One prominent theory is that these health disparities are driven in part by disparities in the neighborhood conditions where people live (Williams and Collins, 2001; Phelan et al., 2010; Braveman et al., 2011). This theory is supported by the strong experimental and quasi-experimental evidence that neighborhood conditions affect health outcomes across the life course (Leventhal and Brooks-Gunn, 2003; Kling et al., 2007; Ludwig et al., 2013; Chetty et al., 2016; Finkelstein et al., 2021; Chyn and Katz, 2021). If this is the case, then housing policies that successfully desegregate by race and income, and therefore reduce disparities in neighborhood conditions, may be an effective means for reducing disparities in health.

Empirically, relatively little is known about the health effects of housing policies that explicitly seek to reverse neighborhood disparities.[1] Massey et al. (2013) find that moving low- and moderate-income households to an affordable housing development in high-income suburbs improved mental health. However, they do not examine other health outcomes, and effects for a small study may not scale more broadly.

This paper examines the relationship between desegregation-focused housing policies and health outcomes. Specifically, I examine the impacts of Massachusetts Chapter 40B–a major civil rights-era policy that aims to enable low- and moderate-income households to move to higher-income areas–on the health outcomes of pregnant people and their newborn infants. I focus on these outcomes based on the enormous importance of early-life health for health throughout the life course (Barker et al., 2002; Royer, 2009; Almond et al., 2011; Currie, 2011; Figlio et al., 2014) and the evidence showing that poor birth outcomes can be reversed by targeted interventions (Almond et al., 2011; Chyn and Katz, 2021). A growing body of literature also shows that birth outcomes are affected by neighborhood conditions such as pollution and access to prenatal care (Currie and Rossin-Slater, 2015; Chyn and Shenhav, 2022). This implies that policies like Chapter 40B may help reduce racial and economic

[1] Recent quasi-experimental work by Chyn (2018) examines the long-run impacts of public housing demolitions on children's labor market, school, and criminal justice outcomes, but not on health.

disparities in birth outcomes that could have lasting effects on health and equity throughout the life course (Krieger et al., 2005; Martin et al., 2007; Blumenshine et al., 2010; Metcalfe et al., 2011; Ncube et al., 2016; Osterman et al., 2021).

Massachusetts Chapter 40B (henceforth "40B") works by requiring all communities to maintain a minimum proportion of affordable housing and allowing developers to build more affordable housing if these minimums are not met (The Commonwealth of Massachusetts, 1968; Massachusetts Department of Housing and Community Development, 2014). Affordable housing can be either rental or ownership under 40B. Because this "fair share" design allows developers to override local zoning rules in exchange for building more affordable housing (Krefetz, 2001), 40B is particularly effective at incentivizing affordable housing construction in the wealthy, white suburbs of Massachusetts, which are typically not accessible to beneficiaries of other subsidized housing programs (CHAPA, 2018; Sportiche et al., in progress).

To estimate the effect of 40B on health, I use a difference-in-differences design that compares the health outcomes of birthing people who move to 40B housing to those of demographically-matched birthing people who move to market rate housing from similar neighborhoods. I use novel data on 40B development addresses[2] linked to birth records and highly detailed longitudinal address data between 2000 and 2019 to identify both birthing people who become 40B beneficiaries and a plausible counterfactual group of birthing people who moved at the same age and time from similar origin neighborhoods. I also leverage additional self-reported data in birth records to match treated beneficiaries to controls based on race and ethnicity. To address differential selection into 40B rental and 40B ownership housing, I run separate analyses for each tenancy group.

I find that moving to 40B housing produces meaningful improvements in birth outcomes and some gains in birthing parents' health among 40B renters. I find no changes in health among 40B owners, potentially due to differences in program selection. Among renters,

[2] Research on 40B's beneficiaries has not previously been possible because the state does not maintain records of precise development locations or any records of beneficiary identities. The novel dataset I use herein, introduced by (Sportiche et al., in progress), overcomes this limitation by recovering the exact street addresses of rental buildings and subsidized ownership units permitted under 40B.

moving to 40B housing increases the average infant's birth weight by roughly 73 grams (0.12 standard deviations) and reduces the rate of preterm births by 3 percentage points. I also find that birthing people in this group are 1 percentage point less likely to be diagnosed with inappropriate weight gain or loss during pregnancy. All of these results are robust to differences in sample construction and placebo tests that vary the timing of treated moves. The magnitude of the effects on birth outcomes are large and clinically relevant. For example, these estimates represent 48 percent and 32 percent of the estimated impact of smoking on birth weight and preterm birth, respectively.

Further evidence suggests that effects are not equal across all racial/ethnic groups. Though white non-Hispanic and Black non-Hispanic see consistent improvements in birth outcomes, the magnitude of improvements are largest among Black beneficiaries. For example, birth weight increases by six to nearly eight times more among birthing parents who identify as Black when compared to those who identify as white. Similar, more attenuated patterns apply to all four other outcomes.

When examining potential underlying mechanisms, I find evidence that health effects are specific to 40B and not associated with moving to subsidized housing in general. I show this by comparing the health effects of moving to 40B housing with the health effects of moving to housing built under the other major supply-side affordable housing policy in Massachusetts: the Low-Income Housing Tax Credit (LIHTC) program. The LIHTC program uses tax credits to incentivize private developers to construct affordable rental housing. However, the LIHTC program often produces housing in higher-poverty areas[3] (Ellen et al., 2015) and facilitates moves that do not improve, and even worsen, many neighborhood conditions (Ellen et al., 2018; McClure and Schwartz, 2021). Using data from birth records, I find no evidence that moving to LIHTC housing improves birth outcomes, though it does produce similar reductions to 40B in a birthing person's probability of being diagnosed with inappropriate weight changes during pregnancy. This evidence suggests that parental health effects may be mediated by a general feature of subsidized housing, such as the additional income provided

[3] Though tax credits are distributed by the Federal government, specific allocations of those credits are determined at the state level. The extent to which LIHTC developments are located in higher- or lower-poverty areas therefore varies across states (Ellen et al., 2015)

by the subsidy.

Additional analyses suggest that the effects of 40B on birth outcomes may be explained by changes in neighborhood conditions. I find that 40B significantly changes a variety of neighborhood characteristics among renters consistent with moving to more suburban areas, including: increasing median household income, decreasing poverty, increasing commute times, decreasing incarceration rates, and decreasing exposure to many pollutants. Renters who move to 40B housing from areas with higher male incarceration rates, from higher poverty neighborhoods, and from neighborhoods with a greater proportion of Black residents also see additional gains in birth weight and infant gestation relative to birthing people who move from lower male incarceration, lower poverty, and whiter neighborhoods. 40B also facilitates the largest improvements in neighborhood conditions for Black beneficiaries (who see the largest improvements in birth outcomes) and in doing so, reduces the disparities in neighborhood conditions between Black and white groups. Together, these results suggest that desegregating housing policies like 40B could help reduce racial and economic health disparities in birth outcomes.

This article makes three main contributions to research literature. First, I contribute to a growing literature on how social policies impact health and health disparities (Brown et al., 2019; Thornton et al., 2016; Williams and Collins, 2001). Housing research in this area has largely focused on rental assistance programs that do not change neighborhood conditions (Jacob et al., 2015; Slopen et al., 2018; Fenelon et al., 2021) or is based on experimental evidence (Leventhal and Brooks-Gunn, 2003; Fauth et al., 2004; Liebman et al., 2004; Ludwig et al., 2013). By examining the impact of a major, desegregation-focused state policy, I provide insight on the health impacts of affordable housing policies that do facilitate changes in neighborhood conditions.

I also build on a large public health literature that examines the relationship between health and specific aspects of housing, such as housing quality. Most research in this area identifies associations between individual housing exposures and health outcomes (Gibson et al., 2011; Ellen and Glied, 2015). However, housing conditions are often closely linked to a person's income and neighborhood conditions. Because housing policies often aim to improve multiple dimensions of housing at once, this study provides evidence of the more

comprehensive effects of housing on health.

Finally, by examining the effects of a housing policy that successfully facilitates moves to higher-income neighborhoods, my findings are also relevant to a large literature on the effects of neighborhood conditions on health. Much of the literature in this area is based on experimental evidence (Leventhal and Brooks-Gunn, 2003; Kling et al., 2007; Ludwig et al., 2013; Chetty et al., 2016; Finkelstein et al., 2021) or aims to identify the health effects of places (Finkelstein et al., 2021; Chyn and Shenhav, 2022) that may not generalize to practice. For example, the Moving to Opportunity (MTO) experiment used housing choice vouchers to help public housing residents move to neighborhoods with less than 10 percent poverty (Katz et al., 2001; Briggs et al., 2010). In practice however, voucher holders rarely end up in low poverty areas (Metzger, 2014; Mazzara and Knudsen, 2019), especially when they are not white (McClure, 2008; Julian and Daniel, 2009).[4] This paper complements previous work by providing new insight into the health impacts of a housing policy that facilitates "moves to opportunity" in practice.

The remainder of this article is organized as follows: Section I provides background on Chapter 40B and the LIHTC program, Section II describes potential mechanisms through which moving to 40B housing could affect health and the health outcomes that are the focus of this paper, Sections III and IV describe my data and empirical approach, Section V evaluates the health impacts of moving to 40B housing and identifies possible mechanisms, and Section VI concludes.

[4] The potential drivers of this pattern include factors such as limited time and resources to search for housing (Bergman et al., 2019; Rosenblatt and DeLuca, 2012; DeLuca et al., 2013), discrimination against voucher holders (Phillips, 2017), racial exclusion (Massey and Denton, 1993; Massey et al., 2009; Rothstein, 2017), and the limited supply of affordable rentals in low-poverty areas (Popkin et al., 2003). Similar patterns exist for beneficiaries of public housing (Collinson et al., 2016) and the LIHTC program (Ellen et al., 2016; McClure and Johnson, 2015).

I. Background

I.A. Massachusetts Chapter 40B

Massachusetts Chapter 40B was enacted in 1969 to reduce racial and economic segregation by expanding the number of communities where low- and- moderate-income households can afford to live (The Commonwealth of Massachusetts, 1968; Krefetz, 2001). To accomplish this, 40B (as it is known) requires that all municipalities in Massachusetts maintain at least 10 percent of their housing stock or 1.5 percent of their land area as affordable[5]–requirements which it enforces, in part, by granting developers the ability to bypass local zoning rules in municipalities that don't maintain these minimum standards.

As the oldest and longest running "fair share" policy,[6] 40B is arguably the most important policy of its kind in the United States. Since it was enacted over 50 years ago, it has facilitated the construction of over 70,000 total and 18,000 affordable housing units, accounting for around 20 percent of Massachusetts' affordable housing stock. It is also the dominant mechanism through which new housing is built in suburban and rural communities in Massachusetts (CHAPA, 2018). Because it was the first US policy of its kind, 40B has also served as a model for similar policies in other states. For instance, 40B served as the model for New Jersey's much more famous Fair Housing Act (Krefetz, 2001; Mallach, 2011), similar policies in Rhode Island (Stonefield, 2001) and Connecticut (Stonefield, 2001), and was most recently proposed as a model for a similar policy in California (Reid et al., 2016, 2017).

Two additional features set 40B apart from other major housing programs. First, it is one of the only policies that facilitates the construction of affordable ownership units in addition to rentals. Within Massachusetts, over half of the state's affordable ownership units were permitted through 40B. Second, 40B's requirement that municipalities maintain a minimum proportion of housing stock as affordable is more strictly enforced than some other similar

[5] The vast majority of 40B compliance is monitored with respect to the 10 percent threshold.

[6] 40B was in place well before the landmark civil rights case known as the Mount Laurel Doctrine, which required New Jersey municipalities to build their "fair share" of affordable housing for low- and moderate-income people (Krefetz, 2001).

policies (Monkkonen et al., 2019). Likely as a consequence, 40B has historically been used in municipalities with more stringent restrictions on multifamily residential development (Fisher and Marantz, 2015; Sportiche et al., in progress) and has produced housing in much whiter, wealthier, and lower poverty areas than those accessible to beneficiaries of other major affordable housing programs such as the LIHTC program, the public housing program, and the Housing Choice Voucher (HCV) program (Sportiche et al., in progress).[7]

To count towards a municipality's housing minimum, developments must meet both affordability and affirmative marketing requirements. For both ownership and rental developments, at least 25 percent of a development's units must be affordable to households earning less than 80 percent of area median income. Rental developments may also qualify if at least 20 percent of units are affordable for households earning less than 50 percent of area median income. As an example, a family of four living in Boston in 2010 would qualify for a unit subsidized at 80 percent of area median income if their gross income did not exceed $64,400. To qualify for a rental unit subsidized at 50 percent of area median income, they would have to earn less than $41,300 (Department of Housing and Urban Development). [8]

Affordability is defined differently for rental and ownership units. For rental units, affordability is defined as not paying more than 30 percent of gross income on rent, though units can be made more affordable if paired with mobile housing choice vouchers. If a person is living in a subsidized 40B rental and their earnings increase above the subsidy threshold, the unit simply reverts to a market rate price and the landlord must fill the next available unit with a subsidized tenant. To qualify for 40B ownership, subsidized owners must meet the same qualifications as renters and, with some exceptions [9], may not have owned a home within three years preceding their 40B application. Unlike renters, 40B owners may earn more without any penalties once they move in. Because ownership units are made afford-

[7] See (Sportiche et al., in progress) for a detailed description of the 40B permitting process.

[8] Per HUD's calculations, these numbers do not line up exactly with 80 percent and 50 percent of area median income in Massachusetts, which was $82,600 in 2010.

[9] Exceptions include: displaced homemakers (defined as "an adult who has not worked full-time, full-year in the labor force for a number of years but has, during such years, worked primarily without remuneration to care for the home and family"), single parents, households where at least one member is 55 or over, mobile home owners, and owners of buildings out of compliance with state code that cannot be brought up to code for less than the value of the house.

able by restricting the resale price of the house, it is not possible to build wealth under the program.

Finally, developments must meet two sets of affirmative marketing requirements. The first requirement is that developers create an affirmative fair housing marketing plan for all units, which transparently describes the housing opportunity (e.g., units, cost) and process for selection (e.g., eligibility, selection procedures, application form). This plan applies to affordable units for the duration of their affordability and must be also designed to attract persons protected under state and Federal civil rights law that are less likely to apply.[10] The second requirement concerns how that plan is advertised. To attract residents that live outside of the community, the state requires advertisements be sent in multiple languages to a wide variety of places, including on the state's online housing portal, a variety of newspapers that target different audiences including ones that serve predominantly protected classes, and to a very wide range of community organizations such as local churches, local and regional housing agencies, and local housing authorities (Massachusetts Department of Housing and Community Development, 2014).

Figure 1 depicts the municipalities where 40B beneficiaries are located and the municipalities they move to 40B housing from within Massachusetts. As the top panel of Figure 1 shows, 40B housing is primarily concentrated in the suburbs around Boston, as well as on the cape and in Western Massachusetts. The bottom panel of Figure 2 shows that 40B beneficiaries move to that housing from nearly all over the state, though somewhat higher numbers of people move to 40B housing from Boston and other cities such as Lowell, Worcester, and Springfield.

[10] This refers to people who fall into protected classes based on race, color, national origin, religion, gender identity, sexual orientation, familial status, source of income (i.e., housing choice voucher receipt), and disability.

II. Mechanisms and health outcomes

II.A. Potential effects of moving to 40B housing on health

Previous literature suggests that the main mechanism through which 40B may impact health is by facilitating moves that change the health-relevant neighborhoxod characteristics where people live (Ludwig et al., 2013; Finkelstein et al., 2021; Chyn and Katz, 2021). Consider the case of people giving birth, which I focus on in this paper. Moves facilitated by 40B housing could change birthing peoples' access to economic opportunity, social networks, perceived safety, exposure to pollution, or the quantity and quality of medical care. These place-based changes could then impact either the parent or infant's health directly (e.g., via pollution exposure) (Currie and Walker, 2011; Currie et al., 2011) or via intermediary factors known to impact health such as changes to stress (Schneiderman et al., 2005) or changes to parental health behaviors (Doll et al., 2004; Cutler and Lleras-Muney, 2006; Nandi et al., 2014). The direction of this impact could either improve or worsen health.

If these place-based changes affect the conditions for an infant in utero, they may also affect birth outcomes (Almond and Currie, 2011; Almond et al., 2018). Specific pathways through which 40B could plausibly impact birth weight or gestational age include changes to stress during pregnancy (Hobel et al., 2008; Dunkel Schetter, 2011; Currie and Rossin-Slater, 2013),[11] changes to in-utero exposures to pollution (Currie et al., 2011; Currie and Walker, 2011), changes to health behaviors during pregnancy (Blumenshine et al., 2010), and changes to the quality or quantity of medical care. There are particularly large geographic, racial, and/or economic disparities across all of these categories (Williams and Jackson, 2005; Krieger et al., 2005; Jbaily et al., 2022). For example, Black women are significantly more likely than other racial and ethnic groups to live in high pollution areas (Jbaily et al., 2022), in higher poverty areas (Subramanian et al., 2005; Acevedo-Garcia et al., 2008), and to be exposed to pollution during pregnancy (Currie, 2011) which is known to harm birth outcomes (Currie, 2011, 2013). In Massachusetts, annual average pollution exposure is highest among

[11] Because of the potential importance of stress exposure in utero, 40B could also impact birth outcomes by providing more stable, secure housing.

urban non-Hispanic black and urban Hispanic populations, even at the census block level (Rosofsky et al., 2018).

Changes to each of these pathways may also impact a birthing person's health. For instance, moving to an environment with less pollution may affect a birthing parent's cardiovascular or lung disease risk (Brugge et al., 2007), the former of which is the leading cause of parental death during pregnancy (Ramlakhan et al., 2020). Changes to stress, new social contexts, or changes to social relationships may also affect whether a birthing person smokes or drinks during pregnancy (Pampel et al., 2010; Umberson et al., 2010; Short and Mollborn, 2015), though previous literature provides mixed evidence about the direction and magnitude these effects (Schmidt et al., 2017). Moving may also change the quantity and quality of health care a birthing person receives during pregnancy. For example, the appropriate use of cesarean deliveries are highly variable across hospitals (Baicker et al., 2006; Cáceres et al., 2013).

Moving to 40B housing may also affect both an infant and birthing parents' health through other pathways. For instance, pre-pregnancy changes in income may affect birth outcomes (Almond et al., 2018) and parental health by increasing material resources at parents' disposal (Evans and Garthwaite, 2014; Hoynes et al., 2015), and increasing birthing person's access to prenatal care (Mallinson et al., 2020). These changes to income could occur either directly through the financial subsidy provided by 40B or via other pathways, such as changes to employment. Finally, changes to peer networks or building quality may also affect a birthing parent's level of stress during pregnancy, their health behaviors, or other health outcomes.

II.B. Health outcomes

In this paper, I focus primarily on the impact of moving to 40B housing on birth outcomes. A large, multidisciplinary literature shows that health at birth can have persistent, profound impacts on later life (Royer, 2009; Almond and Currie, 2011; Currie, 2011; Figlio et al., 2014) and that negative effects can essentially be reversed through medical interventions targeted at improving health early in life (Almond and Currie, 2011; Chyn et al., 2021). This suggests that interventions targeted at reducing the substantial racial, economic, and geographic

disparities in birth outcomes (Krieger et al., 2005; Martin et al., 2007; Blumenshine et al., 2010; Metcalfe et al., 2011; Ncube et al., 2016; Osterman et al., 2021) may have implications for improve both health and equity throughout the life course.

The primary birth outcomes I focus on include birth weight, gestational age, preterm birth (gestational age of less than 37 weeks), and low birth weight (birth weight under 2500 grams), as they are are widely considered general indicators of infant health that are reliably and accurately measured on birth certificates (Northam and Knapp, 2006; Devlin et al., 2008; Martin et al., 2013; Dietz et al., 2015). To these I also add an indicator of common adverse pregnancy outcomes, including low birth weight, preterm birth, perinatal death,[12] and being born small for gestational age (McConnell et al., 2022).[13] Another possible outcome is infant mortality. Fortunately, the number of infant deaths is extremely low in my sample (32 infant deaths out of 6,962 births). Without sufficient observations, the power to detect changes in infant mortality is limited, so I do not present analyses of infant mortality alone.

III. Data

I bring together data from multiple sources that enable me to identify 40B and LIHTC beneficiaries, track the characteristics of their neighborhoods over time, and observe their health outcomes. To do so, I rely primarily on probabilistic methods developed for linking data with no shared unique identifiers (see Enamorado et al., 2019). Appendix A.0 provides a detailed description of my methodology for each of the linkages I describe below.

My first dataset was introduced by Sportiche et al. (in progress) and contains the precise geocoded addresses of 5,010 addresses (representing 1,174 developments, an estimated 17,941 subsidized units, and 57,124 total units) permitted under 40B. These data are based on the Massachusetts Department of Housing and Community Development's (DHCD) sub-

[12] Perinatal death refers to a fetal death that occurs during or after the 20th week of gestation, or infant mortality within the first week of life.

[13] Small for gestational age is defined as being less than the 10th percentile of US births conditional on gestational age and gender. Because I do not have infant gender, I construct a conservative version of this indicator based on the 10th percentile for female infants, who tend to be a bit smaller than male infants. Specific cutoffs come from Talge et al. (2014)

sidized housing inventory (SHI), a public dataset which was created to monitor municipal compliance with 40B. The SHI provides the approximate street address of all subsidized housing in Massachusetts, along with the number of subsidized units, whether the building was constructed under a comprehensive permit (i.e., 40B), the date that the building and occupancy permits were filed, and the state agency responsible for tracking that development. Historically, the utility of the SHI has been limited since the vast majority of its street addresses could not be used to precisely identify subsidized housing locations.[14] The dataset put together in Sportiche et al. (in progress) overcomes this limitation by recovering the exact street address of buildings permitted under 40B, making it possible to identify 40B's beneficiaries for the first time.

To identify 40B beneficiaries and the characteristics of their neighborhoods over time, I link these 40B addresses to people in Infutor, which includes the history of residential addresses for the estimated 13 million adult individuals who lived in Massachusetts at some point between 1980 and 2021.[15] By identifying a particular address in Infutor as a 40B development, I am able to construct a longitudinal dataset of 40B beneficiaries which includes their exact address histories within and outside of Massachusetts, the month and year in which they were first seen at that address; first name, middle initial, and last name; and demographic information such as birth year and gender.[16] Of the 110,618 40B beneficiaries I find in Infutor, I focus my analyses on the 31,776 renters and 5,532 subsidized owners[17] for whom I observe at least one pre-40B address, excluding those Infutor identifies as male.

[14] Addresses are therefore included in the SHI at the time of the comprehensive permit application, when precise addresses are not yet known. The state does not follow up with developers or landlords to obtain the correct addresses once developments have been constructed. Common examples of entries include street intersections, street names without street numbers, or inaccurate street numbers.

[15] Infutor constructs these address histories by aggregating data from sources such as voter files, property deeds, credit header files, phone records, and magazine subscriptions.

[16] Previous research has examined the quality of these data and shown that, when compared to the US census, they are relatively representative of overall population counts, covering adults aged 30 - 49 particularly well (Diamond et al., 2019).

[17] The data on 40B development addresses includes unit-level information for subsidized ownership properties but not for rentals. Because 40B ownership properties are wealth-restricted, subsidized ownership remains fixed over time, making it possible to identify the exact unit that is subsidized in these properties. In contrast, 40B explicitly prohibits fixing subsidized rental properties to ensure that unit quality is consistent across subsidized and ownership properties. The data on 40B development addresses therefore do not contain unit-level addresses for subsidized 40B rentals.

Because Infutor does not perfectly capture the timing of moves,[18] I excluded 6,139 people who moved to a 40B development five or more years before any permits were filed to obtain this sample.[19] Because 40B requires subsidized rental units to change within a development to ensure that subsidized and market rate units are of equal quality, I cannot exclude market rate renters from my sample.

To recover the "neighborhood" characteristics for each person's address, I geocode all of Infutor's addresses first using ESRI's 2020 data for ArcGIS and then with the US Census API and censusxy package in R. The resulting latitude and longitude coordinates allow me to identify the 2010 census tract corresponding to each address, and thus 2010 tract (i.e., "neighborhood") characteristics, such as the median household income of that tract, its racial demographics, and the percent of residents living below the poverty line.

I use a similar procedure to construct additional longitudinal datasets of two types of comparison groups: beneficiaries of the LIHTC program and those who were neither beneficiaries of 40B nor of LIHTC. To identify people who were beneficiaries of LIHTC, I link the publicly available street addresses for 1,052 LIHTC buildings in Massachusetts (representing 970 developments, 76,634 total units, and 52,074 subsidized units) based on Department of Housing and Urban Development records (HUDuser).[20] In addition to addresses, LIHTC records include the total number of units in each building as well as the number of subsidized units, making it possible to identify the proportion of units in those buildings that are subsidized. Using the same method of linking 40B to Infutor addresses, I find 115,017 LIHTC beneficiaries, and focus my analyses on the 32,094 number of people for whom I observe at least one pre-LIHTC address whom Infutor does not identify as male. To identify people who were neither beneficiaries of 40B or LIHTC, I simply exclude those people who ever resided in a LIHTC or 40B development from the population of people who resided in Massachusetts at some point between 1980 and 2021 for whom I observe at least one move

[18] Appendix Figure A.I shows that while I detect moves into 40B housing relatively well, there is some variation in the timing of moves relative to when permits were filed.

[19] Because there is no official record of 40B beneficiaries (this first-ever study on the topic), I cannot report what percentage of residents I am capturing with this linkage.

[20] These data have been used in previous research (McClure and Schwartz, 2021; Diamond and McQuade, 2019) and are considered reliable.

from a similar neighborhood as 40B or LIHTC residents. This leaves me with about 3.8 million people who fall into this last group.

Finally, I link each of these datasets to birth certificates from the Massachusetts Registry of Vital Records and Statistics between 2005 and 2019 using a combination of first and last name, residential address, and date of birth (see Appendix A.0 more detail).[21] This allows me to observe the birth outcomes of people who gave birth prior to, while residing in, or after moving out of a 40B development. Birth records contain a rich set of health outcomes for both the infant and birthing parent, as well as high quality, self-reported parental race and ethnicity data (Northam and Knapp, 2006). For instance, in addition to birth weight and gestational age, birth records also include: information on the birthing parent, such as the age at which the parent gave birth and parental conditions that may affect pregnancy outcomes such as gestational diabetes or smoking during pregnancy; information on birth histories, including the number of previous pregnancies and previous birth outcomes (e.g., previous cesarean, previous low-birth weight); and information on health care prior to and during delivery, including the birthing parent's health insurance coverage, various indicators of prenatal care, delivery care and location, delivery method (e.g., cesarean delivery, vaginal), presentation at delivery (e.g., breech), and complications that occurred during delivery (e.g., infant transferred to another facility).

After completing the final linkage to birth records, I end up with samples of 3,030 40B beneficiaries who gave birth some time during my study period (687 subsidized owners and 2,343 subsidized and market rate renters), 2,824 subsidized and market rate LIHTC beneficiaries who gave birth, and 320,823 residents who gave birth in Massachusetts but did not live in either 40B or LIHTC.

[21] I collect birth certificate data beginning in 2005 to create a longitudinal dataset that provides sufficiently long coverage of various economic conditions and housing market changes (e.g., housing bubble, Great Recession, etc.).

IV. Empirical approach

My empirical approach compares the outcomes for babies born to birthing people who move to 40B housing relative to babies born to people who move to non-subsidized housing. Specifically, I run a difference-in-differences analysis that compares the changes in health outcomes for 'treated' 40B beneficiaries before and after they enter subsidized housing with the changes in health outcomes for birthing people who move to non-subsidized housing.

The central empirical challenge lies in identifying plausible control group(s) that describe counterfactual birth outcomes for 40B beneficiaries had they not moved to 40B housing. An ideal experiment would compare the health outcomes of people who were randomly offered the opportunity to live in 40B housing to the health outcomes of those people who were randomly not offered that same opportunity. In the absence of these data,[22] my identification strategy needs to address the fact that the reason(s) people move to 40B housing may also be correlated with birth outcomes. For example, parents who apply to live in 40B housing may be better at seeking out other opportunities to improve their health than parents who do not, which may in turn affect both the parent and infant's health.

To address this issue, I use a matched difference-in-differences design that exploits my rich address data to construct several sets of race-and-ethnicity-matched controls who, like my "treated" 40B beneficiaries, also moved at the same age and time[23] from the same types of origin neighborhoods. This approach assumes that conditioning on pre-move neighborhood characteristics, race/ethnicity, and the choice to move somewhere at a particular age and time controls for differential trends in health outcomes that could be driven by the choice of housing.

[22] Lottery data are not officially collected by the state. Obtaining these data therefore requires collecting records of lottery applicants and waitlists ("winners" are those highest up on the waitlist) directly from the developers and agencies that run the lotteries.

[23] It is well-established that people move for different reasons at different ages in ways that may affect health outcomes. For instance, people tend to purchase a home when they get married, which also independently affects health. Similarly, race/ethnicity both voluntarily and involuntarily affects choice of move destination in ways that are also strongly correlated with health outcomes. Finally, mobility patterns change during times of economic growth and hardship (Joint Center for Housing Studies, 2014, 2015, 2016), which also independently affect infant and parental health (Currie et al., 2015; Aizer and Currie, 2014)

IV.A. Matched sample construction

The sample that I use for matching is a subset of the full set of 40B beneficiaries for whom I observe at least one pre-40B address. To obtain this sample, I first restrict my sample to moves made between 2000 and 2019. Because I have birth records starting in 2005 and I restrict my estimation period to five pre- and post-treatment years, 2000 is the earliest year that can be included in my analyses. Second, to deal with the fact that a small number of beneficiaries move from one 40B residence to another, I only match beneficiaries to controls based on their first move to 40B housing. Finally, to allow for clear comparisons between 40B and LIHTC, I exclude the small number of people who moved to LIHTC housing that was permitted through 40B. With these additional sample restrictions, I end up with a total of 2,250 treated beneficiaries (96 percent of possible beneficiaries) who moved to 40B rental housing and 661 treated beneficiaries (96 percent of possible beneficiaries) who moved to 40B ownership housing.[24]

While these samples are reasonably large, they may be small for detecting changes in outcomes such as low birth weight or preterm birth.[25] I thus implement a matching approach designed to match as many treated people as possible. I accomplish this using cardinality matching, a method that aims to find the largest matched sample while balancing the original covariates rather than coarsened versions of those covariates (Visconti and Zubizarreta, 2018). This approach allows me to preserve as much of the "treated" group as possible when creating a balanced sample, thereby overcoming limitations from other methods that may reduce my statistical power (Diamond and Sekhon, 2013; King et al., 2016). An additional advantage of cardinality matching is that it allows me to flexibly match more closely on some covariates than on others. For instance, I can match exactly on covariates that are very strong confounders of the relationship between 40B and birth outcomes (e.g., race/ethnicity) while matching on the distributions of other covariates (e.g., the age at which a person moved).

[24] I make the same restrictions for LIHTC beneficiaries, after which I end up with a total of 2,564 LIHTC beneficiaries (91 percent of possible beneficiaries).

[25] In Massachusetts, roughly eight percent of all infants are born with low birth weights and roughly nine percent are born preterm (Massachusetts Department of Public Health: Registry of Vital Records and Statistics, 2022).

Using this method, I match 40B beneficiaries to people from similar origin neighborhoods who moved anywhere other than to 40B housing or to LIHTC housing. Because people who move anywhere are most likely moving to market rate housing, I refer to them as "non-subsidized movers" throughout the remainder of this paper.[26] To address the fact that selection into 40B rental and ownership programs may differ, I begin by matching 40B renters to comparable non-subsidized movers before matching 40B owners to comparable non-subsidized mover controls. I also construct two additional control groups to provide insight into potential mechanisms underlying the relationship between moving to 40B housing and health. The first matches LIHTC beneficiaries to non-subsidized movers from similar origin neighborhoods to provide insight into the health impacts of receiving subsidized housing more generally.[27] The second then compares 40B and LIHTC directly by matching 40B renters matched to comparable people who moved from similar origin neighborhoods to LIHTC rental housing.

When constructing each set of controls, I match exactly on the birthing parent's self-reported race/ethnicity, and match closely on the distributions[28] of the age and the year at which they moved, the state they moved from, and a series of key characteristics from birthing peoples' pre-move neighborhoods.[29] These neighborhood characteristics, which I proxy with census tract data,[30] include: the percent of people below the poverty line; median household income; and the percent of people who are non-Hispanic white, non-Hispanic Black, non-

[26] It is possible that members of this group receive Housing Choice Vouchers, live in public housing, or move to subsidized housing in other states. However, the fact that Infutor better captures individuals in middle- and higher-income areas (Blanco, 2023) together with substantial shortage of subsidized housing relative to demand among qualified groups (Collinson et al., 2016; Joint Center for Housing Studies, 2016, 2018) suggests that I am more likely capturing people who move to market rate housing.

[27] Moves made to LIHTC housing are meant to proxy moves to other subsidized housing. As the other major supply-side affordable housing policy in Massachusetts, LIHTC is the natural comparison for 40B.

[28] I allow for up to 0.002 standard deviations of difference when matching distributions for all comparisons except 40B v. LIHTC, where–due to small sample sizes–I allow for up to 0.02 standard deviations of difference.

[29] Since I match on time-invariant covariates that do change after treatment, my estimates should not be subject to regression to the mean (Daw and Hatfield, 2018).

[30] I use 2010 census tract boundaries and 2010 census tract characteristics throughout this paper. Though tract characteristics may change over time, my results do not change if I use data from the most recent (i.e., 1990, 2000, 2010) census year. Because census tracts are designed to be homogeneous with respect to population characteristics, economic status, and living conditions by the US census, they are more appropriate for geographic research than zip codes (Krieger et al., 2002).

Hispanic Asian, or Hispanic, respectively. I also match on the joint distribution of the birthing parent's race/ethnicity and the tract-level percent of people in poverty and the joint distribution of the birthing parent's race/ethnicity and tract-level median household income. Matching on these joint distributions ensures that I am comparing people of the same race/ethnicity who moved from areas with similar poverty and income levels. In other words, it avoids the scenario where I compare the health outcomes of treated Asian parents who come predominantly from high-poverty neighborhoods to the health outcomes of a control group of Asian parents who come predominantly from low-poverty neighborhoods.

Table 1, which shows pre- and post-match means for the sample of all 40B beneficiaries v. all movers, illustrates how this matching procedure improves the pre-move comparability of treatment and control groups. Rows above the double line in Table 1 correspond to variables I explicitly used for matching, while rows below the double line correspond to those I did not match on. Focusing first on the variables used in the match, the left two columns show that 40B beneficiaries and potential controls were not demographically and geographically comparable populations prior to matching. For instance, 40B beneficiaries are more likely to identify as Black, Asian, or Hispanic than potential controls. They are also more likely to move to 40B housing from higher income, whiter, and lower poverty areas. Matching makes the groups much more comparable, as seen by smaller standardized differences in column 6 compared to those in column 3.

More important is the impact of matching on variables not included in the match. As shown in the bottom part of the table, matching reduces the standardized differences for the birthing parent's education decrease at least three fold. Though matching does not eliminate differences in these variables entirely (some differences remain statistically significant), all standardized differences are below the 0.1 threshold that is typically considered negligible (Austin, 2011).[31] Similar patterns are found in pre- and post-match balance tables for my other matched samples, which are included in Appendix Tables B.I through B.III Given that education is an important predictor of health outcomes (Cutler and Lleras-Muney, 2012;

[31] There is no single agreed upon threshold above which standardized differences are considered too large; 0.25 is also a threshold that has been proposed (Stuart, 2010).

Galama et al., 2018), these reductions provide evidence that matching produces plausible counterfactual groups for treated 40B beneficiaries.

Table 2 shows baseline (pre-move) summary statistics and sample sizes of all four matched samples. The first three columns show that 40B and LIHTC beneficiaries tend to be slightly less educated and have worse health at baseline when compared to matched non-subsidized movers. Though the proportion who have less than a high school degree are no different between these three sets of treatment and control groups, all three treated samples are slightly less likely to have earned a college degree. Health characteristics also differ at baseline. In particular, birthing people who eventually become 40B renters have infants with worse birth outcomes prior to moving and are more likely to report previous preterm births or worse birth outcomes (though the means are the same, the distributions differ). Parental health also tends to be worse among 40B or LIHTC beneficiaries. 40B owners and LIHTC beneficiaries are slightly more likely to be diagnosed with lung disease, while all three samples are more likely to report smoking during pregnancy prior to moving. Finally, 40B renters and LIHTC beneficiaries are more likely to also be beneficiaries of Medicaid and all three samples are slightly less likely to receive prenatal care during the first trimester of pregnancy.

A comparison of treated groups also shows that baseline health and demographic characteristics vary across 40B owners, 40B renters, and LIHTC beneficiaries. Demographically, 40B owners are the most likely to identify as white non-Hispanic (80 percent), have a college degree (75 percent), and to move to 40B housing from whiter, higher-income, and lower-poverty neighborhoods. In contrast, the majority of LIHTC beneficiaries identify as either Hispanic or a non-white race (53 percent), are less likely to have a college degree (72 percent) and are more likely to move to LIHTC from less white, higher-poverty, and lower-income neighborhoods. 40B renters fall in between these two groups. 40B owners also tend to be healthier at baseline than 40B renters and LIHTC beneficiaries. For example, birthing people who eventually become 40B owners have better birth outcomes than the other two groups across nearly all categories, are more likely to seek out early prenatal care, and are about half as likely to be Medicaid beneficiaries. Exceptions include parental health indicators such as the number of prenatal visits, smoking and drinking while pregnant, and a parental

diagnosis of lung disease.

IV.B. Types of moves facilitated by 40B

To examine whether 40B facilitates changes in neighborhood characteristics for beneficiaries, I compare the change in neighborhood characteristics for moves made by treated beneficiaries to the change in neighborhood characteristics for moves made by matched controls. Figure 2 plots each group's pre-move neighborhood household income against their post-move neighborhood household income to illustrate this comparison. I use neighborhood income as a proxy for a wide range of neighborhood characteristics that may affect health. Each binned scatterplot in Figure 2 shows a different sample of treated beneficiaries and matched controls. The top two plots in Figure 2 correspond to the primary two samples comparing 40B beneficiaries to matched non-subsidized mover controls. In each plot, points above the 45-degree line indicate moving to a higher-income neighborhood while points below the line indicate moving to a lower-income neighborhood. Points for treated 40B beneficiaries above those for matched controls would imply that 40B facilitates health promoting moves.

The top two plots of Figure 2 show that the points for treated 40B beneficiaries are nearly always above those for matched controls. In other words, the average increase in neighborhood-level income facilitated by 40B is larger than the increase experienced by matched controls across all but the highest origin neighborhood-level incomes. Non-subsidized movers tend to make moves that regress to the mean: people moving from below-average income areas tend to move to slightly higher income areas while people moving from above-average income areas tend to move to slightly lower income areas. Consider non-subsidized movers matched to 40B renters in the top left plot. In this group, the median non-subsidized mover increases their neighborhood-level income by $9,000 if they move from a lower-than-average income neighborhood, but decreases their post-move neighborhood-level income by $16,000 if they move from a greater-than-average income neighborhood. This results in roughly no change for the median non-subsidized mover, who transitions to a neighborhood with a household income $300 lower than where they came from.

In contrast, the median 40B renter increases their neighborhood-level income by roughly $14,000 overall, by $23,000 if they come from a lower-than-average income neighborhood,

and by $28,500 if they come from a neighborhood in the bottom quartile of incomes. These changes represent average neighborhood-level income increases of $14,000, $11,000, and $15,000 relative to increases experienced by non-subsidized movers. Similar patterns exist for 40B owners. The differences between moves facilitated by 40B compared to counterfactual moves are large. Moreover, Appendix Figure C.I shows that the magnitude of these differences is even larger among Black and Hispanic movers. Relative to increases experienced by Black or Hispanic non-subsidized movers, the median Black or Hispanic 40B renter increases their neighborhood-level income by $20,000 overall, $18,000 if they move from the top quartile of neighborhood-level incomes, and by $21,000 if they move from the bottom quartile of neighborhood level incomes.

Figure 2 also demonstrates that the moves facilitated by 40B are roughly opposite those facilitated by the LIHTC program. While the top two plots show that 40B facilitates moves to higher-income areas when compared to matched controls, the bottom left plot shows that LIHTC tends to move beneficiaries to lower-income neighborhoods when compared to matched controls. This pattern is consistent with previous research showing that LIHTC tends to facilitate moves that do not improve, and even worsen, many neighborhood conditions (Ellen et al., 2018; McClure and Schwartz, 2021). These differences between 40B and LIHTC are also predicted by program design: whereas 40B incentivizes affordable housing construction in higher-income suburban areas (Sportiche et al., in progress), LIHTC incentivizes affordable housing in lower-income urban areas (McClure, 2008; Ellen et al., 2015). As expected based on these incentives, the bottom right plot of Figure 2 shows that differences between neighborhood characteristics are largest for 40B renters compared to matched LIHTC beneficiaries moving from similar neighborhoods.

These same patterns of 40B facilitating moves to wealthier suburban neighborhoods are replicated across a range of other outcomes. An equivalent figure for pre- and post-move neighborhood-level poverty is included in Appendix Figure C.II.

IV.C. Estimating equation

I start by estimating the effect of 40B on health using the dynamic difference-in-differences model:

$$y_{i,t} = 40\text{B}_i \ + \gamma_t + \sum_{k=-5}^{5} \delta_k \ 40\text{B}_i \times \mathbb{1}(t - \tau_i = k) + \mathbf{X}_{i,t} + \epsilon_{i,t} \tag{1}$$

Where y is the health outcome for person i in year t, 40B_i indicates whether person i was ever a 40B beneficiary, λ_t are calendar-year fixed effects, and τ_i corresponds to the year t when person i moves (to 40B housing among beneficiaries or anywhere else among matched controls). Because I restrict my analyses to five years prior to and after moving, k ranges from -5 to 5 where treatment begins at $k = 0$. The omitted period is $k = -1$.

The coefficients of interest (each δ_k) therefore represent the average change in health outcome y between period k and $k = -1$, the year prior to a move, among people who move to 40B housing compared to people who move anywhere from similar origin neighborhoods.[32] Finally, $\mathbf{X}_{i,t}$ is a vector of covariates known to affect birth outcomes including indicators for the birthing parents' first birth, being 35 or older when giving birth, and multiple births from the same pregnancy (i.e. multifetal gestation). I also include indicators of having a previous adverse birth outcome and having a previous preterm birth as these are strong predictors of subsequent birth outcomes, though the interpretation of my results does change if I omit any of these covariates.[33]

As I show below, treatment effects do not seem to evolve over time. Thus, to increase the power of the estimates, I estimate the following static difference-in-difference model:

$$y_{i,t} = 40\text{B}_i + \text{Post}_t + \gamma_t + \delta^{DD}(40\text{B}_i \times \text{Post}_t) + \mathbf{X}_{i,t} + \epsilon_{i,t} \tag{2}$$

Where y is again the health outcome for person i in (pre- or post-move) period t, 40B_i and γ_t retain the same definitions as in equation (1), Post_t is a post-move indicator, and

[32]There are 2.4 people per census tract on average. Clustering by tract therefore leads to *smaller* standard errors.

[33]Other covariates vary slightly depending on the outcome variable. For example, for cesarean births I condition on having a previous cesarean delivery (Zhang et al., 2010). See the Figure 4 caption for a full description of covariates by outcome.

$40B_i \times Post_t$ is 1 after a 40B beneficiary has moved to their first 40B residence. In this specification, δ^{DD} is the parameter of interest and can be interpreted as the additional effect on health of moving to 40B housing. Covariates included in $\mathbf{X}_{i,t}$ are equivalent to equation (1). Note that the interpretation of my results does not change if I omit these covariates.

V. Impacts of moving to 40B housing on health

V.A. 40B renters

I first examine the effects of moving to 40B housing on birth outcomes using birth weight, gestational age, preterm birth, low-birth weight, and the composite indicator of any adverse outcome as the dependent variable. I begin by focusing on 40B renters, as renters are much more likely to have lower incomes, identify as Black, and spend a greater fraction of their income on housing (Collinson, Ellen, and Ludwig, 2016; Desilver, 2021). In my sample, renters also have worse health than owners at baseline (see Table 2).

Figure 3, which depicts these estimates for the sample of 40B renters compared to non-subsidized movers, shows little evidence that treatment effects vary over time once both groups have moved. Though the coefficients on preterm birth deviate somewhat from the null starting in the third period after treatment, these differences are relatively small in magnitude and not statistically distinguishable from estimates in previous post-treatment years. This lack of trends is consistent with the idea that the effects of moving should affect births taking place four or five years after a move in a similar way to births occurring two or three years after a move.[34]

Moreover, each plot in Figure 3 shows that the standard errors on effect estimates are large. For instance, standard errors on birth weight estimates are around 350g – a value which represents roughly 10 percent of a healthy infants' weight at birth. Appendix Figures D.I to

[34] The main mechanism through which effects could evolve over time is by significantly changing the health of the birthing parent between pregnancies in a way that increases the risk of poor birth outcomes. For instance, if moving affected whether the birthing parent became hypertensive or diabetic, this would significantly affect the risk of poor infant and birthing parents' outcomes. However, previous empirical literature shows that even very large neighborhood changes do not affect the overall prevalence of adult disease (Ludwig et al., 2012), though they can affect the severity of those chronic disease outcomes (Ludwig et al., 2011).

D.IV show similar patterns (no statistically significant effects on trends and large standard errors) across other outcomes among renters, as well as among 40B owners compared to non-subsidized movers, and LIHTC beneficiaries compared to non-subsidized movers.[35] While I do not have power to detect statistically significant effects using event study methods, Figure 3 plots provide no evidence that pre-move trends differ across groups.[36] Taken together, these patterns suggest that it is reasonable to pool pre- and post-treatment periods to estimate equation (2).

Figure 4 presents the results of equation (2) for birth outcomes, parental health during pregnancy, access to care during pregnancy, and delivery outcomes. Each plotted value of Figure 4 represents the standardized coefficient[37] and confidence interval on δ^{DD} and be interpreted as the additional effect of moving to 40B housing on the outcome in that row. The values for regression coefficients are shown above each standardized point estimate.

The coefficients in Figure 4 suggest that moving to 40B rental housing affects birth outcomes, parental health, and health care during pregnancy. For instance, these results show that compared to both control groups, moving to 40B housing increases birth weight by around 73 grams (0.12 standard deviations), gestational age by roughly 2.2 days (0.14 standard deviations), and preterm birth by 3 percentage points (0.12 standard deviations), though the confidence intervals around these estimates are relatively large at 5.1 g to 141.7 g for birth weight, 0.6 to 6 days for gestational age, and 0.02 to 6 percentage points for preterm birth. Similarly, birthing people moving to 40B housing are 1 percentage point (0.12 standard deviations) less likely to be diagnosed with inappropriate weight changes during pregnancy (95% confidence: 0.01 percentage points to 3 percentage points), are 7 percentage points more likely to report smoking during pregnancy (0.2 standard deviations, 95% confidence: 3 percentage points to 10 percentage points), and have about half of an additional prenatal visit during pregnancy (95% confidence: 0.18 to 0.95).

[35] I do not present event study findings for the sample that compares 40B renters to LIHTC beneficiaries due to small sample sizes.

[36] Coefficients in the pre-move period remain close to zero and never achieve statistical significance, even at the 10 percent level.

[37] I standardize variables to have a mean of 0 and a standard deviation of 1 to make the magnitude of estimated effects comparable.

One way to gain an intuition for the magnitude of these effects is to compare them to factors known to affect infant outcomes, such as smoking during pregnancy. Recent estimates from cross-sibling comparisons find that smoking reduces infant birth weight by roughly 150 grams among light smokers and 226 grams for heavy smokers (Juárez and Merlo, 2013). Similarly, a meta-analysis of 20 prospective cohort studies found that smoking increases the risk of preterm birth by 25 percent (Shah and Bracken, 2000). The effect of moving to 40B housing represents 48 percent and 32 percent of the estimates for birth weight and an effect of roughly the same magnitude for preterm birth. These effects suggest that a 73 gram increase in birth weight and a 3 percentage point reduction in preterm birth are clinically relevant.

Relative to the effects of other policies, the magnitude of the effects on birth outcomes are large. For instance, the average effect of 40B on birth weight is roughly three times larger than the effect of access to WIC during pregnancy (estimate of 27g; Rossin-Slater, 2013), an order of magnitude larger than the intergenerational effects of Medicaid expansion (estimate of 7g; East et al., 2017, and similar to the effect Chyn and Shenhav (2022) reported for moving from a location in the bottom percentile of birth weight to a location in the top percentile of birth weight (estimate of 65g; Chyn and Shenhav, 2022). Note that even if the coefficients on these estimates decrease to the lowest end of the confidence interval, effects would be comparable to those detected by other programs (Almond et al., 2011; Chyn and Shenhav, 2022).

The only clear effect of moving to 40B housing on parental health is a decrease in inappropriate weight changes during pregnancy.[38] Though small in absolute terms, the decline in this outcome is large relative to baseline prevalence. Prior to moving, the mean percent of treated birthing people diagnosed with inappropriate weight changes is roughly two percent. A one percentage point decrease implies a fifty percent reduction after moving to 40B, from two percent to one percent. Though I also find that birthing people who move to 40B housing make more prenatal visits than non-subsidized people, the implication of

[38] Massachusetts birth records do not distinguish between inappropriate weight gain and inappropriate weight loss until after 2011.

such a change is unclear. One possible explanation is that birthing parents are seeking out important preventive care. However, Figure 4 shows no evidence that birthing people who move to 40B housing are more likely to seek out early prenatal care (in fact, the coefficient is slightly negative), which current guidelines consider a marker of adequate prenatal care (Gourevitch et al., 2022). Moreover, the number of prenatal visits is strongly correlated with length of infant gestation. This implies that the small increase I detect in prenatal visits may be due to 40B's effect on infant gestation rather than prenatal care per se.

To assess the extent to which differences in birthing parents' baseline health is driving these differences, I also test the effect of moving to 40B housing on chronic conditions and previous adverse birth outcomes. These coefficients are shown under the pre-pregnancy health section of Figure 4. Statistically different trends in these outcomes would provide evidence that health selection drives at least some of the health effects described above. The results in Figure 4 show no evidence of different trends in these outcomes. All of the coefficients under pre-pregnancy health are close to zero and none are statistically significant, even at the 10 percent level.

Finally, I also include an indicator of whether the baby is breech[39] as a placebo test. Because the baby's orientation at delivery should not be affected by changes to neighborhood conditions,[40] breech can be conceived of as a placebo outcome. Again, Figure 4 shows that the coefficient on breech is not statistically significant and is centered on zero, suggesting that the health effects I detect are not spurious.

Appendix Figures E.I through E.III that these results are robust to variations in sample construction and placebo tests that vary the timing of treated moves. Appendix Figure E.I shows equivalent results to Figure 4 for a sample constructed by matching exactly on pre-move census tracts (i.e., people from the exact same neighborhoods) rather than on

[39] Breech occurs when the baby is positioned such that the feet or buttocks are positioned to come out first during birth. It is sometimes also referred to as non-vertex presentation.

[40] Note that breech is more likely to be present in preterm births (Toijonen et al., 2020). Specific other risk factors for breech include the birthing parent's age, giving birth for the first time, previous cesarean deliveries or other procedures that could scar the uterus, having a female baby, and other pregnancy risk factors such as gestational diabetes (Toijonen et al., 2020; Cammu et al., 2014). I condition on all but having a female baby (which I do not have in my data) and other pregnancy risk factors in my analyses.

the demographic and economic characteristics of pre-move tracts (i.e., people from similar neighborhoods). These results demonstrate that the interpretation of results does not change with a more closely matched sample. Despite a slightly smaller sample size of 2,047 (mostly due to an inability to identify matches for birthing people who move to 40B housing from out of state) the coefficients on birth weight, gestational age, preterm birth and adverse birth outcomes all increase in magnitude and statistical significance, and the coefficient on birth weight becomes statistically significant. Parental weight gain or loss and prenatal visits are similarly robust to the change in sample. There is also no indication of selection on pre-pregnancy health outcomes, and breech remains close to zero.

Appendix Figures E.II and E.III then show the results of placebo tests where I shift the "treatment" year to two and three years prior to the actual treatment move year. Because the placebo treatment year no longer corresponds to the first year I detect treated beneficiaries in 40B housing, these results should show no effect of moving to 40B housing on health. As expected, these figures show no effect of moving to 40B on birth outcomes, parental health, or health care during pregnancy or delivery. The coefficients all move close to zero, and none of the key health outcomes are statistically significant.

V.A.I. Heterogeneity in effects on birth outcomes by race and ethnicity

A long history of deliberately segregationist policies targeted at Black people have created large disparities in neighborhood conditions along racial lines (Rothstein, 2017; Taylor, 2019; Bailey et al., 2019), which a growing empirical literature suggests may be one factor driving the large and persistent disparities in birth outcomes between Black birthing people and other racial/ethnic groups (Ellen, 2000; Paradies et al.; Williams et al., 2019). Given that one of 40B's goals is to reverse these disparities in neighborhood conditions, my next analyses examine whether effects on birth outcomes differ according to the birthing parents' self-disclosed race and ethnicity. To do so, I estimate equation (2) on birth outcomes separately for each racial/ethnic group of 40B renters.[41] Figure 5 depicts these results for my main sample (left panel) and the sample of beneficiaries matched on exact origin neighborhood

[41]I do not examine effects for other racial groups or heterogeneity among 40B owners due to small sample sizes.

(right panel).

Though standard errors increase due to smaller sample sizes, the results depicted in Figure 5 reveal meaningful heterogeneity across racial/ethnic groups. The first notable trend is though white non-Hispanic and Black non-Hispanic see the most consistent improvements in birth outcomes, larger coefficient magnitudes suggest that effect sizes are larger among Black beneficiaries. The most striking difference is for birth weight. While white non-Hispanic beneficiaries see a 54-58g (0.09 standard deviation) increase in birth weight, birth weight increases by six to nearly eight times that magnitude among birthing parents who identify as Black (330 - 421 grams or 0.6 - 0.7 standard deviations). Similar, more attenuated patterns apply to all four other outcomes. Effects among Hispanic beneficiaries are less clear. Larger coefficient magnitudes that increase in the sample matched on the same origin neighborhood suggest that gestational age and adverse birth outcomes may improve in this group. However, the effects for other outcomes are do not demonstrate a clear pattern across the two samples – perhaps as a reflection of the large heterogeneity by factors such as race, birthplace, and place of ancestry in this group (Fernandez et al., 2023). Finally, coefficients that are centered close to zero suggest that effects are null among Asian beneficiaries.

V.A.II. Heterogeneity in effects on birth outcomes by education

Previous research has also highlighted disparities in birth outcomes across educational groups (Meara, 2001; Chyn and Shenhav, 2022). My next analyses therefore examine heterogeneity by the birthing parents' educational background. As with subgroup analyses by race/ethnicity, I test for differences across educational groups by estimating equation (2) on birth outcomes separately for each of educational group. Figure 6 shows these results for my main sample of 40B renters on the left panel and the sample of 40B renters matched to a control group who moved from the exact same origin neighborhoods on the right panel.

Overall, these results suggest that effects are driven by beneficiaries with mixed educational backgrounds. Some evidence suggests that effects on birth weight and gestational age are driven by the birthing parents with the lowest levels of educational attainment. For example, the coefficient on gestational age is three times the magnitude of the positive coefficient for college-educated beneficiaries (0.3 v. 0.1 standard deviations). On the other

hand, beneficiaries who report have at least college degree (at the time of birth) see somewhat larger improvements in low birth weight and adverse birth outcomes while effects on preterm birth appear similar for both groups.

V.B. 40B owners

Because selection into 40B ownership and rental housing creates demographically and economically different populations at baseline (e.g., see Table 2), the health of owners and renters may be affected differently by moves to 40B.[42] Similarly, health impacts may differ if 40B owners end up in different types of neighborhoods than 40B renters do.

Figure 7 summarizes the results of equation (2) for the sample of 40B owners compared to non-subsidized movers. These results show little evidence that moving to 40B affects birth outcomes or parental health among 40B owners. The coefficients on both sets of outcomes decrease towards the null, and the standard errors increase substantially. This absence of impact is corroborated by the robustness check in Appendix Figure E.IV, which summarizes the equivalent results for 40B owners compared to non-subsidized movers from the exact same origin neighborhoods. The magnitude of the coefficients on both sets of outcomes in this figure decrease even further to the null.

Though both Figure 7 and Appendix Figure E.IV show some evidence of negative health selection among 40B owners (see the positive coefficients on adverse birth outcomes in both figures and that or preterm births in Appendix Figure E.IV), it is unlikely that this selection is driving the null effects. If this negative selection fully explained the lack of effect among owners, then conditioning on birth histories should increase the coefficient on birth outcomes. However, as Appendix Figure E.V shows, the coefficients on birth outcomes remain essentially unchanged if I remove these covariates from my models.

Because there aren't large differences in the characteristics of neighborhoods where 40B ownership and 40B rental properties are constructed (Sportiche et al., in progress) or where

[42]These differences may be driven by the larger financial barriers to becoming a beneficiary of a 40B ownership program. Unlike renters, potential 40B owners must pass credit checks, produce evidence of employment with pay stubs, and qualify for bank loans in order to move into the housing provided. Previous research suggests that these differences in program eligibility may particularly be barriers to program entry for Black beneficiaries (Taylor, 2019).

beneficiaries in my sample end up (see Figure 2 and Appendix Figure C.II), it is also unlikely that the lack of effect on 40B owners is due to housing location.[43]

Another potential explanation for this lack of effect is that 40B owners are healthier at baseline and therefore stand to gain less from moving to 40B housing than renters do. Table 3, which compares the baseline (pre-move) health of 40B owners to 40B renters, provides some evidence to this effect. 40B owners have better baseline birth outcomes than 40B renters across all outcomes but the indicator of any adverse outcome. 40B owners are also more likely to seek out early prenatal care, are much less likely to be beneficiaries of Medicaid, and are slightly less likely to be diagnosed with chronic diabetes when compared to 40B renters. These comparisons are consistent with those drawn based on Table 2, which also show that the average 40B owner is whiter, slightly more educated, and tends to move to 40B housing from whiter, lower poverty neighborhoods when compared to 40B renters.

One final possibility is that this overall average masks heterogeneous effects across different racial/ethnic and educational subgroups (as is the case for 40B renters in Figure 4). However, I am not able to examine heterogeneity by these factors due to small samples sizes and the few owners in my sample who identify as Black, Hispanic, Asian, or who have less education (see Appendix Table B.II.

VI. What Explains the Effect of Moving to 40B Housing on the Health of Renters?

VI.A. Birthing parents' health and health behaviors

One potential pathway through which moving to 40B housing may affect birth outcomes is by changing health behaviors during pregnancy (Ion and Bernal, 2015). To test whether this is the case, I add parental health outcomes to the right hand side of equation (2) and examine whether the coefficient on δ^{DD} moves towards zero. A coefficient that moves towards the null suggests that parental health may mediate the effect of 40B on that particular birth

[43] Though 40B ownership properties tend to be located in slightly whiter, less dense suburban communities that have fewer proximal jobs when compared to the locations where 40B rental properties are constructed, these differences in development locations are very small (Sportiche et al., in progress)

outcome.

Figure 8 summarizes these results for 40B renters compared to all non-subsidized movers. As with previous figures, each plotted coefficient corresponds to the standardized coefficient on DD. Based on previous results, the potential mediators I consider are: whether the birthing parent ever smoked while pregnant, whether the birthing parent reported more than one daily drink while pregnant, and inappropriate weight gain or loss. The top coefficient in each row corresponds to the estimates shown in Figure 4 (with no mediators), the second includes all potential mediators, the third includes only an indicator of whether the birthing parent smoked while pregnant, and the fourth includes an indicator of whether the birthing parent was diagnosed with inappropriate weight changes.

Overall, these results provide some evidence that smoking during pregnancy explains differential trends in adverse birth outcomes. With the addition of smoking alone, the coefficient on adverse birth outcomes decreases towards zero and is no longer statistically significant (see the third coefficient in each row). I find no evidence that any of these parental health mediators explain the effect of 40B on birth weight, gestational age, or preterm births. These results are replicated in Appendix Figures F.I, which shows the same results for the sample of 40B renters and controls matched exactly on neighborhood of origin.

Appendix Figure F.II further reveals heterogeneity in the mediating role of parental health behaviors across different racial and ethnic groups. In particular, the addition of smoking reduces the coefficients on both adverse birth outcomes and preterm birth decrease to nearly zero among Black non-Hispanic beneficiaries, but has little effect among white non-Hispanic beneficiaries. In contrast, smoking appears to marginally reduce birth weight among white birthing parents but has no mediating effect among Black birthing parents. Similar patterns are replicated in Appendix Figure F.III, which illustrates the same results for 40B renters matched to controls who moved from the exact same origin neighborhoods.

VI.B. Housing subsidy

A comparison of 40B's effects on birth outcomes to those of other program subsidies suggests that the effect of 40B extends beyond what would be predicted by the program subsidy alone. A back-of-the-envelope calculation suggests that a family of four earning

80 percent of Area Median Income in 2010 would have received a monthly 40B subsidy of roughly 259 dollars per month to rent in a relatively expensive municipality such as Newton or Cambridge.[44] If the effect of 40B on birth outcomes were primarily due to receiving this subsidy, the magnitude of the effect on birth outcomes should be similar to what would be predicted by receipt of the subsidy alone. However, previous estimates of the effect of receiving 200 dollars per month in food stamps on birth weight (Almond et al., 2011) suggest that a 259 dollar subsidy should increase birth weight by around 29 grams,[45] a quantity that is only 40 percent of the 73 gram increase seen for renters in Figure 4 (though it is contained in the 95 percent confidence interval and thus not statistically distinct). The same pattern applies when examining effects by race and ethnicity. Drawing again on estimates from Almond et al. (2011), 40B's 259 dollar subsidy should predict a 26 gram increase in birth weight for white beneficiaries and 54 gram increase for Black beneficiaries. These quantities are 50 percent and 13 percent of 40B's effects on birth weight for each of these groups, respectively.

To further disentangle whether 40B's effect on health is mediated by the program's subsidy or by the change in neighborhood context, my next analyses compare the effects of moving to 40B housing on health with the effects of moving to LIHTC housing on health.

[44] Eighty percent of AMI for a family of four in 2010 was $64,400 (Department of Housing and Urban Development) while the median rent for a three bedroom unit in the greater Boston area in 2010 was around 1700 dollars per month, or 20,400 dollars per year (Department of Housing and Urban Development). Today, the HUD median rent estimate for a three-bedroom apartment rent was 3200 while estimated median rents in more expensive municipalities such as Cambridge or Newton are 3500, which represents roughly a 10% increase. Assuming the relative distribution of rents was similar in 2010 and 2022, 2010 rents for three bedroom units in those expensive municipalities would have been around 1870 dollars per month (10% more than 1700) or 22,440 per year. A fair rent for a family of four earning a gross income of 64,400 in 2010 would be thirty percent of that gross income, or 19,332 per year. This implies that 40B provides a subsidy of $22,440 - $19,332 = $3108 per year ($259 per month) in an expensive destination and $1068 per year ($89 per month) in a median priced location. Rent estimates are based on the Department of Housing and Urban Development 50th percentile rent estimates (Department of Housing and Urban Development) for three-bedroom units. All incomes and rents are in 2010 dollars.

[45] Almond, Hoynes, and Schanzenbach (2011) find that an increase of roughly 15 to 20 grams in birth weight among white beneficiaries of food stamps and 13 to 42 grams in birth weight among Black beneficiaries. Typical benefits at the time of publication were $200 per recipient household per month. This implies that a $259 monthly subsidy should increase birth weight by 26 grams for white beneficiaries and 54 grams for Black beneficiaries. Because the 76 percent of my renter sample that is white non-Hispanic or Black non-Hispanic is 89 percent white and 11 percent Black, this implies a weighted estimate of about 29 grams.

Figure 9 summarizes these results.

In 2010, the LIHTC program provided an estimated subsidy of roughly $668 per month, which is $409 greater than the subsidy provided by 40B.[46] If 40B's health effects are primarily mediated by the income received, the effect of moving to LIHTC on health outcomes should be similar to or larger than the effects on health of moving to 40B. The left two panels of Figure 9 show no evidence that moving to LIHTC housing affects birth outcomes. Despite standard errors of a similar size to those in Figure 4, coefficients on all five birth outcomes in Figure 9 are centered on the null. Appendix Figure G.I also demonstrates that these null effects persist when I match LIHTC beneficiaries to controls who moved from the exact same origin neighborhoods, rather than pre-move neighborhoods with similar demographic or economic characteristics. This lack of effect is consistent with the interpretation that the majority of 40B's effect on birth outcomes is explained by something beyond the income provided via the subsidy.

There is some evidence that parental health effects are mediated by 40B's housing subsidy, however. While moving to 40B housing leads to a 1 percentage point decrease in the probability of being diagnosed with inappropriate weight changes during pregnancy, the left panel of Figure 9 shows that moving to LIHTC housing leads to a 2 percentage point reduction in this same outcome.[47] As with birth outcomes, the effect on parental weight changes persist when I match LIHTC beneficiaries to controls from their same origin neighborhood (see Appendix Figure G.I). This difference also disappears when comparing 40B renters to LIHTC beneficiaries, as is shown in the right two panels of Figure 9.

[46] The LIHTC program subsidizes units for families earning fifty to sixty percent of Area Median Income (AMI). Fifty percent of AMI for a family of four in 2010 was $41,300 (Department of Housing and Urban Development). A fair rent for a family of four earning a gross income of $41,300 in 2010 would be thirty percent of that gross income, or 12,390 per year. Based on the median rent of roughly $1,700 per month (LIHTC developments are not located in expensive municipalities) for a three bedroom apartment, LIHTC provides a subsidy of roughly $20,400 - $12,390 = $8,010 per year or $668 per month. Rent estimates are based on the Department of Housing and Urban Development 50th percentile rent estimates (Department of Housing and Urban Development) for three-bedroom units. All incomes and rents are in 2010 dollars.

[47] Massachusetts birth records do not distinguish between inappropriate weight gain and inappropriate weight loss until after 2011.

VI.C. Relocation to new neighborhoods

A final potential explanation – and one of the central motivations for this paper – is that moving to 40B housing improves neighborhood conditions that in turn improve birth outcomes. As Figure 2 demonstrates, while 40B facilitates moves to higher-income and lower-poverty neighborhoods when compared to counterfactual moves, LIHTC facilitates moves to lower-income and higher-poverty neighborhoods.

If 40B's positive effect on birth outcomes and LIHTC's lack of effect are driven primarily by these differences in post-move neighborhood characteristics, then 40B beneficiaries should see improved birth outcomes relative to matched LIHTC controls. The results of this 40B v. LIHTC comparison are summarized in the right two panels of Figure 9. The middle panel of Figure 9 shows the comparison of 40B renters to matched LIHTC beneficiaries from similar origin neighborhoods whereas the right-most panel shows the results for a smaller sample of 40B renters and LIHTC beneficiaries from the exact same origin neighborhoods (n = 666 for each group).

These results are consistent with the hypothesis that 40B improves birth outcomes by improving neighborhood conditions.[48] Although standard errors increase, so too do the magnitude of the coefficients on all five birth outcomes. For example, the coefficients on low birth weight and preterm birth in the middle panel imply that moving to 40B housing reduces each outcome by 5 and 6 percentage points each. These figures represent reductions of close to 50 percent from baseline levels of roughly 11 and 13 percent, though large confidence intervals mean that impacts could be closer to 0.3 and 0.4 percentage points, respectively. Both the magnitude and statistical significance of effects increase substantially in the sample of 40B renters and LIHTC beneficiaries from the same origin neighborhoods. In this sample, the lower bound on the confidence intervals show effect sizes of 115 grams (0.18 standard deviations) for birth weight, 1.5 additional days of gestation (0.09 standard deviations), a 6 percentage point decrease in low birth weight (0.24 standard deviations), a 2 percentage

[48] Note that the larger decrease in parental weight changes for LIHTC beneficiaries and the lack of difference in parental weight changes between 40B and LIHTC beneficiaries further suggests that effects on weight changes during pregnancy are driven by a general feature of affordable housing.

point decrease in preterm birth (0.08 standard deviations), and a 3 percentage point decrease in any adverse outcome (0.08 standard deviations). These patterns are further reinforced by the right two panels in Appendix Figures G.II and G.III, which show no differences in birth outcomes between 40B and LIHTC beneficiaries when I shift the treated year to two and three years prior to the actual treated move.

If improvements in neighborhood conditions do mediate the effect of 40B on birth outcomes, then effects should be larger for beneficiaries who see the largest average improvements in neighborhood conditions. To test whether effects are larger among beneficiaries moving from these neighborhoods, I estimate the following equation:

$$\begin{aligned} \text{Birth}_{i,t} = 40\text{B}_i + \text{Post}_t + \gamma_t + \delta^{DD}(40\text{B}_i \times \text{Post}_t) + \\ \delta^{NBD}(40\text{B}_i \times \text{Post}_t \times Neighborhood) + \mathbf{X}_{i,t} + \epsilon_{i,t} \end{aligned} \tag{3}$$

Where all variables retain the same definitions as in equations (2) and $Neighborhood$ is an indicator for a pre-move neighborhood characteristic that is improved by moving to 40B (such as moving from a higher-poverty or higher-incarceration neighborhood). In this specification, δ^{DD} and δ^{NBD} are the parameters of interest and represent the effect of moving to 40B housing for beneficiaries from a more privileged neighborhood and the additional effect on health of moving to 40B housing from a less privileged neighborhood, respectively. The vector of covariates $\mathbf{X}_{i,t}$, remains unchanged relative to equation (2) and includes an indicator for whether the birthing parent previously gave birth, an indicator for previous adverse birth outcomes, and whether multiple births resulted from the same pregnancy (i.e. multifetal gestation).

Table 4 summarizes the results of equation (2) where the outcome corresponds to neighborhood conditions that may mediate the 40B-to-infant-health relationship. The second column summarizes the coefficients for the added neighborhood change facilitated by 40B relative to the neighborhood change experienced by non-subsidized movers.[49] The coeffi-

[49] Because Table 4 shows the difference between the entire pre-and post-period, the numbers will differ from those discussed in Section IV.B, which focus only on the difference in neighborhood characteristics between the immediate pre- and post-move neighborhoods.

cients in Table 4 are consistent with moving to white, more educated, and wealthy suburbs that are less dense, have lower levels of pollution, and are further away from jobs. For example, while 40B facilitates moves to neighborhoods with poverty levels that are two 2.7 percentage points lower than the neighborhoods non-subsidized movers relocate to, these neighborhoods also have an average of 18,000 fewer local jobs.

Figure 10 plots the results of equation (3) for groups that move to 40B housing from neighborhoods with below-average neighborhood incomes, poverty rates, educational attainment, economic mobility, social capital, and high school wage growth, and above-average incarceration rates, and pollution levels.[50] Because 40B explicitly aims to desegregate, I also examine whether effects differ for birthing people who move to 40B housing from neighborhoods with higher-than-average proportions of Black residents; Black, Hispanic, Asian, or other non-white residents; and neighborhoods with lower-than-average rates of economic mobility for Black children.[51] As with Figure 4, each plotted value corresponds to the standardized coefficient and confidence intervals for δ^{DD} and δ^{NBD}. Within each birth outcome row, the top plotted coefficient represented with a black line depicts δ^{DD} while the bottom coefficient represented with a blue line depicts δ^{NBD}. The values for regression coefficients are shown above each plotted point.

These results suggest that changes to neighborhood conditions mediate the effect of moving to 40B housing for many birth outcomes, though the mediating role of neighborhoods is not as clear for preterm birth. For example, the coefficients on nearly all birth outcomes are statistically larger for 40B renters moving from neighborhoods with higher-than-average

[50] I define high neighborhood poverty as greater than 10 percent based on the moving to opportunity experiment(Katz et al., 2000). Cutoffs for all other characteristics are based on Massachusetts population-weighted means. These are approximately: less than $72,000 median household income, less than 80 percent white, less than 34 percent with a college degree, an incarceration rate greater than 0.0066, a male incarceration rate greater than 0.013, and a tract-level population of 7300 people. About one third to half of treated 40B renters fall into most of these groups. Specifically: 38 percent move from high-poverty neighborhoods, 57 percent from low-income neighborhoods, 38 percent move from neighborhoods with fewer white non-Hispanic residents, 39 percent from neighborhoods with fewer college degree holders, 32 percent from neighborhoods with a high population density, 34 percent move from neighborhoods with high incarceration rates, and 39 percent move from neighborhoods with high male incarceration rates. Incarceration rates and population density estimates are based on data from the Opportunity Atlas (Chetty et al., 2018). All other variables are from the 2010 census.

[51] I do not have sufficient statistical power to examine neighborhoods with higher-than-average Black male incarceration rates.

male incarceration rates. Birthing people moving to 40B rentals from higher poverty neighborhoods and neighborhoods with a greater proportion of Black residents also see additional gains in birth weight and infant gestation relative to birthing people who move from lower poverty, whiter neighborhoods. Similar patterns apply to a lesser extent for birthing people moving from neighborhoods with lower economic mobility (as measured by the adult incomes of children who grew up in the area) and areas with lower median household incomes.

However, while effects on preterm birth are largest among birthing parents moving from areas with lower economic mobility for Black children and lower social capital, they are also driven by groups who see *smaller* changes in other neighborhood conditions. Specifically, effects on preterm birth are also largest for birthing parents moving to 40B housing from areas that are more educated, have higher-than-average household incomes, and lower pollution rates. These mixed patterns suggest that there may be multiple factors affecting preterm birth among 40B renters, and is consistent with literature highlighting the complex etiology of this outcome (Goldenberg et al., 2008; Frey and Klebanoff, 2016).

VI.C.I. Racial disparities

As described above, a central motivation for this paper is the hypothesis that explicitly desegregationist housing policies could improve the large and persistent disparities in birth outcomes between Black birthing people and other racial/ethnic groups. Though Section VI.C suggests that relocation to new neighborhoods may explain effects on birth outcomes for all 40B renters, this same explanation may not apply to each racial/ethnic subgroup. The present section thus focuses on what might explain improvements in birth outcomes among Black non-Hispanic beneficiaries.

Previous results show that Black beneficiaries see the largest improvements in birth outcomes (see Section V.A.I) and that smoking during pregnancy explains effects on preterm birth and adverse birth outcomes, but not birth weight, gestational age, or low birth weight. Section VI.B also shows that these effects extend well beyond what would be predicted by the housing subsidy alone. Thus, if neighborhood changes facilitated by 40B explain some of these effects, then changes to neighborhood conditions should be larger among Black beneficiaries than they are among white beneficiaries.

Table 5, which replicates the results of Table 4 for each racial/ethnic subgroup, demonstrates that 40B does indeed facilitate the largest neighborhood changes for Black non-Hispanic beneficiaries. As with Table 4, each δ^{DD} coefficient represents the additional effect of moving to 40B housing on the neighborhood condition in that row for 40B beneficiaries relative to non-subsidized mover controls.[52] When compared to white 40B renters, Black renters see double the increase in median household income (+$17,659 v. +$7,892) three times the decrease in poverty (-6.4 pp v. -1.8 pp), and close to five times the increase in social capital (+5.1 v. +1.3). These figures represent about 60 percent of the standard deviation of median household incomes, poverty rates, and census mail return rates across all tracts in Massachusetts, respectively. Consistent with 40B's goal of racial desegregation, Black 40B beneficiaries also move to neighborhoods that are 17 percentage points (0.85 standard deviations) whiter than the neighborhoods where non-subsidized Black beneficiaries.

Appendix Table H.I shows further evidence that moves facilitated by 40B close the gap in neighborhood conditions between white and Black birthing parents, and sheds light on potential null effects Asian birthing parents. Though Black beneficiaries move to 40B housing from lower income neighborhoods, Black and white beneficiaries end up in neighborhoods with similar demographic characteristics, opportunities for social mobility, social capital, and pollution exposure.[53] Asian beneficiaries, in contrast, move to 40B housing from the highest income, lowest poverty neighborhoods of all the groups, suggesting that they may not benefit as much from the change in neighborhood conditions facilitated by 40B.

Overall, these sets of patterns suggests that 40B does – to some extent – desegregate, and that this desegregation may explain some of 40B's effect on birth weight, gestational age, and low birth weight among Black beneficiaries.

[52] As with Table 4, I obtain δ^{DD} by replacing the the outcome in equation (2) with each neighborhood condition.

[53] A similar pattern applies to Hispanic beneficiaries. Understanding why Hispanic beneficiaries do not see improvements in birth outcomes is a central priority for future research.

VII. Conclusion

Despite substantial government investment, reducing racial and economic disparities in health outcomes remains a challenge in the United States. Theory suggests that housing policies which facilitate moves for lower-income households to higher-income areas may help reduce these disparities. This article examines the health effects of Massachusetts Chapter 40B, a desegregation-focused housing policy that facilitates these types of moves by increasing the supply of affordable housing in higher-income areas. Focusing on the health of pregnant parents and newborn infants, I find that moving to 40B housing improves birth outcomes and produces small improvements parental health among 40B renters. I find no effects on the health of 40B owners, potentially due to differences in who selects into the 40B ownership versus the 40B rental program.

Additional analyses and a comparison of 40B's health effects with those of people who move to housing built under another major program suggest that effects on birth outcomes are partially explained by changes to neighborhood conditions. Moving to 40B housing changes a variety of neighborhood characteristics among renters consistent with moving to wealthier suburban areas, including: increasing median household income, decreasing poverty, increasing commute times, and decreasing incarceration rates. Moreover, effects on birth outcomes among renters are driven primarily by Black birthing people as well as people who move from higher-poverty, higher-incarceration areas, and areas with more Black residents.

Taken together, these results suggest that housing policies aimed at increasing the supply of affordable housing in high-income areas may be important tools for reducing racial and economic disparities in early-life health but not necessarily in adult health. This pattern is consistent with other research on neighborhood conditions that demonstrates heterogeneous effects on health across the life course (Kling et al., 2007; Ludwig et al., 2013; Schmidt et al., 2017).

However, this paper also underscores the importance of a more nuanced interpretation of results. For example, my results also showed that smoking may be an important pathway through which preterm birth and adverse birth outcomes improve among Black birthing par-

ents but not among white birthing parents. Moreover, changes to neighborhood conditions are largest among both Black and Hispanic beneficiaries, yet effects on birth outcomes are inconsistent among the latter group.

These heterogeneous health impacts underscore the need to examine the effects of similar policies on a wider range of health outcomes in future research. Moreover, because improvements in birth outcomes are driven by Black birthing parents and birthing parents moving from neighborhoods with lower rates of social mobility and worse health exposures, my results also highlight the importance of considering *whom* housing policies serve when evaluating the health effects of those policies (Rudolph et al., 2018).

Table 1: Pre- and post-match balance table, 40B renters v. non-subsidized movers

	Pre-match Means				Matched Means			
	Treated (N = 2,250)	Control (N = 323,809)	Standardized difference	P-value	Treated (N = 2,250)	Control (N = 11,250)	Standardized difference	P-value
Year moved	2009.8	2003.84	0.91	***	2009.8	2009.8	0	
Age at move	30.22	27.18	0.43	***	30.22	30.22	0	
Birthing parents' race/ethnicity								
White non-Hispanic (%)	67.73	76.27	-0.19	***	67.73	67.73	0	
Black non-Hispanic (%)	8.04	5.58	0.1	***	8.04	8.04	0	
Asian non-Hispanic (%)	9.2	6.89	0.08	***	9.2	9.2	0	
Other non-Hispanic (%)	1.51	1.12	0.03		1.51	1.51	0	
Hispanic (%)	13.51	10.13	0.1	***	13.51	13.51	0	
Pre-move tract characteristics								
Median household income	72,171	67,432	0.16	***	72,171	72,144	0	
Percent below poverty (%)	10.74	12.99	-0.22	***	10.74	10.74	0	
White (%)	79.18	76.93	0.12	***	79.18	79.16	0	
Black (%)	6.7	7.99	-0.11	***	6.7	6.7	0	
Asian (%)	6.12	6.53	-0.06		6.12	6.16	-0.01	
Hispanic (%)	10.72	11.42	-0.04		10.72	10.71	0	
Moved from out of state (%)	15.82	19.56	-0.1	***	15.82	17.7	-0.05	
Birthing parents' education								
< High school (%)	2.71	1.57	0.08	**	2.71	2.66	0	
High school degree (%)	24.18	11.42	0.34	***	24.18	20.34	0.09	***
≥ College (%)	72.22	86.59	-0.36	***	72.22	76.35	-0.09	***

* $p<0.05$, ** $p<0.01$,*** $p<0.001$. Note: pre- and post-match means only correspond to the year prior to a move to 40B or to some other location. Time-varying characteristics such as parental health behaviors and education may vary in the overall sample. Median household income (in 2010 dollars), tract-level racial demographics, and the percent below poverty are drawn from the 2010 U.S. census. State of origin and year of move are based on Infutor records. The birthing parent's age, self-reported age/ethnicity, educational attainment, age at birth, and health behaviors are based on birth records.

Table 2: Pre-move matched sample characteristics

	40B renters v. non-subsidized movers			40B owners v. non-subsidized movers			LIHTC beneficiaries v. non-subsidized movers			40B renters v. matched LIHTC beneficaries		
	Treated N = 2,250	Control N = 11,250		Treated N = 661	Control N = 3,305		Treated N = 2,564	Control N = 12,820		Treated N = 1,419	Control N = 1,419	
Demographic characteristics												
Birthing parents' race/ethnicity												
White non-Hispanic	68 (47)	68 (47)		80 (40)	80 (40)		47 (50)	47 (50)		63 (48)	63 (48)	
Black non-Hispanic	8 (27)	8 (27)		4 (20)	4 (20)		16 (37)	16 (37)		11 (31)	11 (31)	
Asian non-Hispanic	9 (29)	9 (29)		9 (29)	9 (29)		7 (25)	7 (25)		9 (29)	9 (29)	
Other non-Hispanic	2 (12)	2 (12)		1 (10)	1 (10)		2 (15)	2 (15)		2 (13)	2 (13)	
Hispanic	14 (16)	14 (15)		7 (12)	7 (9)		27 (21)	27 (21)		16 (17)	16 (15)	
Birthing parents' education												
< High school	3 (16)	3 (16)		1 (11)	2 (14)		4 (20)	4 (20)		3 (17)	4 (20)	
High school degree	24 (43)	20 (40)	***	23 (42)	19 (39)	**	23 (42)	20 (40)	***	25 (43)	24 (43)	
≥ College degree	72 (45)	76 (42)	***	75 (43)	79 (41)	*	72 (45)	75 (43)	**	71 (45)	71 (45)	
Pre-move tract characteristics												
Median household income ($)	72,172 (29,771)	72,144 (28,967)		75,392 (29,992)	75,368 (28,017)		54,371 (27,197)	54,354 (25,545)		64,460 (23,973)	63,070 (25,253)	
Below poverty	11 (9)	11 (9)		9 (9)	9 (7)		18 (14)	18 (14)		12 (10)	13 (9)	
White non-Hispanic	79 (18)	79 (18)		83 (16)	83 (14)		67 (25)	67 (24)		77 (20)	76 (19)	
Pre-move health characteristics												
Birth outcomes												
Birth weight (g)	3327 (631)	3340 (587)	*	3369 (585)	3353 (576)		3288 (622)	3292 (621)		3304 (644)	3293 (627)	
Gestational age (weeks)	38.64 (2.38)	38.82 (2.11)	***	38.81 (1.76)	38.81 (2.23)		38.68 (2.29)	38.69 (2.36)		38.60 (2.50)	38.69 (2.17)	*
Low birth weight	8 (27)	7 (25)	***	6 (24)	6 (24)		8 (27)	8 (27)		8 (28)	7 (26)	
Preterm birth	9 (28)	8 (27)	***	8 (26)	8 (26)		8 (28)	9 (28)		10 (29)	8 (28)	*
Any adverse outcome	15 (36)	14 (35)	*	14 (35)	13 (34)		15 (36)	16 (37)	*	16 (37)	15 (36)	
Birthing parents' health												
Lung disease	4 (20)	4 (19)		5 (22)	4 (19)	***	6 (25)	5 (23)	***	4 (21)	5 (21)	
Eclampsia	2 (15)	2 (15)		1 (9)	3 (16)	***	2 (14)	2 (15)		2 (15)	2 (12)	**
Inap. weight gain/loss	2 (12)	1 (12)		1 (11)	2 (14)	**	2 (15)	2 (13)	**	1 (12)	2 (14)	
Smoked while pregnant	12 (33)	9 (28)	***	12 (32)	9 (28)	***	14 (34)	9 (29)	***	11 (31)	16 (37)	***
Drank while pregnant	15 (35)	15 (35)		16 (37)	14 (35)	**	8 (26)	11 (31)	***	13 (34)	10 (30)	***
Health care												
Num. prenatal visits (n)	12.12 (3.50)	12.18 (3.13)	*	12.06 (2.91)	12.21 (3.08)	*	12.03 (3.34)	12.06 (3.26)		12.14 (3.58)	12.14 (3.34)	
Early prenatal care	85 (36)	86 (35)	**	88 (33)	86 (35)	*	83 (38)	84 (36)	***	85 (36)	84 (37)	
Medicaid beneficiary	28 (45)	20 (40)	***	16 (37)	17 (38)		37 (48)	28 (45)	***	29 (45)	33 (47)	***
Delivery procedures												
C-section	35 (48)	34 (48)		36 (48)	34 (47)	*	33 (47)	34 (48)	*	35 (48)	35 (48)	
Infant transferred	4 (21)	5 (21)		5 (22)	4 (21)		5 (22)	6 (23)		5 (21)	5 (22)	
Pre-pregnancy health												
Chronic Diabetes	1 (12)	1 (12)		1 (10)	1 (11)		1 (12)	2 (13)		1 (12)	1 (10)	*
Chronic Hypertension	2 (15)	2 (13)	***	2 (15)	2 (13)	*	3 (16)	2 (15)	**	3 (16)	3 (16)	

* $p<0.05$, ** $p<0.01$,*** $p<0.001$. Table shows means and standard deviations. All values correspond to percentages unless otherwise indicated. P-values are calculated using a two-sample t-test for educational attainment, median household income, birth weight, gestational age, and the number of prenatal visits while the Wilcoxon rank-sum test for all other variables. Birth outcomes include birth weight in grams, the obstetric estimate of gestation in weeks, low birth weight (less than 2500 grams at birth), preterm birth (less than 37 weeks gestation at birth), and an indicator of any adverse outcome which is defined as: a low birth weight infant, being born preterm, being born small for gestational age (when an infant weighs less than the 10th percentile of US births conditional on age based on Talge et al 2009 using 2009-2010 natality data), and perinatal death (fetal death occurring at 20 weeks gestation or later or infant death in the first 7 days of life). Smoking is defined as ever smoking while pregnant, drinking refers to consuming more than one daily drink while pregnant. Early prenatal care is true if the birthing parent initiates prenatal care during the first trimester. Infant transfer refers to an infant's transfer within a hospital (e.g., to the neonatal intensive care unit) or across hospitals after delivery.)

Table 3: Baseline health characteristics, 40B renters v. 40B owners

	40B renters N = 11,263	40B owners N = 3,243	
Birth outcomes			
Birth weight (g)	3327 (631)	3369 (585)	**
Gestational age (weeks)	38.64 (2.38)	38.81 (1.76)	***
Low birth weight	8 (27)	6 (24)	**
Preterm birth	9 (28)	8 (26)	*
Any adverse outcome	15 (36)	14 (35)	
Birthing parents' health			
Lung disease	4 (20)	5 (22)	*
Eclampsia	2 (15)	1 (9)	***
Inap. weight gain/loss	2 (12)	1 (11)	
Smoked while pregnant	12 (33)	12 (32)	
Drank while pregnant	15 (35)	16 (37)	
Health care			
Num. prenatal visits (n)	12.12 (3.50)	12.06 (2.91)	
Early prenatal care	85 (36)	88 (33)	***
Medicaid beneficiary	28 (45)	16 (37)	***
Delivery procedures			
C-section	35 (48)	36 (48)	
Infant transferred	4 (21)	5 (22)	
Pre-pregnancy health			
Chronic Diabetes	1 (12)	1 (10)	*
Chronic Hypertension	2 (15)	2 (15)	

* $p<0.05$, ** $p<0.01$,*** $p<0.001$. Table shows means and standard deviations. All values correspond to percentages unless otherwise indicated. P-values are calculated using a two-sample t-test for educational attainment, age, birth weight, gestational age, and the number of prenatal visits. The Wilcoxon rank-sum test is used to calculate p-values for all other variables.

Table 4: Neighborhood changes facilitated by moving to 40B housing

	Change facilitated by 40B		
Neighborhood Characteristic	δ^{DD}	(se)	p-value
Demographic			
Median household income	$10,037	$546	***
Below poverty (pp)	-2.72	0.18	***
White non-Hispanic (pp)	5.38	0.31	***
Black non-Hispanic (pp)	-2.19	0.15	***
≥ College degree (pp)	4.00	0.37	***
Population density	-2,043	245	***
Social mobility			
Incarceration rate	-0.003	0.0002	***
Incarceration rate, male only	-0.004	0.0003	***
Adult outcomes for children who grew in tract			
Median household income	$4,363	$204	***
Median household income, Black children	$2,065	$309	***
Median household income, low-income Black children	$481	$297	
Economic			
Wage growth for high school graduates	-0.01	0.01	
Job density	-150	168	
Tot. jobs within 5 miles	-18,168	5,301	***
High paying jobs within 5 miles	-8,033	3,630	*
Mean commute time (min)	0.25	0.09	**
Social capital			
Census mail return rate	1.81	0.12	***
Pollution			
Sulfur dioxide (SO_2)	-0.19	0.04	***
Carbon monoxide (CO)	-0.01	0.00	***
Ozone (O_3)	-0.32	0.08	***
Nitrogen dioxide (NO_2)	-0.84	0.10	***
PM_{10}	-0.90	0.08	***
$PM_{2.5}$	-0.61	0.05	***
Ultrafine particulate matter	-419	57	***

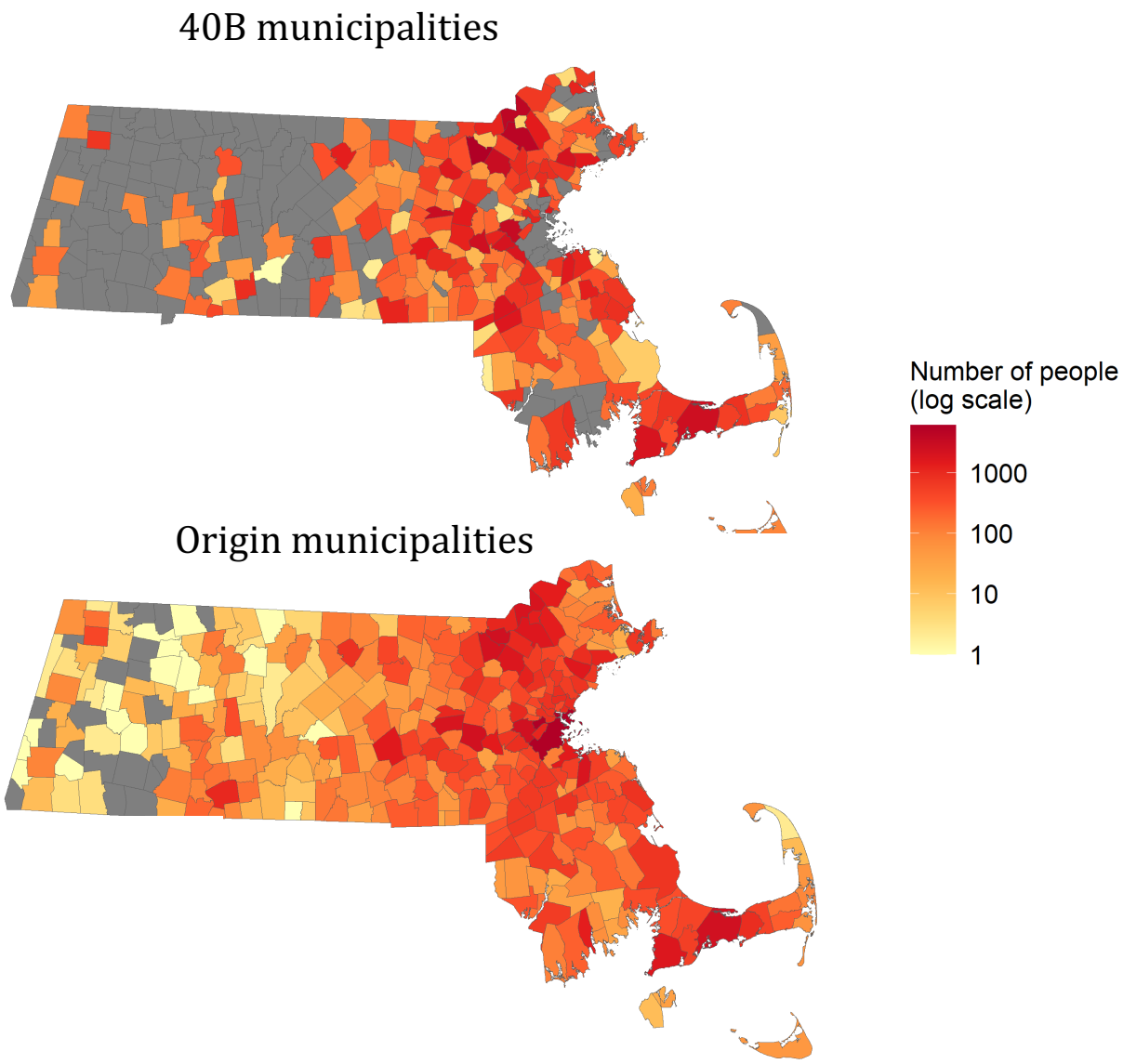
* $p<0.05$, ** $p<0.01$,*** $p<0.001$. Table represents the results of equation (2) with each neighborhood characteristic as the outcome. Incarceration is defined as residing in a federal detention center, federal prison, state prison, local jail, residential correctional facility, military jail, or juvenile correctional facility. Low-income children refer to the fraction of children with parents who have incomes in the bottom quartile of the national income distribution relative to parents who have children in the same birth cohort (Chetty et al., 2018). All outcomes except for those pertaining to racial demographics, education, and population density are logged for regressions before being converted back to their original scale. Median household income, the percent of residents below poverty, and the percent of residents with at least a college degree are drawn from the 2010 census. Mean commute time is measured in minutes and was drawn from the 2000 census. All pollution data are drawn from estimates developed by the Center for Air, Climate and Energy Solutions (CACES) using the models as described in Kim et al. (2020) and Saha et al. (2021). Ozone, sulfur dioxide, and nitrogen dioxide are measured in parts per billion (ppb); carbon monoxide is measured in parts per million (ppm); $PM_{2.5}$ and PM_{10} are measured in $\mu g/m^3$; and ultrafine particulate matter is measured based on population-weighted particle number concentrations (particle number/cm^3). All other variables are drawn from Opportunity Insights and the Opportunity Atlas (Chetty et al., 2018).

Table 5: Neighborhood changes facilitated by moving to 40B housing by race and ethnicity

	White non-Hispanic			Black non-Hispanic			Hispanic			Asian non-Hispanic		
Neighborhood Characteristic	δ^{DD}	(se)	p-value	δ^{DD}	(se)	p-value	δ^{DD}	(se)	p-value	δ^{DD}	(se)	p-value
Demographic												
Median household income	$7,892	$623	***	$17,659	$1,641	***	$12,348	$1,336	***	$9,743	$1,918	***
Below poverty (pp)	-1.8	0.2	***	-6.4	0.9	***	-7.3	0.8	***	-2.2	0.6	***
White non-Hispanic (pp)	3.5	0.3	***	17.2	1.6	***	9.4	1.0	***	3.0	1.0	**
Black non-Hispanic (pp)	-1.2	0.1	***	-12.4	1.6	***	-4.5	0.6	***	-1.7	0.5	***
≥ College degree (pp)	2.5	0.4	***	11.7	1.2	***	7.5	1.0	***	1.6	1.3	
Population density	-2,031	291	***	-2,055	701	**	-2,333	712	**	-2,212	949	*
Social mobility												
Incarceration rate	-0.002	0.000	***	-0.006	0.001	***	-0.005	0.001	***	-0.002	0.001	***
Incarceration rate, male only	-0.003	0.000	***	-0.013	0.002	***	-0.009	0.002	***	-0.004	0.001	***
Adult outcomes for children who grew in tract												
Median household income	$3,454	$223	***	$9,308	$746	***	$6,133	$591	***	$3,696	$687	***
Median household income, Black children	$2,398	$418	***	$3,971	$748	***	$629	$667		-$192	$1,133	
Median household income, low-income Black children	-$132	$409		$2,064	$699	**	$2,012	$658	**	-$1,038	$1,087	
Economic												
Wage growth for high school graduates	0.01	0.01		-0.05	0.02	*	-0.01	0.02		-0.14	0.03	***
Job density	26	193		406	583		-733	311	**	-532	1,070	
Tot. jobs within 5 miles	-17,986	6,192	**	-40,974	20,025	*	-7,862	11,510		-25,452	23,531	
High paying jobs within 5 miles	-8,388	4,227	*	-22,233	14,052		-1,078	7,872		-10,151	16,511	
Mean commute time (min)	0.22	0.10	*	-0.53	0.35		0.76	0.24	**	0.56	0.30	
Social capital												
Census mail return rate	1.30	0.13	***	5.08	0.50	***	3.07	0.35	***	0.75	0.43	
Pollution												
Sulfur dioxide (SO_2)	-0.21	0.05	***	-0.31	0.15	*	-0.07	0.11		-0.15	0.14	
Carbon monoxide (CO)	-0.01	0.00	***	-0.02	0.01	*	-0.01	0.01		-0.02	0.01	*
Ozone (O_3)	-0.35	0.09	***	-0.07	0.27		0.01	0.21		-0.62	0.29	*
Nitrogen dioxide (NO_2)	-0.84	0.12	***	-1.27	0.36	***	-0.48	0.28		-0.92	0.39	*
PM_{10}	-0.87	0.09	***	-1.34	0.27	***	-0.84	0.21	***	-0.95	0.28	***
$PM_{2.5}$	-0.66	0.06	***	-0.81	0.18	***	-0.33	0.14	*	-0.54	0.18	**
Ultrafine particulate matter	-303	67	***	-979	192	***	-637	142	***	-571	194	**

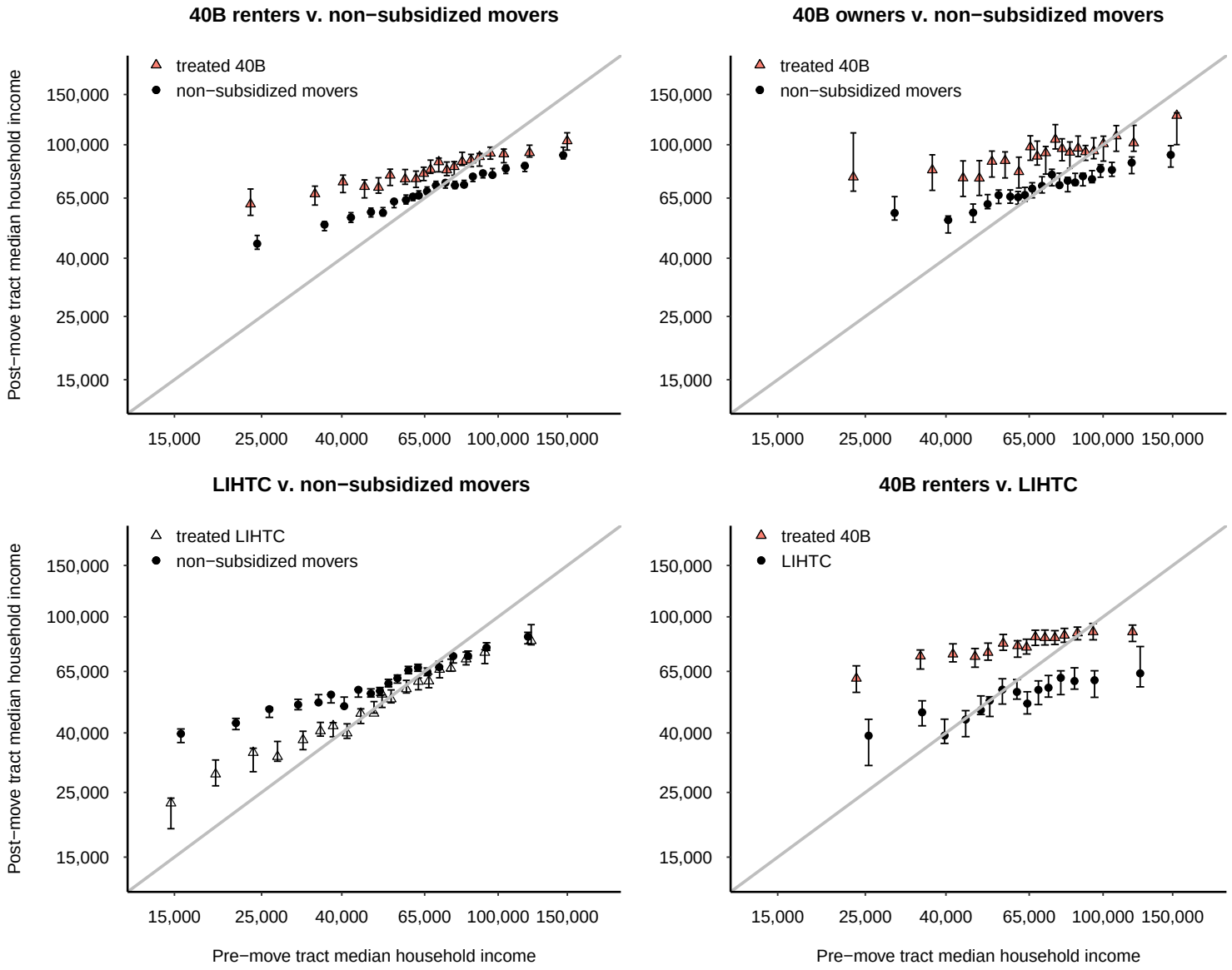
* $p<0.05$, ** $p<0.01$,*** $p<0.001$. Table represents the results of equation (2) with each neighborhood characteristic as the outcome. Incarceration is defined as residing in a federal detention center, federal prison, state prison, local jail, residential correctional facility, military jail, or juvenile correctional facility. Low-income children refer to the fraction of children with parents who have incomes in the bottom quartile of the national income distribution relative to parents who have children in the same birth cohort (Chetty et al., 2018). All outcomes except for those pertaining to racial demographics, education, and population density are logged for regressions before being converted back to their original scale. Median household income, the percent of residents below poverty, and the percent of residents with at least a college degree are drawn from the 2010 census. Mean commute time is measured in minutes and was drawn from the 2000 census. All pollution data is drawn from data prepared for the Center for Air, Climate, and Energy Solutions (CACES) (Kim et al., 2020; Saha et al., 2021). Ozone, sulfur dioxide, and nitrogen dioxide are measured in parts per billion (ppb); carbon monoxide is measured in parts per million (ppm); $PM_{2.5}$ and PM_{10} are measured in $\mu g/m^3$; and ultrafine particulate matter is measured based on population-weighted particle number concentrations (particle number/cm^3). All other variables are drawn from the Opportunity Atlas (Chetty et al., 2018).

Figure 1: 40B beneficiaries' municipal move trajectories within Massachusetts



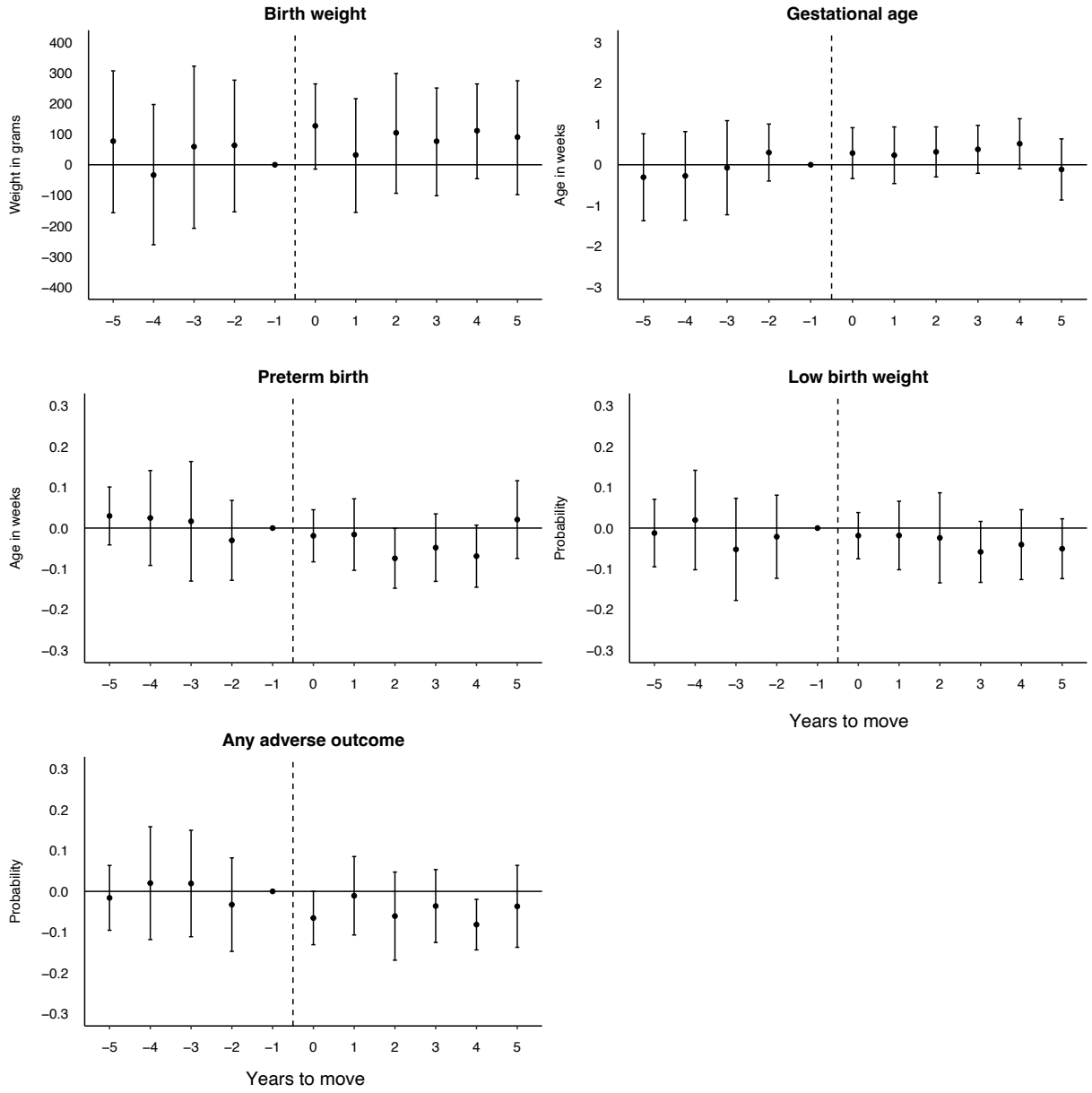
Beneficiary counts are based on the entire sample of approximately 110,000 beneficiaries found in Infutor's address histories. 40B municipalities refer to the municipalities where beneficiaries live once they move to 40B housing while origin municipalities refer to those 40B beneficiaries move into 40B housing from.

Figure 2: Pre- and post-move neighborhood-level median household incomes†, 40B beneficiaries v. matched controls



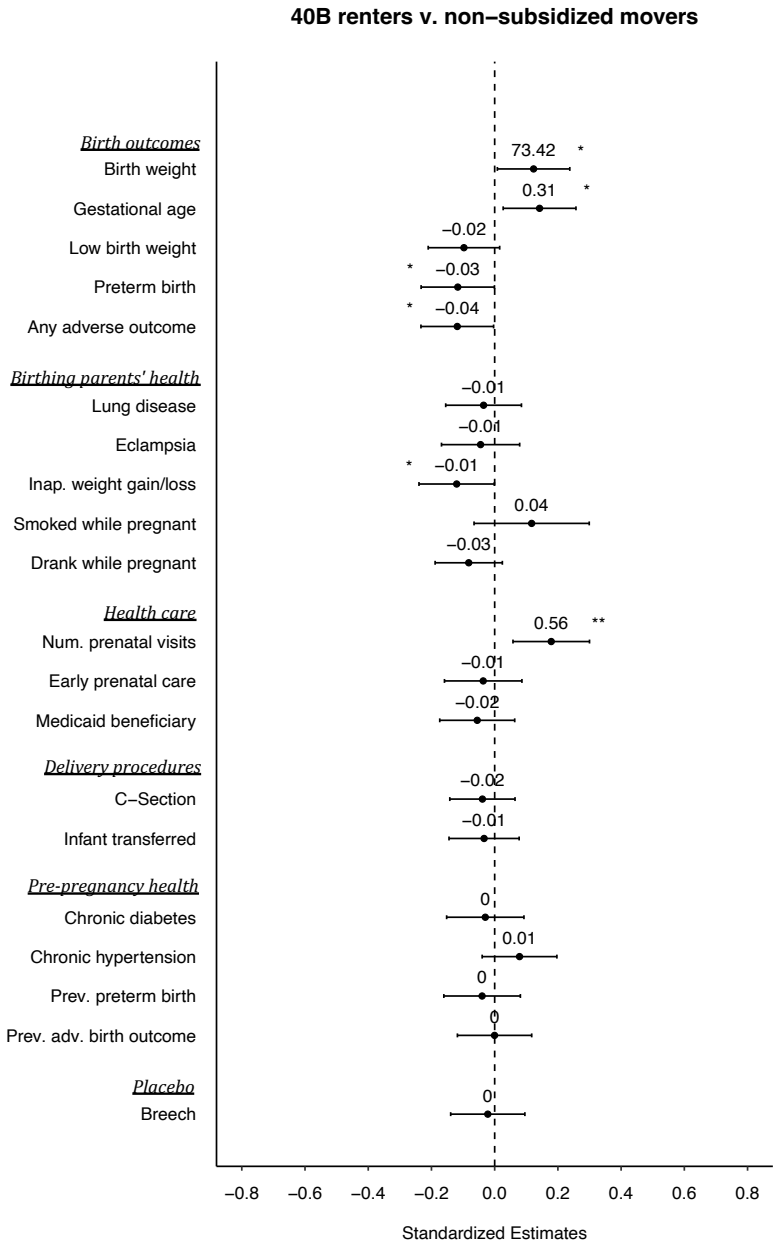
† Neighborhood-level median household incomes refers to the 2010 median household incomes at the census tract level (in 2010 dollars).

Figure 3: Effects of moving to 40B on birth outcomes, 40B renters v. non-subsidized movers



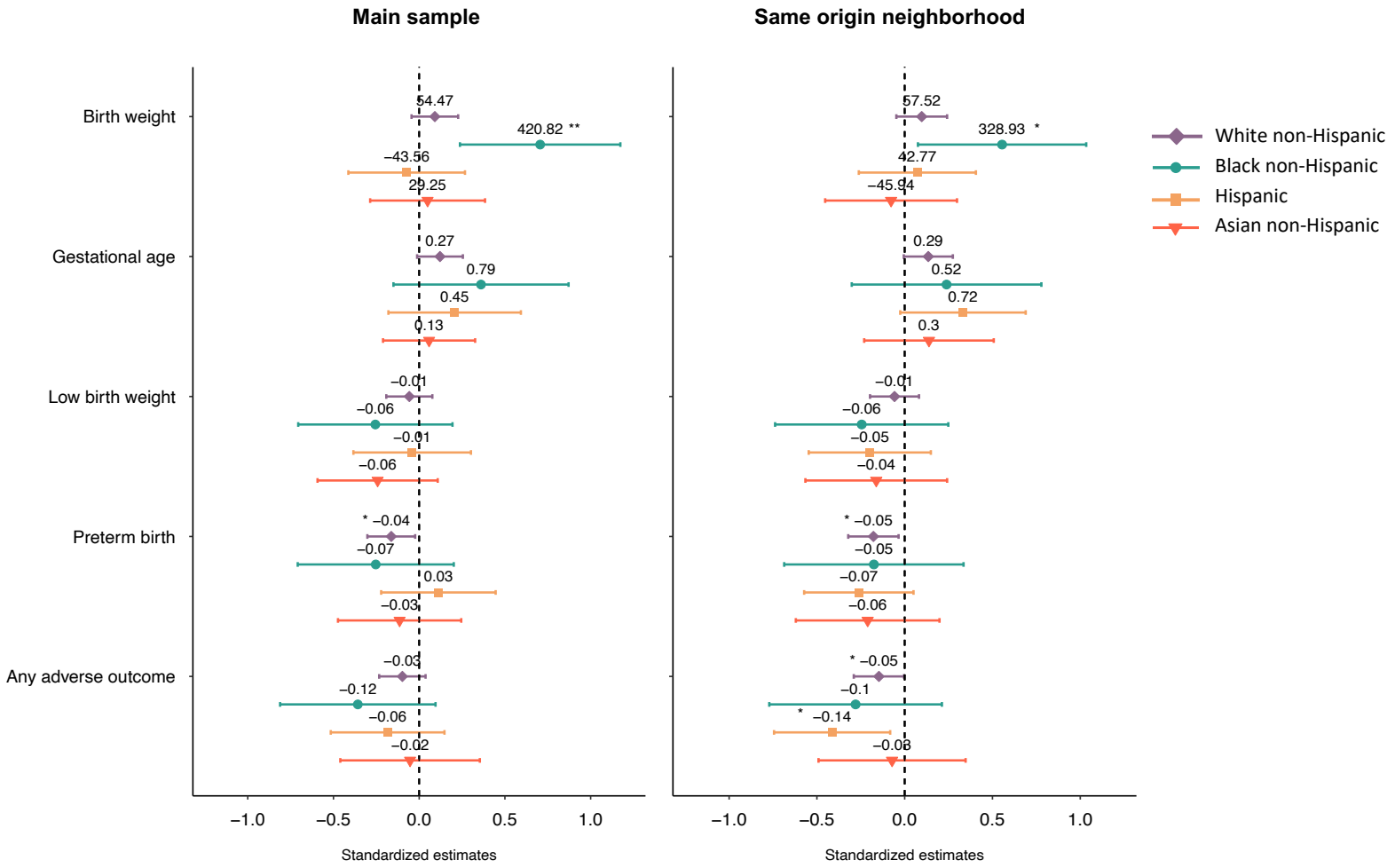
Each plotted point corresponds to the coefficient and standard error for each δ_k from equation (1). All estimates are compared to never treated controls. Models include covariates for the birthing parent's first birth, whether the birthing parent gave birth over the age of 35, whether multiple births resulted from the same pregnancy (i.e. multifetal gestation), whether the birthing parent had a previous preterm birth, and an indicator of whether the birthing parent previously had any of the following common adverse birth outcomes: low birth weight, preterm birth, being born small for gestational age, or perinatal death (i.e. fetal death that occurs starting in the 20th week of gestation or infant mortality within the first week of life)

Figure 4: Pooled difference-in-difference estimates, 40B renters v. non-subsidized movers



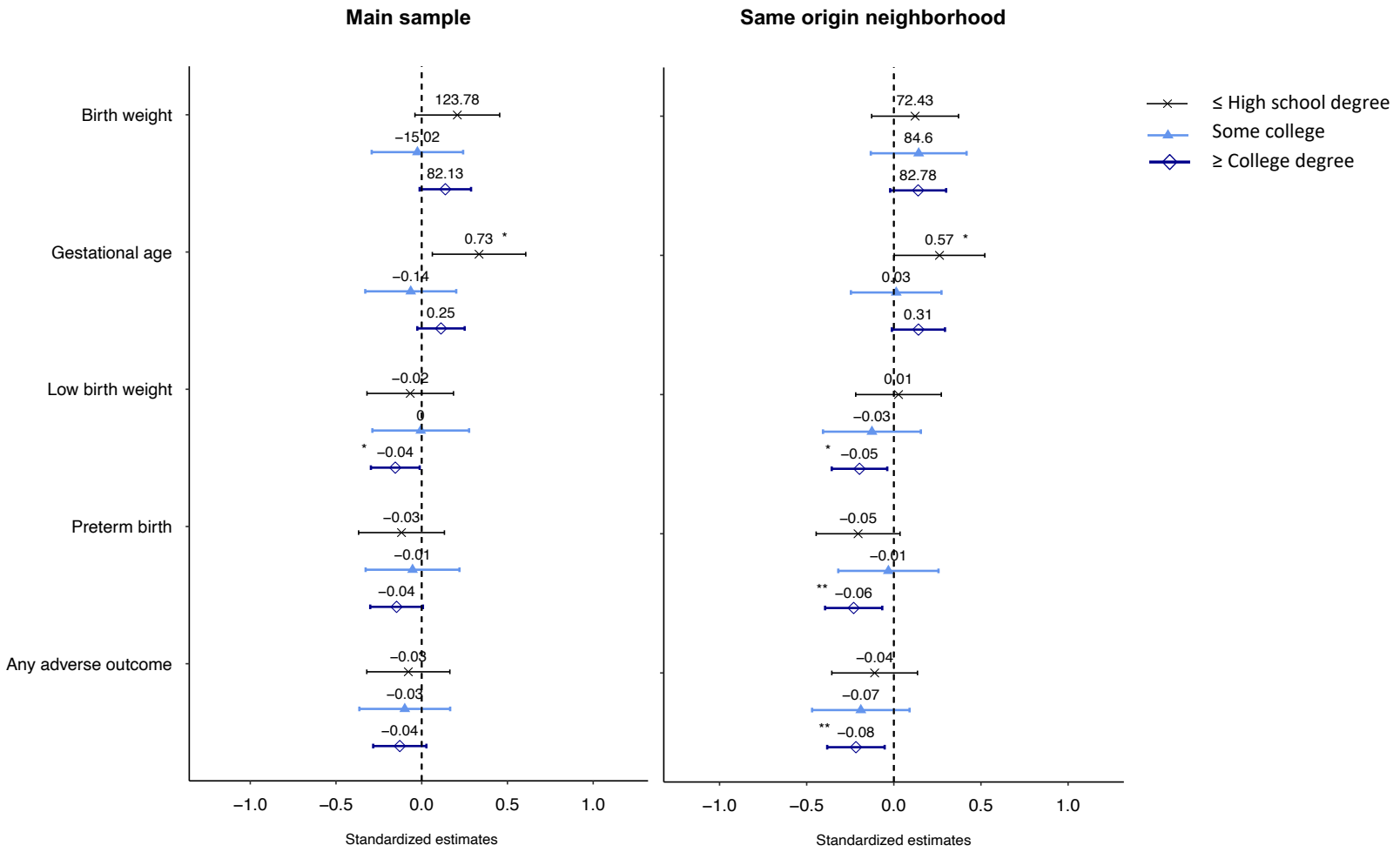
* p<0.05, ** p<0.01,*** p<0.001. Each plotted value represents the standardized coefficient and confidence interval on δ^{DD} from equation (2) and be interpreted as the additional effect of moving to 40B housing on the outcome in that row. The values for regression coefficients are shown above each standardized point estimate. All regressions include covariates for the birthing parent's first birth, whether the birthing parent gave birth over the age of 35, and whether multiple births resulted from the same pregnancy (i.e. multifetal gestation). Birth outcomes also include an indicator of previous adverse outcomes (e.g., previous preterm births), Models include covariates for the birthing parent's first birth, whether the birthing parent gave birth over the age of 35, whether multiple births resulted from the same pregnancy (i.e. multifetal gestation), whether the birthing parent had a previous preterm birth, and an indicator of whether the birthing parent previously had any of the following common adverse birth outcomes: low birth weight, preterm birth, being born small for gestational age, or perinatal death (i.e. fetal death that occurs starting in the 20th week of gestation or infant mortality within the first week of life). Cesarean deliveries and breech also include an indicator of a previous cesarean delivery.

Figure 5: Effects of moving to 40B on birth outcomes by birthing parent race/ethnicity, 40B renters v. non-subsidized movers



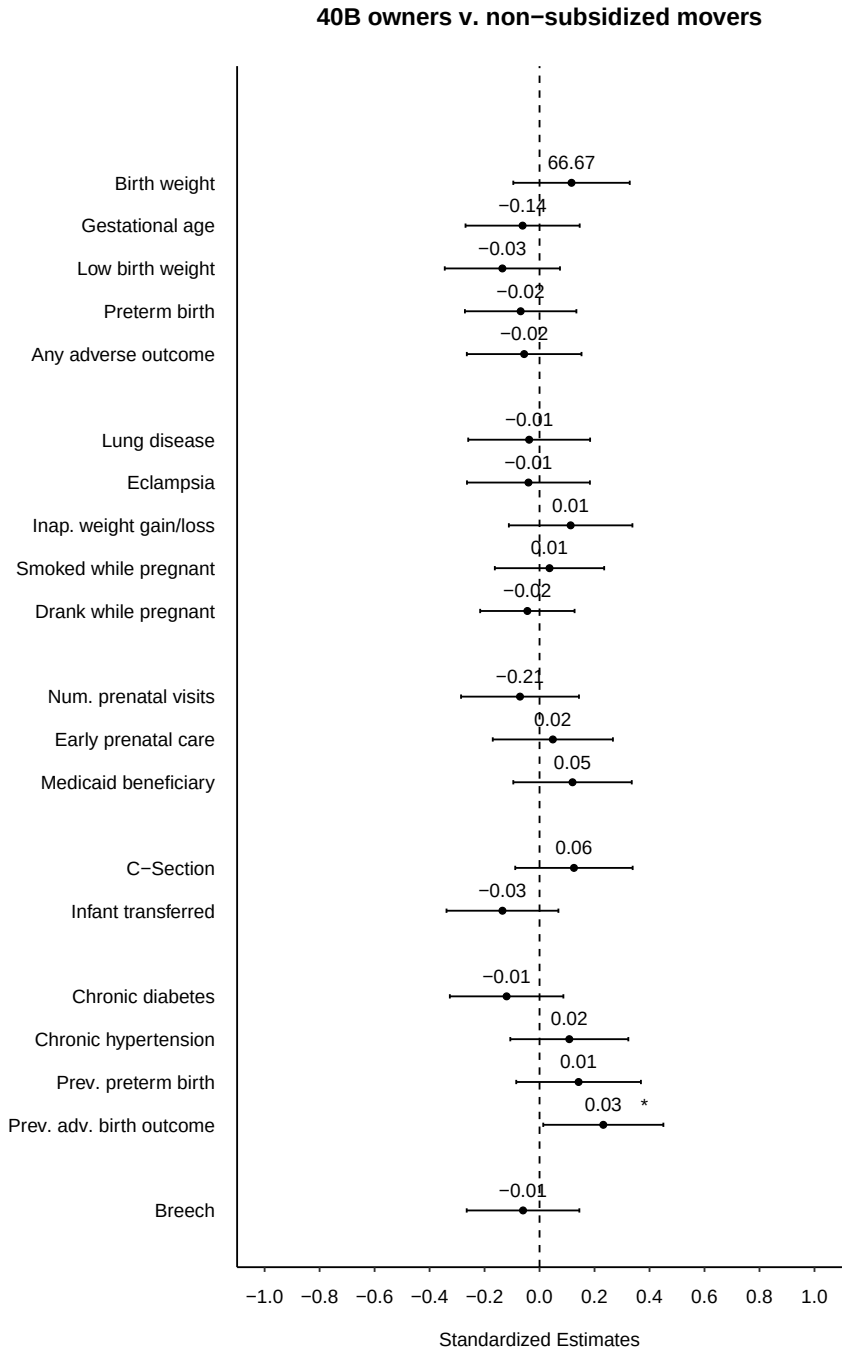
* p<0.05, ** p<0.01,*** p<0.001. Each plotted value represents the standardized coefficient and confidence interval on δ^{DD} from equation (2) for each racial/ethnic subgroup and be interpreted as the additional effect of moving to 40B housing on the outcome in that row. The values for regression coefficients are shown above each standardized point estimate. Race/ethnicity is drawn from self-reported data on birth certificates. Each plotted value represents the standardized coefficient and confidence interval for subgroups of 40B renters based on equation (2) and can be interpreted as the additional effect of moving to 40B housing on the outcome in that row for that group. All birth outcomes models include covariates for the birthing parent's first birth, whether the birthing parent gave birth over the age of 35, whether multiple births resulted from the same pregnancy (i.e. multifetal gestation), whether the birthing parent had a previous preterm birth, and whether the birthing parent had any common adverse birth outcomes as defined by the composite adverse birth outcome indicator.

Figure 6: Effects of moving to 40B on birth outcomes by birthing parent educational attainment, 40B renters v. non-subsidized movers



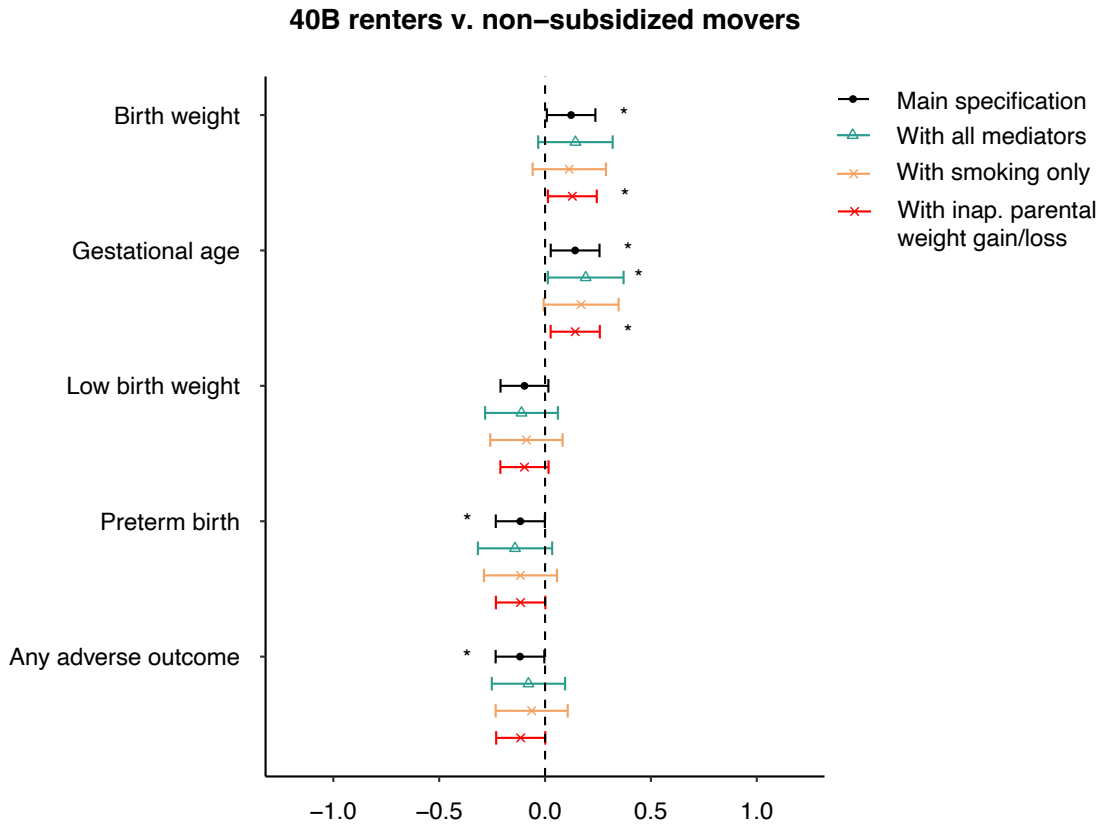
* p<0.05, ** p<0.01,*** p<0.001. Each plotted value represents the standardized coefficient and confidence interval on δ^{DD} from equation (2) for each education subgroup and be interpreted as the additional effect of moving to 40B housing on the outcome in that row. The values for regression coefficients are shown above each standardized point estimate. Educational attainment is drawn from self-reported data on birth certificates. Each plotted value represents the standardized coefficient and confidence interval for subgroups of 40B renters based on equation (2) and can be interpreted as the additional effect of moving to 40B housing on the outcome in that row for that group. All birth outcomes models include covariates for the birthing parent's first birth, whether the birthing parent gave birth over the age of 35, whether multiple births resulted from the same pregnancy (i.e. multifetal gestation), whether the birthing parent had a previous preterm birth, and whether the birthing parent had any common adverse birth outcomes as defined by the composite adverse birth outcome indicator.

Figure 7: Pooled difference-in-difference estimates, 40B owners v. non-subsidized movers



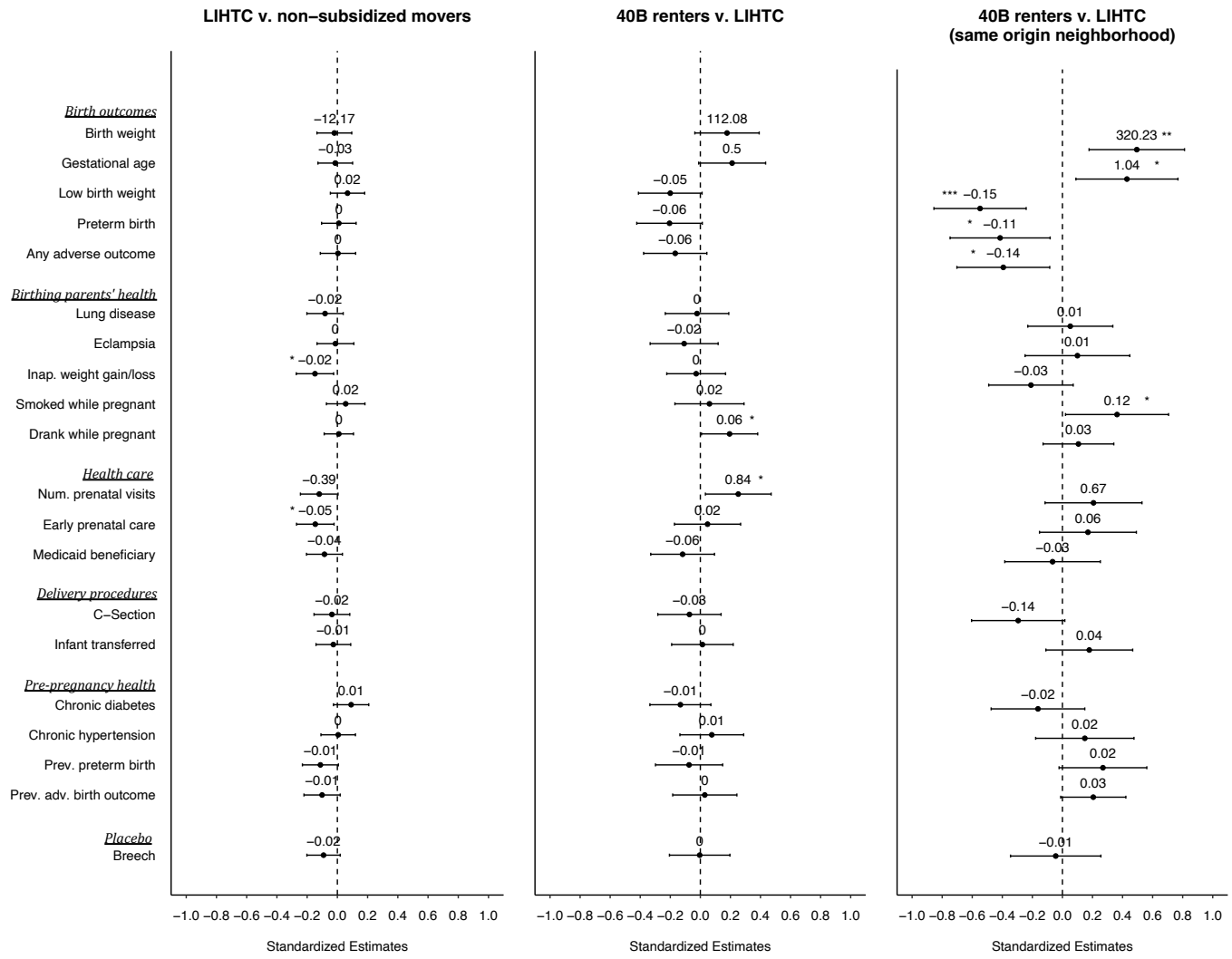
* p<0.05, ** p<0.01,*** p<0.001. Each plotted value represents the standardized coefficient and confidence interval on δ^{DD} from equation (2) and be interpreted as the additional effect of moving to 40B housing on the outcome in that row. The values for regression coefficients are shown above each standardized point estimate. All regressions include covariates for the birthing parent's first birth, whether the birthing parent gave birth over the age of 35, and whether multiple births resulted from the same pregnancy (i.e. multifetal gestation). Birth outcomes also include indicators for whether the birthing parent had a previous preterm birth and whether the birthing parent had any common adverse birth outcomes as defined by the composite adverse birth outcome indicator.

Figure 8: Parental health outcomes and behaviors that may explain the effect of moving to 40B housing on birth outcomes, 40B renters v. non-subsidized movers



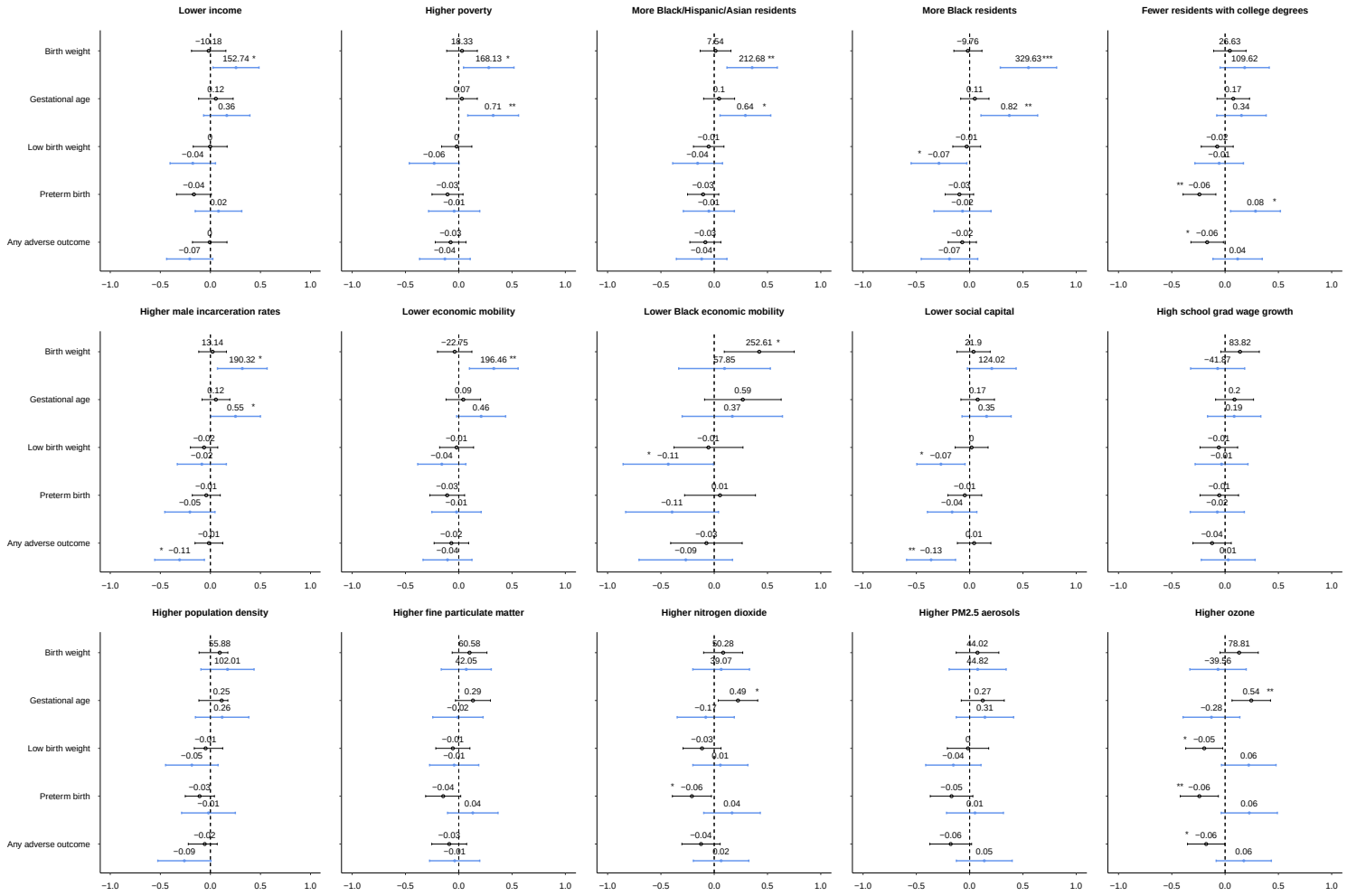
* p<0.05, ** p<0.01,*** p<0.001. All birth outcomes models include covariates for the birthing parent's first birth, whether the birthing parent gave birth over the age of 35, whether multiple births resulted from the same pregnancy (i.e. multifetal gestation), whether the birthing parent had a previous preterm birth, and whether the birthing parent had any common adverse birth outcomes as defined by the composite adverse birth outcome indicator. The model with all mediators includes: indicators for ever smoking while pregnant, drinking more than one daily drink while pregnant, and diagnosis with either inappropriate weight gain or loss during pregnancy.

Figure 9: Pooled difference-in-difference estimates, LIHTC beneficiaries and 40B renters



* p<0.05, ** p<0.01,*** p<0.001. Each plotted value of Figure 4 represents the standardized coefficient and confidence interval on δ^{DD} from equation (1) and be interpreted as the additional effect of moving to 40B housing on the outcome in that row. The values for regression coefficients are shown above each standardized point estimate. All regressions include covariates for the birthing parent's first birth, whether the birthing parent gave birth over the age of 35, and whether multiple births resulted from the same pregnancy (i.e. multifetal gestation). Birth outcomes also include indicators for whether the birthing parent had a previous preterm birth and whether the birthing parent had any common adverse birth outcomes as defined by the composite adverse birth outcome indicator. Cesarean deliveries and breech also include an indicator of a previous cesarean delivery.

Figure 10: Additional effects of moving to 40B housing for beneficiaries who experience large neighborhood changes under 40B



* p<0.05, ** p<0.01,*** p<0.001. Coefficients correspond to δ^{DD} and δ^{NBD} from equation (2). Within each birth outcome row, the top plotted coefficient represented with a black line depicts δ^{DD} while the bottom coefficient represented with a blue line depicts δ^{NBD}. All birth outcomes models include covariates for the birthing parent's first birth, whether the birthing parent gave birth over the age of 35, whether multiple births resulted from the same pregnancy (i.e. multifetal gestation), whether the birthing parent had a previous preterm birth, and whether the birthing parent had any common adverse birth outcomes as defined by the composite adverse birth outcome indicator.

References

R. Abramitzky, L. P. Boustan, and K. Eriksson. Europe's Tired, Poor, Huddled Masses: Self-Selection and Economic Outcomes in the Age of Mass Migration. *American Economic Review*, 102(5):1832–1856, Aug. 2012. ISSN 0002-8282. doi: 10.1257/aer.102.5.1832. URL https://pubs.aeaweb.org/doi/10.1257/aer.102.5.1832.

R. Abramitzky, R. Mill, and S. Pérez. Linking individuals across historical sources: A fully automated approach*. *Historical Methods: A Journal of Quantitative and Interdisciplinary History*, 53(2):94–111, Apr. 2020. ISSN 0161-5440. doi: 10.1080/01615440.2018.1543034. URL https://doi.org/10.1080/01615440.2018.1543034. Publisher: Routledge _eprint: https://doi.org/10.1080/01615440.2018.1543034.

D. Acevedo-Garcia, T. L. Osypuk, N. McArdle, and D. R. Williams. Toward A Policy-Relevant Analysis Of Geographic And Racial/Ethnic Disparities In Child Health. *Health Affairs*, 27(2):321–333, Mar. 2008. ISSN 0278-2715. doi: 10.1377/hlthaff.27.2.321. URL https://www.healthaffairs.org/doi/full/10.1377/hlthaff.27.2.321. Publisher: Health Affairs.

A. Aizer and J. Currie. The intergenerational transmission of inequality: Maternal disadvantage and health at birth. *Science*, 344(6186):856–861, May 2014. ISSN 0036-8075, 1095-9203. doi: 10.1126/science.1251872. URL https://www.science.org/doi/10.1126/science.1251872.

D. Almond and J. Currie. Killing Me Softly: The Fetal Origins Hypothesis. *Journal of Economic Perspectives*, 25(3):153–172, Aug. 2011. ISSN 0895-3309. doi: 10.1257/jep.25.3.153. URL https://pubs.aeaweb.org/doi/10.1257/jep.25.3.153.

D. Almond, H. W. Hoynes, and D. W. Schanzenbach. Inside the War on Poverty: The Impact of Food Stamps on Birth Outcomes. *Review of Economics and Statistics*, 93(2):387–403, May 2011. ISSN 0034-6535, 1530-9142. doi: 10.1162/REST_a_00089. URL https://direct.mit.edu/rest/article/93/2/387-403/58599.

D. Almond, J. Currie, and V. Duque. Childhood Circumstances and Adult Outcomes: Act II. *Journal of Economic Literature*, 56(4):1360–1446, Dec. 2018. ISSN 0022-0515. doi: 10.1257/jel.20171164. URL https://pubs.aeaweb.org/doi/10.1257/jel.20171164.

P. C. Austin. An Introduction to Propensity Score Methods for Reducing the Effects of Confounding in Observational Studies. *Multivariate Behavioral Research*, 46(3):399–424, May 2011. ISSN 0027-3171. doi: 10.1080/00273171.2011.568786. URL https://doi.org/10.1080/00273171.2011.568786. Publisher: Routledge _eprint: https://doi.org/10.1080/00273171.2011.568786.

K. Baicker, K. S. Buckles, and A. Chandra. Geographic variation in the appropriate use of cesarean delivery. *Health Affairs (Project Hope)*, 25(5):w355–367, Oct. 2006. ISSN 1544-5208. doi: 10.1377/hlthaff.25.w355.

M. Bailey, P. Farrell, T. Kuchler, and J. Stroebel. Social Connectedness in Urban Areas. Working Paper 26029, National Bureau of Economic Research, July 2019. URL http://www.nber.org/papers/w26029.

D. Barker, J. Eriksson, T. Forsén, and C. Osmond. Fetal origins of adult disease: strength of effects and biological basis. *International Journal of Epidemiology*, 31(6):1235–1239, Dec. 2002. ISSN 0300-5771. doi: 10.1093/ije/31.6.1235. URL https://doi.org/10.1093/ije/31.6.1235.

P. Bergman, R. Chetty, S. DeLuca, N. Hendren, L. F. Katz, and C. Palmer. Creating Moves to Opportunity: Experimental Evidence on Barriers to Neighborhood Choice. Working Paper 26164, National Bureau of Economic Research, Aug. 2019. URL http://www.nber.org/papers/w26164.

H. Blanco. Pecuniary effects of public housing demolitions: Evidence from chicago. *Regional Science and Urban Economics*, 98:103847, 2023.

P. Blumenshine, S. Egerter, C. J. Barclay, C. Cubbin, and P. A. Braveman. Socioeconomic Disparities in Adverse Birth Outcomes: A Systematic Review. *American Journal of Preventive Medicine*, 39(3):263–272, Sept. 2010. ISSN 0749-3797. doi: 10.1016/j.amepre.2010.05.012. URL https://www.sciencedirect.com/science/article/pii/S0749379710003636.

P. Braveman, S. Egerter, and D. R. Williams. The Social Determinants of Health: Coming of Age. *Annual Review of Public Health*, 32(1):381–398, Apr. 2011. ISSN 0163-7525, 1545-2093. doi: 10.1146/annurev-publhealth-031210-101218. URL https://www.annualreviews.org/doi/10.1146/annurev-publhealth-031210-101218.

X. d. S. Briggs, S. J. Popkin, and J. Goering. *Moving to Opportunity: The Story of an American Experiment to Fight Ghetto Poverty*. Oxford University Press, Mar. 2010. ISBN 978-0-19-974186-1. Google-Books-ID: CuJcHoxUxDkC.

A. F. Brown, G. X. Ma, J. Miranda, E. Eng, D. Castille, T. Brockie, P. Jones, C. O. Airhihenbuwa, T. Farhat, L. Zhu, and C. Trinh-Shevrin. Structural Interventions to Reduce and Eliminate Health Disparities. *American Journal of Public Health*, 109(S1):S72–S78, Jan. 2019. ISSN 0090-0036, 1541-0048. doi: 10.2105/AJPH.2018.304844. URL https://ajph.aphapublications.org/doi/10.2105/AJPH.2018.304844.

D. Brugge, J. L. Durant, and C. Rioux. Near-highway pollutants in motor vehicle exhaust: A review of epidemiologic evidence of cardiac and pulmonary health risks. *Environmental*

Health, 6:23, Aug. 2007. ISSN 1476-069X. doi: 10.1186/1476-069X-6-23. URL https://doi.org/10.1186/1476-069X-6-23.

H. Cammu, N. Dony, G. Martens, and R. Colman. Common determinants of breech presentation at birth in singletons: a population-based study. *European Journal of Obstetrics, Gynecology, and Reproductive Biology*, 177:106–109, June 2014. ISSN 1872-7654. doi: 10.1016/j.ejogrb.2014.04.008.

CHAPA. Chapter 40B Affordable Housing: Frequently Asked Questions. page 2, 2018.

R. Chetty, N. Hendren, and L. F. Katz. The Effects of Exposure to Better Neighborhoods on Children: New Evidence from the Moving to Opportunity Experiment. *American Economic Review*, 106(4):855–902, Apr. 2016. ISSN 0002-8282. doi: 10.1257/aer.20150572. URL https://www.aeaweb.org/articles?id=10.1257/aer.20150572.

R. Chetty, J. Friedman, N. Hendren, M. Jones, and S. Porter. The Opportunity Atlas: Mapping the Childhood Roots of Social Mobility. *National Bureau of Economic Research*, w25147, Oct. 2018. doi: 10.3386/w25147. URL http://www.nber.org/papers/w25147.pdf.

E. Chyn. Moved to Opportunity: The Long-Run Effects of Public Housing Demolition on Children. *American Economic Review*, 108(10):3028–3056, Oct. 2018. ISSN 0002-8282. doi: 10.1257/aer.20161352. URL http://www.aeaweb.org/articles?id=10.1257/aer.20161352.

E. Chyn and L. Katz. Neighborhoods Matter: Assessing the Evidence for Place Effects. *Journal of Economic Perspectives*, 35(4):197–222, Nov. 2021. ISSN 0895-3309. doi: 10.1257/jep.35.4.197. URL https://pubs.aeaweb.org/doi/10.1257/jep.35.4.197.

E. Chyn and N. Shenhav. Place Effects and Geographic Inequality in Health at Birth, Sept. 2022. URL https://www.nber.org/papers/w30424.

E. Chyn, S. Gold, and J. Hastings. The returns to early-life interventions for very low birth weight children. *Journal of Health Economics*, 75:102400, Jan. 2021. ISSN 0167-6296. doi: 10.1016/j.jhealeco.2020.102400. URL https://www.sciencedirect.com/science/article/pii/S0167629620310468.

R. Collinson, I. G. Ellen, and J. Ludwig. Low-Income Housing Policy. In R. Moffitt, editor, *Economics of Means-Tested Transfer Programs in the United States, Volume II*, volume II. University of Chicago Press, 2016. ISBN 978-0-226-39249-3 978-0-226-39252-3. doi: 10.7208/chicago/9780226392523.001.0001. URL http://www.bibliovault.org/BV.landing.epl?ISBN=9780226392523.

J. Currie. Inequality at Birth: Some Causes and Consequences. *The American Economic Review*, 101(3):1–22, May 2011. ISSN 00028282. doi: http://

dx.doi.org.ezp-prod1.hul.harvard.edu/10.1257/aer.101.3.1. URL http://www.proquest.com/docview/871970776/abstract/E1FE4B1A3CAA4FDAPQ/1. Num Pages: 22 Place: Nashville, United States Publisher: American Economic Association Section: Papers; Richard T. Ely Lecture.

J. Currie. Pollution and Infant Health. *Child Development Perspectives*, 7(4):237–242, Dec. 2013. ISSN 17508592. doi: 10.1111/cdep.12047. URL https://onlinelibrary.wiley.com/doi/10.1111/cdep.12047.

J. Currie and M. Rossin-Slater. Weathering the storm: Hurricanes and birth outcomes. *Journal of Health Economics*, 32(3):487–503, May 2013. ISSN 0167-6296. doi: 10.1016/j.jhealeco.2013.01.004. URL https://www.sciencedirect.com/science/article/pii/S0167629613000052.

J. Currie and M. Rossin-Slater. Early-Life Origins of Life-Cycle Well-Being: Research and Policy Implications. *Journal of Policy Analysis and Management*, 34(1):208–242, 2015. ISSN 1520-6688. doi: 10.1002/pam.21805. URL https://onlinelibrary.wiley.com/doi/abs/10.1002/pam.21805. _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1002/pam.21805.

J. Currie and R. Walker. Traffic Congestion and Infant Health: Evidence from E-ZPass. *American Economic Journal: Applied Economics*, 3(1):65–90, 2011. ISSN 1945-7782. URL http://www.jstor.org/stable/25760246. Publisher: American Economic Association.

J. Currie, S. H. Ray, and M. Neidell. Quasi-Experimental Studies Suggest That Lowering Air Pollution Levels Benefits Infants' And Children's Health. *Health Affairs*, 30(12):2391–2399, Dec. 2011. ISSN 0278-2715, 1544-5208. doi: 10.1377/hlthaff.2011.0212. URL http://www.healthaffairs.org/doi/10.1377/hlthaff.2011.0212.

J. Currie, V. Duque, and I. Garfinkel. The Great Recession and Mothers' Health. *The Economic Journal*, 125(588):F311–F346, 2015. ISSN 1468-0297. doi: 10.1111/ecoj.12239. URL http://onlinelibrary.wiley.com/doi/abs/10.1111/ecoj.12239. _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1111/ecoj.12239.

D. Cutler and A. Lleras-Muney. Education and Health: Evaluating Theories and Evidence. Technical Report w12352, National Bureau of Economic Research, Cambridge, MA, July 2006. URL http://www.nber.org/papers/w12352.pdf.

D. Cutler and A. Lleras-Muney. Education and Health: Insights from International Comparisons. page w17738, Jan. 2012. doi: 10.3386/w17738. URL http://www.nber.org/papers/w17738.pdf.

I. A. Cáceres, M. Arcaya, E. Declercq, C. M. Belanoff, V. Janakiraman, B. Cohen, J. Ecker, L. A. Smith, and S. V. Subramanian. Hospital Differences in Cesarean Deliveries in

Massachusetts (US) 2004–2006: The Case against Case-Mix Artifact. *PLoS ONE*, 8(3): e57817, Mar. 2013. ISSN 1932-6203. doi: 10.1371/journal.pone.0057817. URL https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3601117/.

J. R. Daw and L. A. Hatfield. Matching and Regression to the Mean in Difference-in-Differences Analysis. *Health Services Research*, 53(6):4138–4156, 2018. ISSN 1475-6773. doi: 10.1111/1475-6773.12993. URL http://onlinelibrary.wiley.com/doi/abs/10.1111/1475-6773.12993.

S. DeLuca, P. M. E. Garboden, and P. Rosenblatt. Segregating shelter: How housing policies shape the residential locations of low-income minority families. *ANNALS of the American Academy of Political and Social Science*, 647(1):32, 2013.

Department of Health and Human Services. HHS Action Plan to Reduce Racial and Ethnic Health Disparities. Technical report, Department of Health and Human Services, Washington, D.C., 2013. URL http://doi.apa.org/get-pe-doi.cfm?doi=10.1037/e553842012-001. Type: dataset.

Department of Housing and Urban Development. HUD Income Limits Documentation System. URL https://www.huduser.gov/portal/datasets/il.html#null.

D. Desilver. As national eviction ban expires, a look at who rents and who owns in the U.S., Aug. 2021. URL https://www.pewresearch.org/fact-tank/2021/08/02/as-national-eviction-ban-expires-a-look-at-who-rents-and-who-owns-in-the-u-s/.

H. M. Devlin, J. Desai, and A. Walaszek. Reviewing Performance of Birth Certificate and Hospital Discharge Data to Identify Births Complicated by Maternal Diabetes. *Maternal and Child Health Journal*, 13(5):660, Sept. 2008. ISSN 1573-6628. doi: 10.1007/s10995-008-0390-9. URL https://doi.org/10.1007/s10995-008-0390-9.

A. Diamond and J. S. Sekhon. Genetic Matching for Estimating Causal Effects: A General Multivariate Matching Method for Achieving Balance in Observational Studies. *Review of Economics and Statistics*, 95(3):932–945, July 2013. ISSN 0034-6535, 1530-9142. doi: 10.1162/REST_a_00318. URL http://www.mitpressjournals.org/doi/10.1162/REST_a_00318.

R. Diamond and T. McQuade. Who Wants Affordable Housing in Their Backyard? An Equilibrium Analysis of Low-Income Property Development. *Journal of Political Economy*, Apr. 2019. ISSN 0022-3808. doi: 10.1086/701354. URL https://www.journals.uchicago.edu/doi/abs/10.1086/701354. Publisher: The University of Chicago Press-Chicago, IL.

R. Diamond, T. McQuade, and F. Qian. The Effects of Rent Control Expansion on Tenants, Landlords, and Inequality: Evidence from San Francisco. *American Economic Review*,

109(9):3365–3394, Sept. 2019. ISSN 0002-8282. doi: 10.1257/aer.20181289. URL https://www.aeaweb.org/articles?id=10.1257%2Faer.20181289&ref=mainstreem-dotcom.

P. Dietz, J. Bombard, C. Mulready-Ward, J. Gauthier, J. Sackoff, P. Brozicevic, M. Gambatese, M. Nyland-Funke, L. England, L. Harrison, and S. Farr. Validation of Selected Items on the 2003 U.S. Standard Certificate of Live Birth: New York City and Vermont. *Public Health Reports*, 130(1):60–70, Jan. 2015. ISSN 0033-3549, 1468-2877. doi: 10.1177/003335491513000108. URL http://journals.sagepub.com/doi/10.1177/003335491513000108.

R. Doll, R. Peto, J. Boreham, and I. Sutherland. Mortality in relation to smoking: 50 years' observations on male British doctors. *BMJ*, 328(7455):1519, June 2004. ISSN 0959-8138, 1468-5833. doi: 10.1136/bmj.38142.554479.AE. URL https://www.bmj.com/content/328/7455/1519. Publisher: British Medical Journal Publishing Group Section: Paper.

C. Dunkel Schetter. Psychological Science on Pregnancy: Stress Processes, Biopsychosocial Models, and Emerging Research Issues. *Annual Review of Psychology*, 62(1):531–558, Jan. 2011. ISSN 0066-4308, 1545-2085. doi: 10.1146/annurev.psych.031809.130727. URL https://www.annualreviews.org/doi/10.1146/annurev.psych.031809.130727.

C. East, S. Miller, M. Page, and L. Wherry. Multi-generational Impacts of Childhood Access to the Safety Net: Early Life Exposure to Medicaid and the Next Generation's Health. Technical Report w23810, National Bureau of Economic Research, Cambridge, MA, Sept. 2017. URL http://www.nber.org/papers/w23810.pdf.

I. G. Ellen. Is Segregation Bad for Your Health? The Case of Low Birth Weight. *Brookings-Wharton Papers on Urban Affairs*, 2000(1):203–229, 2000. ISSN 1533-4449. doi: 10.1353/urb.2000.0002. URL http://muse.jhu.edu/article/35571. Publisher: Brookings Institution Press.

I. G. Ellen and S. Glied. Housing, Neighborhoods, and Children's Health. *The Future of Children; Princeton*, 25(1), 2015. ISSN 10548289. URL http://search.proquest.com/docview/1696707241/abstract/1779C42C4C814D9DPQ/1.

I. G. Ellen, K. Horn, Y. Kuai, R. Pazuniak, and M. D. Williams. Effect of QAP Incentives on the Location of LIHTC Properties: Multi-Disciplinary Research Team. Technical report, U.S. Department of Housing and Urban Development, Office of Policy Development and Research, Apr. 2015.

I. G. Ellen, K. M. Horn, and K. M. O'Regan. Poverty concentration and the Low Income Housing Tax Credit: Effects of siting and tenant composition. *Journal of Housing Economics*, 34:49–59, Dec. 2016. ISSN 1051-1377. doi: 10.1016/j.jhe.2016.08.001. URL https://www.sciencedirect.com/science/article/pii/S1051137716300183.

I. G. Ellen, K. M. Horn, and Y. Kuai. Gateway to Opportunity? Disparities in Neighborhood Conditions Among Low-Income Housing Tax Credit Residents. *Housing Policy Debate*, 28 (4):572–591, July 2018. ISSN 1051-1482, 2152-050X. doi: 10.1080/10511482.2017.1413584. URL https://www.tandfonline.com/doi/full/10.1080/10511482.2017.1413584.

T. Enamorado and K. Imai. Validating Self-Reported Turnout by Linking Public Opinion Surveys with Administrative Records. *Public Opinion Quarterly*, 83(4):723–748, Dec. 2019. ISSN 0033-362X, 1537-5331. doi: 10.1093/poq/nfz051. URL https://academic.oup.com/poq/article/83/4/723/5719430.

T. Enamorado, B. Fifield, and K. Imai. Using a Probabilistic Model to Assist Merging of Large-Scale Administrative Records. *American Political Science Review*, 113(2):353–371, May 2019. ISSN 0003-0554, 1537-5943. doi: 10.1017/S0003055418000783. URL https://www.cambridge.org/core/product/identifier/S0003055418000783/type/journal_article.

W. N. Evans and C. L. Garthwaite. Giving Mom a Break: The Impact of Higher EITC Payments on Maternal Health. *American Economic Journal: Economic Policy*, 6(2):258–290, May 2014. ISSN 1945-7731. doi: 10.1257/pol.6.2.258. URL http://www.aeaweb.org/articles?id=10.1257/pol.6.2.258.

R. C. Fauth, T. Leventhal, and J. Brooks-Gunn. Short-term effects of moving from public housing in poor to middle-class neighborhoods on low-income, minority adults' outcomes. *Social Science & Medicine*, 59(11):2271–2284, Dec. 2004. ISSN 02779536. doi: 10.1016/j.socscimed.2004.03.020. URL https://linkinghub.elsevier.com/retrieve/pii/S0277953604001224.

A. Fenelon, M. Boudreaux, N. Slopen, and S. J. Newman. The Benefits of Rental Assistance for Children's Health and School Attendance in the United States. *Demography*, 58(4):1171–1195, Aug. 2021. ISSN 0070-3370, 1533-7790. doi: 10.1215/00703370-9305166. URL https://read.dukeupress.edu/demography/article/58/4/1171/173456/The-Benefits-of-Rental-Assistance-for-Children-s.

J. Fernandez, M. García-Pérez, and S. Orozco-Aleman. Unraveling the hispanic health paradox. *Journal of Economic Perspectives*, 37(1):145–167, 2023.

D. Figlio, J. Guryan, K. Karbownik, and J. Roth. The Effects of Poor Neonatal Health on Children's Cognitive Development. *American Economic Review*, 104(12):3921–3955, Dec. 2014. ISSN 0002-8282. doi: 10.1257/aer.104.12.3921. URL https://pubs.aeaweb.org/doi/10.1257/aer.104.12.3921.

A. Finkelstein, M. Gentzkow, and H. Williams. Place-Based Drivers of Mortality: Evidence from Migration. *American Economic Review*, 111(8):2697–2735, Aug. 2021. ISSN 0002-8282. doi: 10.1257/aer.20190825. URL https://pubs.aeaweb.org/doi/10.1257/aer.20190825.

L. M. Fisher and N. J. Marantz. Can state law combat exclusionary zoning? Evidence from Massachusetts. *Urban Studies*, 52(6):1071–1089, May 2015. ISSN 0042-0980, 1360-063X. doi: 10.1177/0042098014534906. URL http://journals.sagepub.com/doi/10.1177/0042098014534906.

H. A. Frey and M. A. Klebanoff. The epidemiology, etiology, and costs of preterm birth. In *Seminars in fetal and neonatal medicine*, volume 21, pages 68–73. Elsevier, 2016.

T. Galama, A. Lleras-Muney, and H. v. Kippersluis. The Effect of Education on Health and Mortality: A Review of Experimental and Quasi-Experimental Evidence. In *Oxford Research Encyclopedia of Economics and Finance*. Oxford University Press, May 2018. ISBN 978-0-19-062597-9. doi: 10.1093/acrefore/9780190625979.013.7. URL https://oxfordre.com/economics/view/10.1093/acrefore/9780190625979.001.0001/acrefore-9780190625979-e-7.

M. Gibson, M. Petticrew, C. Bambra, A. J. Sowden, K. E. Wright, and M. Whitehead. Housing and health inequalities: A synthesis of systematic reviews of interventions aimed at different pathways linking housing and health. *Health & Place*, 17(1):175–184, Jan. 2011. ISSN 1353-8292. doi: 10.1016/j.healthplace.2010.09.011. URL https://www.sciencedirect.com/science/article/pii/S1353829210001486.

R. L. Goldenberg, J. F. Culhane, J. D. Iams, and R. Romero. Epidemiology and causes of preterm birth. *The lancet*, 371(9606):75–84, 2008.

R. A. Gourevitch, T. Natwick, C. E. Chaisson, A. Weiseth, and N. T. Shah. Variation in guideline-based prenatal care in a commercially insured population. *American Journal of Obstetrics and Gynecology*, 226(3):413.e1–413.e19, Mar. 2022. ISSN 0002-9378. doi: 10.1016/j.ajog.2021.09.038. URL https://www.sciencedirect.com/science/article/pii/S0002937821010887.

C. J. Hobel, A. Goldstein, and E. S. Barrett. Psychosocial Stress and Pregnancy Outcome. *Clinical Obstetrics and Gynecology*, 51(2):333–348, June 2008. ISSN 0009-9201. doi: 10.1097/GRF.0b013e31816f2709. URL https://journals.lww.com/clinicalobgyn/Fulltext/2008/06000/Psychosocial_Stress_and_Pregnancy_Outcome.17.aspx.

H. Hoynes, D. Miller, and D. Simon. Income, the Earned Income Tax Credit, and Infant Health. *American Economic Journal: Economic Policy*, 7(1):172–211, Feb. 2015. ISSN 1945-7731. doi: 10.1257/pol.20120179. URL http://www.aeaweb.org/articles?id=10.1257/pol.20120179.

HUDuser. Low-Income Housing Tax Credit (LIHTC): Property Level Data. URL https://www.huduser.gov/portal/datasets/lihtc/property.html.

R. Ion and A. L. Bernal. Smoking and Preterm Birth. *Reproductive Sciences*, 22(8):918–926, Aug. 2015. ISSN 1933-7191, 1933-7205. doi: 10.1177/1933719114556486. URL https://link.springer.com/10.1177/1933719114556486.

B. A. Jacob, M. Kapustin, and J. Ludwig. The Impact of Housing Assistance on Child Outcomes: Evidence from a Randomized Housing Lottery*. *The Quarterly Journal of Economics*, 130(1):465–506, Feb. 2015. ISSN 0033-5533, 1531-4650. doi: 10.1093/qje/qju030. URL https://academic.oup.com/qje/article/130/1/465/2337692.

A. Jbaily, X. Zhou, J. Liu, T.-H. Lee, L. Kamareddine, S. Verguet, and F. Dominici. Air pollution exposure disparities across US population and income groups. *Nature*, 601(7892):228–233, Jan. 2022. ISSN 0028-0836, 1476-4687. doi: 10.1038/s41586-021-04190-y. URL https://www.nature.com/articles/s41586-021-04190-y.

Joint Center for Housing Studies. The State of the Nation's Housing 2014. Technical report, Harvard Graduate School of Education; Harvard Kennedy School, 2014. URL https://www.jchs.harvard.edu/sites/default/files/son2011.pdf.

Joint Center for Housing Studies. The State of the Nation's Housing 2015. Technical report, Harvard University, 2015. URL https://www.jchs.harvard.edu/research-areas/reports/state-nations-housing-2015.

Joint Center for Housing Studies. The State of the Nation's Housing 2016. Technical report, Harvard University, 2016. URL https://www.jchs.harvard.edu/research-areas/reports/state-nations-housing-2016.

Joint Center for Housing Studies. The State of the Nation's Housing 2018. Technical report, Harvard University, 2018. URL https://www.jchs.harvard.edu/sites/default/files/Harvard_JCHS_State_of_the_Nations_Housing_2018.pd.

E. Julian and M. Daniel. HUD-Assisted Low-Income Housing: Is It Working and for Whom? - ProQuest. *Poverty & Race*, 18(4):3, Aug. 2009. URL https://www.proquest.com/docview/210357200?accountid=11311&parentSessionId=Z2hxEI8Kqd7DYj5zlJlNMWdMdvnUS9H3SO6nMMe21sk%3D&pq-origsite=primo.

S. P. Juárez and J. Merlo. Revisiting the Effect of Maternal Smoking during Pregnancy on Offspring Birthweight: A Quasi-Experimental Sibling Analysis in Sweden. *PLOS ONE*, 8(4):e61734, Apr. 2013. ISSN 1932-6203. doi: 10.1371/journal.pone.0061734. URL https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0061734. Publisher: Public Library of Science.

L. F. Katz, J. R. Kling, J. B. Liebman, W. Manning, L. Orr, M. Piore, J. Rosenbaum, J. Rebitzer, M. Tienda, and J. Wilson. *The Early Impacts of Moving to Opportunity in Boston*. 2000.

L. F. Katz, J. R. Kling, and J. B. Liebman. Moving to Opportunity in Boston: Early Results of a Randomized Mobility Experiment. *The Quarterly Journal of Economics*, 116(2):607–654, May 2001. ISSN 0033-5533. doi: 10.1162/00335530151144113. URL http://academic.oup.com/qje/article/116/2/607/1904187.

S.-Y. Kim, M. Bechle, S. Hankey, L. Sheppard, A. A. Szpiro, and J. D. Marshall. Concentrations of criteria pollutants in the contiguous U.S., 1979 – 2015: Role of prediction model parsimony in integrated empirical geographic regression. *PLOS ONE*, 15 (2):e0228535, Feb. 2020. ISSN 1932-6203. doi: 10.1371/journal.pone.0228535. URL https://dx.plos.org/10.1371/journal.pone.0228535.

G. King, C. Lucas, and R. A. Nielsen. The Balance-Sample Size Frontier in Matching Methods for Causal Inference. *American Journal of Political Science*, 61(2):473–489, 2016. ISSN 1540-5907. doi: 10.1111/ajps.12272. URL http://onlinelibrary.wiley.com/doi/abs/10.1111/ajps.12272. _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1111/ajps.12272.

J. R. Kling, J. B. Liebman, and L. F. Katz. Experimental Analysis of Neighborhood Effects. *Econometrica*, 75(1):83–119, 2007. ISSN 1468-0262. doi: 10.1111/j.1468-0262.2007.00733.x. URL https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1468-0262.2007.00733.x.

S. Krefetz. The Impact and Evolution of the Massachusetts Comprehensive Permit and Zoning Appeals Act: Thirty Years of Experience with a State Legislative Effort to Overcome Exclusionary Zoning. *Western New England Law Review*, 22, Jan. 2001. URL https://digitalcommons.law.wne.edu/lawreview/vol22/iss2/5.

N. Krieger, P. Waterman, J. T. Chen, M.-J. Soobader, S. V. Subramanian, and R. Carson. Zip Code Caveat: Bias Due to Spatiotemporal Mismatches Between Zip Codes and US Census–Defined Geographic Areas—The Public Health Disparities Geocoding Project. *American Journal of Public Health*, 92(7):1100–1102, July 2002. ISSN 0090-0036. doi: 10.2105/AJPH.92.7.1100. URL http://ajph.aphapublications.org/doi/abs/10.2105/AJPH.92.7.1100.

N. Krieger, J. T. Chen, P. D. Waterman, D. H. Rehkopf, and S. Subramanian. Painting a Truer Picture of US Socioeconomic and Racial/Ethnic Health Inequalities: The Public Health Disparities Geocoding Project. *American Journal of Public Health*, 95(2):312–323, Feb. 2005. ISSN 0090-0036, 1541-0048. doi: 10.2105/AJPH.2003.032482. URL https://ajph.aphapublications.org/doi/full/10.2105/AJPH.2003.032482.

T. Leventhal and J. Brooks-Gunn. Moving to Opportunity: an Experimental Study of Neighborhood Effects on Mental Health. *American Journal of Public Health*, 93(9):1576–1582, Sept. 2003. ISSN 0090-0036, 1541-0048. doi: 10.2105/AJPH.93.9.1576. URL http://ajph.aphapublications.org/doi/10.2105/AJPH.93.9.1576.

J. B. Liebman, L. F. Katz, and J. R. Kling. Beyond Treatment Effects: Estimating the Relationship Between Neighborhood Poverty and Individual Outcomes in the MTO Experiment. *SSRN Electronic Journal*, 2004. ISSN 1556-5068. doi: 10.2139/ssrn.630803. URL http://www.ssrn.com/abstract=630803.

J. Ludwig, L. Sanbonmatsu, L. Gennetian, E. Adam, G. J. Duncan, L. F. Katz, R. C. Kessler, J. R. Kling, S. T. Lindau, R. C. Whitaker, and T. W. McDade. Neighborhoods, Obesity, and Diabetes — A Randomized Social Experiment. *New England Journal of Medicine*, 365(16):1509–1519, Oct. 2011. ISSN 0028-4793. doi: 10.1056/NEJMsa1103216. URL http://dx.doi.org/10.1056/NEJMsa1103216.

J. Ludwig, G. J. Duncan, L. A. Gennetian, L. F. Katz, R. C. Kessler, J. R. Kling, and L. Sanbonmatsu. Neighborhood Effects on the Long-Term Well-Being of Low-Income Adults. *Science*, 337(6101):1505–1510, Sept. 2012. ISSN 0036-8075, 1095-9203. doi: 10.1126/science.1224648. URL https://science.sciencemag.org/content/337/6101/1505.

J. Ludwig, G. J. Duncan, L. A. Gennetian, L. F. Katz, R. C. Kessler, J. R. Kling, and L. Sanbonmatsu. Long-Term Neighborhood Effects on Low-Income Families: Evidence from Moving to Opportunity. *American Economic Review*, 103(3):226–231, May 2013. ISSN 0002-8282. doi: 10.1257/aer.103.3.226. URL http://pubs.aeaweb.org/doi/10.1257/aer.103.3.226.

A. Mallach. The Mount Laurel Doctrine and the Uncertainties of Social Policy in a Time of Retrenchment. *Rutgers Law Review*, 63:18, 2011.

D. C. Mallinson, A. Larson, L. M. Berger, E. Grodsky, and D. B. Ehrenthal. Estimating the effect of Prenatal Care Coordination in Wisconsin: A sibling fixed effects analysis. *Health Services Research*, 55(1):82–93, Feb. 2020. ISSN 0017-9124, 1475-6773. doi: 10.1111/1475-6773.13239. URL https://onlinelibrary.wiley.com/doi/10.1111/1475-6773.13239.

J. Martin, B. Hamilton, P. Sutton, S. Ventura, F. Menacker, S. Kirmeyer, and M. Munson. Births: Final data for 2005. Technical report, National Center for Health Statistics (U.S.), Washington, D.C., Dec. 2007.

J. Martin, E. Wilson, M. Osterman, E. Saadi, S. Sutton, and B. Hamilton. Assessing the Quality of Medical and Health Data From the 2003 Birth Certificate Revision: Results From Two States. *National Vital Statistics Reports*, 62(2):20, July 2013. URL https://www.cdc.gov/nchs/data/nvsr/nvsr62/nvsr62_02.pdf.

Massachusetts Department of Housing and Community Development. Guidelines: G.L. C.40B Comprehensive Permit Projects, Dec. 2014.

Massachusetts Department of Public Health: Registry of Vital Records and Statistics. Massachusetts Births 2019. Technical report, Feb. 2022.

D. S. Massey and N. A. Denton. *American Apartheid*. Harvard University Press, Jan. 1993. URL http://books.google.com/books/about/American_Apartheid.html?id=uGslMsIBNBsC.

D. S. Massey, J. Rothwell, and T. Domina. The Changing Bases of Segregation in the United States. *The ANNALS of the American Academy of Political and Social Science*, 626(1):74–90, Nov. 2009. ISSN 0002-7162. doi: 10.1177/0002716209343558. URL https://doi.org/10.1177/0002716209343558.

D. S. Massey, L. Albright, R. Casciano, E. Derickson, and D. Kinsey. *Climbing Mount Laurel: The Struggle for Affordable Housing and Social Mobility an in American Suburb*. Princeton University Press, July 2013.

T. J. Mathews. Trends in Infant Mortality in the United States, 2005–2014. NCHS Data Brief 279, Mar. 2017.

A. Mazzara and B. Knudsen. Where Families With Children Use Housing Vouchers, Jan. 2019. URL https://www.cbpp.org/research/housing/where-families-with-children-use-housing-vouchers.

K. McClure. Deconcentrating Poverty With Housing Programs. *Journal of the American Planning Association*, 74(1):90–99, Jan. 2008. ISSN 0194-4363, 1939-0130. doi: 10.1080/01944360701730165. URL http://www.tandfonline.com/doi/abs/10.1080/01944360701730165.

K. McClure and B. Johnson. Housing Programs Fail to Deliver on Neighborhood Quality, Reexamined. *Housing Policy Debate*, 25(3):463–496, July 2015. ISSN 1051-1482, 2152-050X. doi: 10.1080/10511482.2014.944201. URL http://www.tandfonline.com/doi/full/10.1080/10511482.2014.944201.

K. McClure and A. F. Schwartz. Neighbourhood opportunity, racial segregation, and the Low-Income Housing Tax Credit program in the United States. *Housing Studies*, pages 1–23, July 2021. ISSN 0267-3037, 1466-1810. doi: 10.1080/02673037.2021.1950646. URL https://www.tandfonline.com/doi/full/10.1080/02673037.2021.1950646.

M. A. McConnell, S. Rokicki, S. Ayers, F. Allouch, N. Perreault, R. A. Gourevitch, M. W. Martin, R. A. Zhou, C. Zera, M. R. Hacker, A. Chien, M. A. Bates, and K. Baicker. Effect of an Intensive Nurse Home Visiting Program on Adverse Birth Outcomes in a Medicaid-Eligible Population: A Randomized Clinical Trial. *JAMA*, 328(1):27, July 2022. ISSN 0098-7484. doi: 10.1001/jama.2022.9703. URL https://jamanetwork.com/journals/jama/fullarticle/2793825.

E. Meara. Why is Health Related to Socioeconoimc Status? The Case of Pregnancy and Low Birth Weight. *National Bureau of Economic Research*, Apr. 2001.

A. Metcalfe, P. Lail, W. A. Ghali, and R. S. Sauve. The association between neighbourhoods and adverse birth outcomes: a systematic review and meta-analysis of multi-level studies. *Paediatric and Perinatal Epidemiology*, 25(3):236–245, 2011. ISSN 1365-3016. doi: 10.1111/j.1365-3016.2011.01192.x. URL http://onlinelibrary.wiley.com/doi/abs/10.1111/j.1365-3016.2011.01192.x. _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1111/j.1365-3016.2011.01192.x.

M. W. Metzger. The Reconcentration of Poverty: Patterns of Housing Voucher Use, 2000 to 2008. *Housing Policy Debate*, 24(3):544–567, July 2014. ISSN 1051-1482, 2152-050X. doi: 10.1080/10511482.2013.876437. URL http://www.tandfonline.com/doi/abs/10.1080/10511482.2013.876437.

P. Monkkonen, M. Manville, and S. Friedman. A Flawed Law: Reforming California's Housing Element. *UCLA Lewis Center for Regional Policy Studies*, page 6, May 2019.

A. Nandi, M. M. Glymour, and S. V. Subramanian. Association Among Socioeconomic Status, Health Behaviors, and All-Cause Mortality in the United States. *Epidemiology*, 25(2):170–177, 2014. ISSN 1044-3983. URL http://www.jstor.org/stable/24759087. Publisher: Lippincott Williams & Wilkins.

C. N. Ncube, D. A. Enquobahrie, S. M. Albert, A. L. Herrick, and J. G. Burke. Association of neighborhood context with offspring risk of preterm birth and low birthweight: A systematic review and meta-analysis of population-based studies. *Social Science & Medicine*, 153:156–164, Mar. 2016. ISSN 0277-9536. doi: 10.1016/j.socscimed.2016.02.014. URL https://www.sciencedirect.com/science/article/pii/S0277953616300697.

S. Northam and T. R. Knapp. The Reliability and Validity of Birth Certificates. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*, 35(1):3–12, 2006. ISSN 1552-6909. doi: 10.1111/j.1552-6909.2006.00016.x. URL http://onlinelibrary.wiley.com/doi/abs/10.1111/j.1552-6909.2006.00016.x. _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1111/j.1552-6909.2006.00016.x.

J. M. Orsi, H. Margellos-Anast, and S. Whitman. Black–White Health Disparities in the United States and Chicago: A 15-Year Progress Analysis. *American Journal of Public Health*, 100(2):349–356, Feb. 2010. ISSN 0090-0036, 1541-0048. doi: 10.2105/AJPH.2009.165407. URL http://ajph.aphapublications.org/doi/10.2105/AJPH.2009.165407.

M. Osterman, B. Hamilton, J. Martin, A. Driscoll, and C. Valenzuela. Births: Final Data for 2018. Technical report, National Center for Health Statistics (U.S.), Washington, D.C., Feb. 2021. URL https://stacks.cdc.gov/view/cdc/112078.

F. C. Pampel, P. M. Krueger, and J. T. Denney. Socioeconomic Disparities in Health Behaviors. *Annual review of sociology*, 36:349–370, Aug. 2010. ISSN 0360-0572. doi: 10.1146/annurev.soc.012809.102529. URL https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3169799/.

Y. Paradies, J. Ben, N. Denson, A. Elias, N. Priest, A. Pieterse, A. Gupta, M. Kelaher, and G. Gee. Racism as a determinant of health: A systematic review and meta-analysis. 10(9): e0138511. ISSN 1932-6203. doi: 10.1371/journal.pone.0138511. URL https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0138511. Publisher: Public Library of Science.

J. C. Phelan, B. G. Link, and P. Tehranifar. Social Conditions as Fundamental Causes of Health Inequalities: Theory, Evidence, and Policy Implications. *Journal of Health and Social Behavior*, 51(1_suppl):S28–S40, Mar. 2010. ISSN 0022-1465, 2150-6000. doi: 10.1177/0022146510383498. URL http://journals.sagepub.com/doi/10.1177/0022146510383498.

D. C. Phillips. Landlords avoid tenants who pay with vouchers. *Economics Letters*, 151: 48–52, Feb. 2017. ISSN 01651765. doi: 10.1016/j.econlet.2016.11.036. URL https://linkinghub.elsevier.com/retrieve/pii/S0165176516304967.

S. J. Popkin, G. C. Galster, K. Temkin, C. Herbig, D. K. Levy, and E. K. Richer. Obstacles to desegregating public housing: Lessons learned from implementing eight consent decrees. *Journal of Policy Analysis and Management*, 22(2):179–199, 2003. ISSN 1520-6688. doi: 10.1002/pam.10112. URL http://onlinelibrary.wiley.com/doi/abs/10.1002/pam.10112. _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1002/pam.10112.

K. P. Ramlakhan, M. R. Johnson, and J. W. Roos-Hesselink. Pregnancy and cardiovascular disease. *Nature Reviews Cardiology*, 17(11):718–731, Nov. 2020. ISSN 1759-5010. doi: 10.1038/s41569-020-0390-z. URL http://www.nature.com/articles/s41569-020-0390-z. Number: 11 Publisher: Nature Publishing Group.

C. K. Reid, C. Galante, and A. F. Weinstein-Carnes. Borrowing Innovation, Achieving Affordability: What We Can Learn From Massachusetts Chapter 40B. *Terner Center for Housing Innovation*, (1):23, Aug. 2016.

C. K. Reid, C. Galante, and A. F. Weinstein-Carnes. Addressing California's Housing Shortage: Lessons from Massachusetts Chapter 40B. *Journal of Affordable Housing & Community Development Law*, 25(2):241–274, 2017. ISSN 1084-2268. URL http://www.jstor.org/stable/26408189. Publisher: American Bar Association.

P. Rosenblatt and S. DeLuca. "We Don't Live Outside, We Live in Here": Neighborhood and Residential Mobility Decisions among Low–Income Families. *City & Community*, 11(3):

254–284, Sept. 2012. ISSN 1535-6841, 1540-6040. doi: 10.1111/j.1540-6040.2012.01413.x. URL http://journals.sagepub.com/doi/10.1111/j.1540-6040.2012.01413.x.

A. Rosofsky, J. I. Levy, A. Zanobetti, P. Janulewicz, and M. P. Fabian. Temporal trends in air pollution exposure inequality in Massachusetts. *Environmental Research*, 161:76–86, Feb. 2018. ISSN 0013-9351. doi: 10.1016/j.envres.2017.10.028. URL https://www.sciencedirect.com/science/article/pii/S001393511731054X.

M. Rossin-Slater. WIC in your neighborhood: New evidence on the impacts of geographic access to clinics. *Journal of Public Economics*, 102:51–69, June 2013. ISSN 00472727. doi: 10.1016/j.jpubeco.2013.03.009. URL https://linkinghub.elsevier.com/retrieve/pii/S0047272713000741.

R. Rothstein. *The Color of Law: A Forgotten History of How our Government Segregated America*. Liverright, 2017.

H. Royer. Separated at Girth: US Twin Estimates of the Effects of Birth Weight. *American Economic Journal: Applied Economics*, 1(1):49–85, Jan. 2009. ISSN 1945-7782, 1945-7790. doi: 10.1257/app.1.1.49. URL https://pubs.aeaweb.org/doi/10.1257/app.1.1.49.

K. E. Rudolph, N. M. Schmidt, M. M. Glymour, R. Crowder, J. Galin, J. Ahern, and T. L. Osypuk. Composition or Context: Using Transportability to Understand Drivers of Site Differences in a Large-scale Housing Experiment. *Epidemiology*, 29(2):199–206, Mar. 2018. ISSN 1044-3983. doi: 10.1097/EDE.0000000000000774. URL http://journals.lww.com/00001648-201803000-00006.

P. K. Saha, S. Hankey, J. D. Marshall, A. L. Robinson, and A. A. Presto. High-Spatial-Resolution Estimates of Ultrafine Particle Concentrations across the Continental United States. *Environmental Science & Technology*, 55(15):10320–10331, Aug. 2021. ISSN 0013-936X, 1520-5851. doi: 10.1021/acs.est.1c03237. URL https://pubs.acs.org/doi/10.1021/acs.est.1c03237.

N. M. Schmidt, M. M. Glymour, and T. L. Osypuk. Housing mobility and adolescent mental health: The role of substance use, social networks, and family mental health in the moving to opportunity study. *SSM - Population Health*, 3:318–325, Dec. 2017. ISSN 23528273. doi: 10.1016/j.ssmph.2017.03.004. URL https://linkinghub.elsevier.com/retrieve/pii/S2352827316301306.

N. Schneiderman, G. Ironson, and S. D. Siegel. Stress and Health: Psychological, Behavioral, and Biological Determinants. *Annual review of clinical psychology*, 1:607–628, 2005. ISSN 1548-5943. doi: 10.1146/annurev.clinpsy.1.102803.144141. URL https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2568977/.

Secretary of the Commonwealth of Massachusetts. CIS: Archaic Community, District, Neighborhood Section and Village, Names in Massachusetts. URL https://www.sec.state.ma.us/cis/cisuno/unoidx.htm.

N. R. Shah and M. B. Bracken. A systematic review and meta-analysis of prospective studies on the association between maternal cigarette smoking and preterm delivery. *American Journal of Obstetrics and Gynecology*, 182(2):465–472, Feb. 2000. ISSN 0002-9378. doi: 10.1016/S0002-9378(00)70240-7. URL https://www.sciencedirect.com/science/article/pii/S0002937800702407.

S. E. Short and S. Mollborn. Social determinants and health behaviors: conceptual frames and empirical advances. *Current Opinion in Psychology*, 5:78–84, Oct. 2015. ISSN 2352-250X. doi: 10.1016/j.copsyc.2015.05.002. URL https://www.sciencedirect.com/science/article/pii/S2352250X15001530.

N. Slopen, A. Fenelon, S. Newman, and M. Boudreaux. Housing Assistance and Child Health: A Systematic Review. *Pediatrics*, 141(6):e20172742, June 2018. ISSN 0031-4005. doi: 10.1542/peds.2017-2742. URL https://doi.org/10.1542/peds.2017-2742.

N. Sportiche, H. Blanco, M. Daepp, E. Graves, and D. Cutler. Where Do Fair Share Housing Policies Site Affordable Housing? Evidence from Massachusetts Chapter 40B. in progress.

S. Stonefield. Affordable Housing in Suburbia: The Importance But Limited Power and Effectiveness of the State Override Tool. *Western New England Law Review*, 22:33, 2001.

E. A. Stuart. Matching Methods for Causal Inference: A Review and a Look Forward. *Statistical Science*, 25(1):1–21, Feb. 2010. ISSN 0883-4237, 2168-8745. doi: 10.1214/09-STS313. URL http://projecteuclid.org/euclid.ss/1280841730.

S. Subramanian, J. T. Chen, D. H. Rehkopf, P. D. Waterman, and N. Krieger. Racial Disparities in Context: A Multilevel Analysis of Neighborhood Variations in Poverty and Excess Mortality Among Black Populations in Massachusetts. *American Journal of Public Health*, 95(2):260–265, Feb. 2005. ISSN 0090-0036. doi: 10.2105/AJPH.2003.034132. URL http://ajph.aphapublications.org/doi/abs/10.2105/AJPH.2003.034132.

N. M. Talge, L. M. Mudd, A. Sikorskii, and O. Basso. United States Birth Weight Reference Corrected For Implausible Gestational Age Estimates. *Pediatrics*, 133(5):844–853, May 2014. ISSN 0031-4005, 1098-4275. doi: 10.1542/peds.2013-3285. URL https://publications.aap.org/pediatrics/article/133/5/844/32772/United-States-Birth-Weight-Reference-Corrected-For.

K.-Y. Taylor. *Race for Profit: How Banks and the Real Estate Industry Undermined Black Homeownership*. UNC Press Books, Sept. 2019. ISBN 978-1-4696-5367-9. Google-Books-ID: BNqsDwAAQBAJ.

The Commonwealth of Massachusetts. Report of the Legislative Research Council Relative to Restricting the Zoning Power to City and County Governments, June 1968.

R. L. J. Thornton, C. M. Glover, C. W. Cené, D. C. Glik, J. A. Henderson, and D. R. Williams. Evaluating Strategies For Reducing Health Disparities By Addressing The Social Determinants Of Health. *Health Affairs*, 35(8):1416–1423, Aug. 2016. ISSN 0278-2715. doi: 10.1377/hlthaff.2015.1357. URL https://www.healthaffairs.org/doi/full/10.1377/hlthaff.2015.1357. Publisher: Health Affairs.

A. E. Toijonen, S. T. Heinonen, M. V. M. Gissler, and G. Macharey. A comparison of risk factors for breech presentation in preterm and term labor: a nationwide, population-based case–control study. *Archives of Gynecology and Obstetrics*, 301(2):393–403, Feb. 2020. ISSN 1432-0711. doi: 10.1007/s00404-019-05385-5. URL https://doi.org/10.1007/s00404-019-05385-5.

D. Umberson, R. Crosnoe, and C. Reczek. Social Relationships and Health Behavior Across Life Course. *Annual review of sociology*, 36:139–157, Aug. 2010. ISSN 0360-0572. doi: 10.1146/annurev-soc-070308-120011. URL https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3171805/.

G. Visconti and J. R. Zubizarreta. Handling Limited Overlap in Observational Studies with Cardinality Matching. *Observational Studies*, 4(1):217–249, 2018. ISSN 2767-3324. doi: 10.1353/obs.2018.0012. URL https://muse.jhu.edu/article/793377.

D. R. Williams and C. Collins. Racial Residential Segregation: A Fundamental Cause of Racial Disparities in Health. *Public Health Reports*, 116:13, 2001.

D. R. Williams and P. B. Jackson. Social Sources Of Racial Disparities In Health. *Health Affairs*, 24(2):325–334, Mar. 2005. ISSN 0278-2715. doi: 10.1377/hlthaff.24.2.325. URL https://www.healthaffairs.org/doi/full/10.1377/hlthaff.24.2.325. Publisher: Health Affairs.

D. R. Williams, J. A. Lawrence, and B. A. Davis. Racism and Health: Evidence and Needed Research. *Annual Review of Public Health*, 40(1):105–125, Apr. 2019. ISSN 0163-7525, 1545-2093. doi: 10.1146/annurev-publhealth-040218-043750. URL https://www.annualreviews.org/doi/10.1146/annurev-publhealth-040218-043750.

W. E. Winkler. Matching and Record Linkage. Technical report, J. Wiley, New York, 1995.

W. E. Winkler. Matching and record linkage. *WIREs Computational Statistics*, 6(5):313–325, Sept. 2014. ISSN 1939-5108, 1939-0068. doi: 10.1002/wics.1317. URL https://onlinelibrary.wiley.com/doi/10.1002/wics.1317.

J. Zhang, J. Troendle, U. M. Reddy, S. K. Laughon, D. W. Branch, R. Burkman, H. J. Landy, J. U. Hibbard, S. Haberman, M. M. Ramirez, J. L. Bailit, M. K. Hoffman, K. D. Gregory,

V. H. Gonzalez-Quintero, M. Kominiarek, L. A. Learman, C. G. Hatjis, and P. van Veldhuisen. Contemporary cesarean delivery practice in the United States. *American Journal of Obstetrics and Gynecology*, 203(4):326.e1–326.e10, Oct. 2010. ISSN 0002-9378. doi: 10.1016/j.ajog.2010.06.058. URL https://www.sciencedirect.com/science/article/pii/S0002937810008380.

Appendix A.0

Linkage Methodology: Combining Chapter 40B Address Data, Infutor Address Histories, and Massachusetts Birth Records

I combine subsidized housing data, Infutor address histories, and Massachusetts birth records in three steps. First, I standardize all linkage fields based on the steps recommended in previous work (Winkler, 1995, 2014; Abramitzky et al., 2012; Enamorado et al., 2019). Next, I create a longitudinal dataset of 40B beneficiaries by linking 40B building addresses with individuals' residential addresses in Infutor. Finally, I link this dataset of 40B beneficiaries' longitudinal records to birth records using a combination of individuals' names, dates of birth, and residential addresses. I use probabilistic linkage methods for the latter two steps.

I. Standardizing Linkage Fields

To standardize address, I remove all punctuation, convert street suffixes to the USPS standard (e.g. route becomes route or street becomes st), and parse addresses into street number, street name, city, five digit zip code, and–where applicable–unit numbers. To maximize sample size, I also standardize all Massachusetts municipalities to those listed in the 2010 census using a crosswalk of historical municipal and neighborhood names drawn from the Massachusetts Secretary of State's database of archaic community and neighborhood names (Secretary of the Commonwealth of Massachusetts).

I follow a similar protocol to standardize names and birth dates. I first remove all punctuation. Then I split individuals' full names into first name, middle initial (if applicable), and last name. also remove all prefixes and suffixes (e.g., JR, junior, II, III). Using this method, names such as John H. Smith J.R. or Robert Max Jones III become John H Smith and Robert M Jones. Finally, I also remove all special characters from birth dates and convert them into a MMYYYY format.

II. Identifying Subsidized Housing Beneficiaries

I identify 40B beneficiaries by determining whether each address in Infutor is a 40B development address. I do so by linking the precise geocoded addresses of 5,010 buildings permitted under 40B to addresses in Infutor based on street number, street name, city, and state. I use the FastLink package in R to complete this linkage (Enamorado et al. (2019)) but employ slightly more conservative parameters than those recommended in supplementary material provided by Enamorado and Imai (2019). Using this method, I am able to identify at least one address in Infutor for 91 percent of developments and 89 percent of buildings permitted under 40B (some developments have many buildings). The vast majority of these

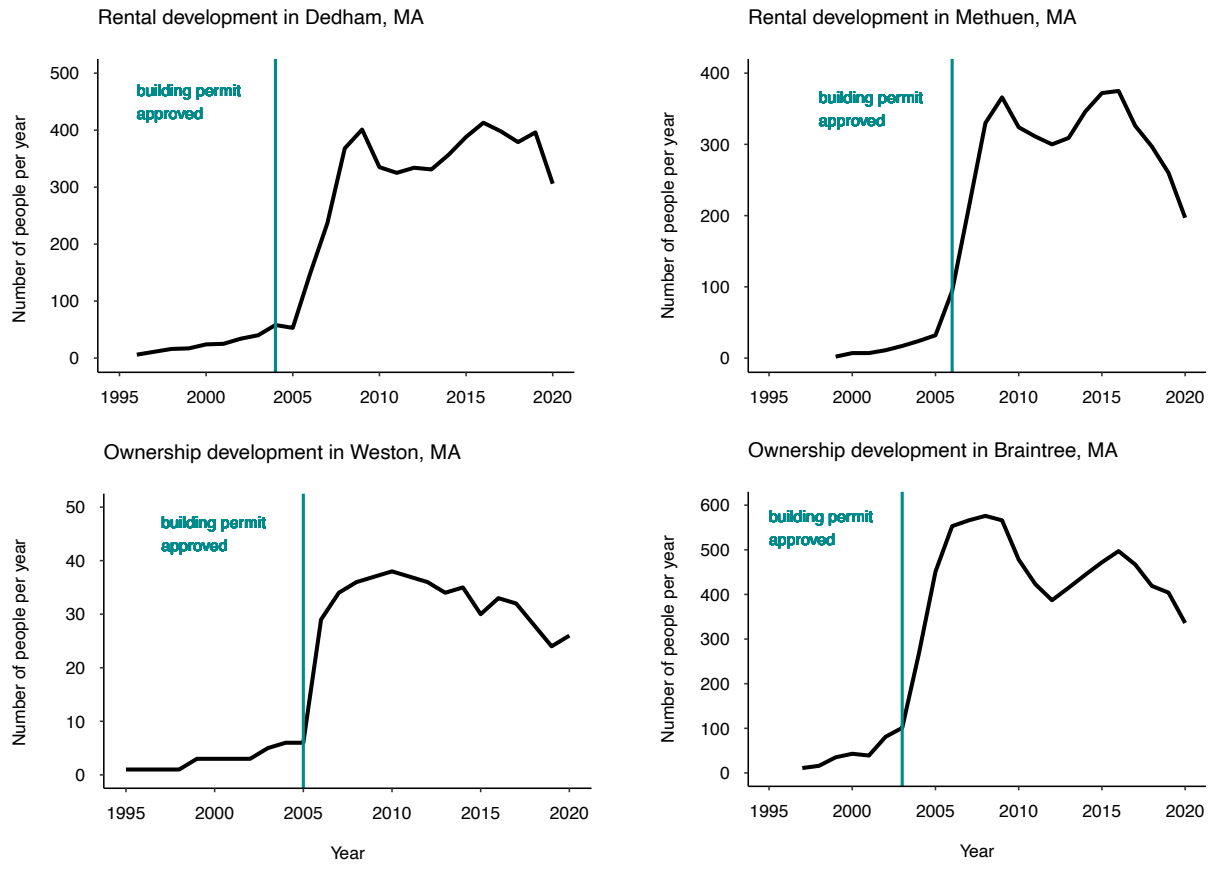
are exact matches. In Infutor, this represents about 28,000 separate address IDs and around 111,000 people. Note that I use the same procedure to link LIHTC records to Infutor address histories, allowing me to identify 115,000 LIHTC beneficiaries in Infutor address histories.

III. Linking Individuals to Birth Records

I link longitudinal data on 40B beneficiaries to birth records based on first and last name, year of birth, and city in Massachusetts. As described in step II I link individuals using slightly more conservative parameters via the FastLink package in R. I begin with about 1 million birth records between 2005 and 2019 and about 43,000 40B beneficiaries whom Infutor does not identify as male. Following recommendations from Abramitzky, Mill, and Pérez (2020) and Winkler (2014), I block on fixed variables where mistakes are unlikely to expedite the matching process. Specifically, I restrict my comparisons to pairs of individuals who have last names starting with the same letter (e.g., I only compare records for people whose last names begin with "A" in both datasets). Because mistakes in these fields are unlikely, I also require an exact match on the first letter of each person's first and last name. Using this method I identify a total of 5,237 births to birthing people (n = 4685) who were 40B beneficiaries during my time frame.

I use the same procedure to identify potential controls and LIHTC beneficiaries who gave birth in Massachusetts between 2005 and 2019, allowing me to identify 422,586 births (306,631 people) and 7,854 births (5,223 people).

Figure A.I: Evolution of 40B beneficiary populations detected in Infutor data



Note: Lines indicate the year when the building permit for each development was approved. Under 40B, occupancy permits must be filed within 18 months of the building permit date, so beneficiaries should move in roughly within two years of a building permit being filed.

Table B.I: Pre- and post-match balance table, 40B owners v. non-subsidized movers

	Pre-match Means				Matched Means			
	Treated (N = 661)	Control (N = 323,809)	Standardized difference	P-value	Treated (N = 661)	Control (N = 3,305)	Standardized difference	P-value
Year moved	2008.64	2003.84	0.74	***	2009.8	2009.8	0	
Age at move	29.88	27.18	0.41	***	30.22	30.22	0	
Birthing parents' race/ethnicity								
White non-Hispanic (%)	79.58	76.27	0.08		79.58	79.58	0	
Black non-Hispanic (%)	4.39	5.58	-0.06		4.39	4.39	0	
Asian non-Hispanic (%)	9.38	6.89	0.09		9.38	9.38	0	
Other non-Hispanic (%)	1.06	1.12	-0.01		1.06	1.06	0	
Hispanic (%)	5.6	10.13	-0.17	***	5.6	5.6	0	
Pre-move tract characteristics								
Median household income	75,392	67,432	0.27	***	75,392	75,368	0	
Percent below poverty (%)	9.42	12.99	-0.35	***	9.42	9.42	0	
White (%)	83.38	76.93	0.36	***	83.38	83.36	0	
Black (%)	5.24	7.99	-0.24	***	5.24	5.24	0	
Asian (%)	5.46	6.53	-0.15	**	5.46	5.76	-0.05	
Hispanic (%)	7.09	11.42	-0.31	***	7.09	7.09	0	
Moved from out of state (%)	12.25	19.56	-0.2	***	12.25	18.34	-0.17	***
Birthing parents' education								
< High school (%)	1.21	1.57	-0.03		1.21	2.09	-0.07	
High school degree (%)	23	11.42	0.31	***	23	18.55	0.11	*
≥ College (%)	74.89	86.59	-0.3	***	74.89	78.79	-0.09	*

* $p<0.05$, ** $p<0.01$,*** $p<0.001$. Note: pre- and post-match means only correspond to the year prior to a move to 40B or to some other location. Time-varying characteristics such as birthing parents' health behaviors and education may vary in the overall sample. Median household income (in 2010 dollars), tract-level racial demographics, and the percent below poverty are drawn from the 2010 U.S. census. State of origin and year of move are based on Infutor records. The birthing parent's age, self-reported age/ethnicity, educational attainment, age at birth, and health behaviors are based on birth records.

Table B.II: Pre- and post-match balance table, 40B renters v. matched LIHTC beneficiaries

	Pre-match Means				Matched Means			
	Treated (N = 1,918)	Control (N = 2,230)	Standardized difference	P-value	Treated (N = 1,419)	Control (N = 1,419)	Standardized difference	P-value
Year moved	2010.14	2006.38	0.54	***	2008.47	2008.4	0.01	
Age at move	30.47	26.98	0.47	***	28.74	28.66	0.01	
Birthing parents' race/ethnicity								
White non-Hispanic (%)	68.35	44.89	0.49	***	62.37	62.37	0	
Black non-Hispanic (%)	8.08	17.4	-0.28	***	10.57	10.57	0	
Asian non-Hispanic (%)	9.8	7.09	0.1	**	9.09	9.09	0	
Other non-Hispanic (%)	1.41	2.2	-0.06		1.9	1.9	0	
Hispanic (%)	12.36	28.43	-0.41	***	16.07	16.07	0	
Pre-move tract characteristics								
Median household income	73,204	52,514	0.73	***	64,012	63,735	0.01	
Percent below poverty (%)	10.41	19.39	-0.76	***	12.49	12.61	-0.01	
White (%)	79.46	65.46	0.64	***	76.57	76.42	0.01	
Black (%)	6.6	14.37	-0.51	***	8	8.14	-0.01	
Asian (%)	6.33	6.04	0.04		6.3	6.32	0	
Hispanic (%)	10.02	19.94	-0.54	***	12.19	12.01	0.01	
Moved from out of state (%)	16.48	12.56	0.11	**	17.41	14.87	0.07	
Birthing parents' education								
< High school (%)	2.82	4.57	-0.09	**	3.17	4.23	-0.06	
High school degree (%)	22.78	22.96	0		25.16	23.96	0.03	
≥ College (%)	73.46	71.88	0.04		70.75	71.25	-0.01	

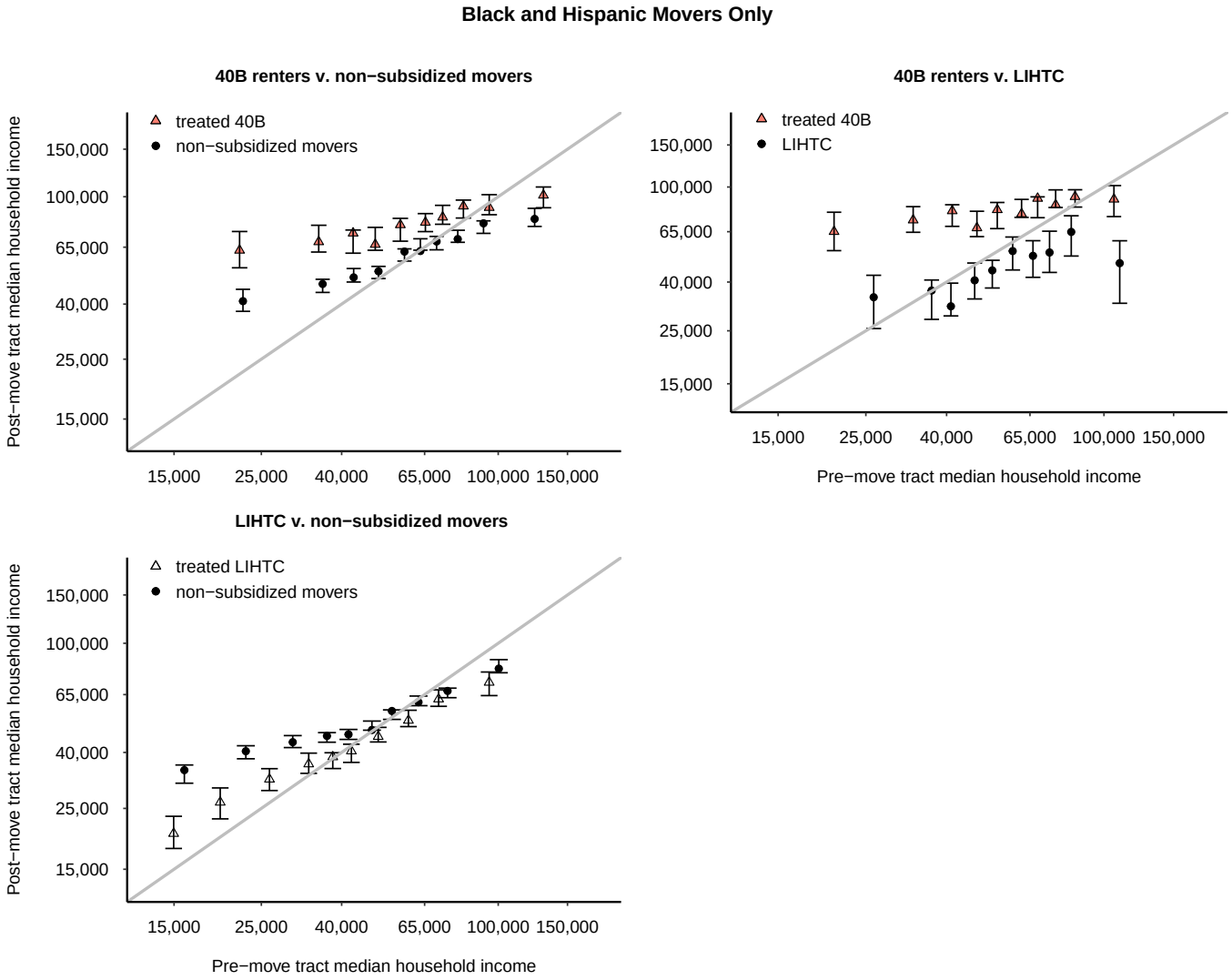
* $p<0.05$, ** $p<0.01$,*** $p<0.001$. Note: pre- and post-match means only correspond to the year prior to a move to 40B or to some other location. Time-varying characteristics such as birthing parents' health behaviors and education may vary in the overall sample. Median household income (in 2010 dollars), tract-level racial demographics, and the percent below poverty are drawn from the 2010 U.S. census. State of origin and year of move are based on Infutor records. The birthing parent's age, self-reported age/ethnicity, educational attainment, age at birth, and health behaviors are based on birth records.

Table B.III: Pre- and post-match balance table, LIHTC beneficiaries v. non-subsidized movers

	Pre-match Means				Matched Means			
	Treated (N = 2,564)	Control (N = 323,809)	Standardized difference	P-value	Treated (N = 2,564)	Control (N = 12,820)	Standardized difference	P-value
Year moved	2006.59	2003.84	0.4	***	2006.59	2006.59	0	
Age at move	27.27	27.19	0.01		27.27	27.27	0	
Birthing parents' race/ethnicity								
White non-Hispanic (%)	47.39	76.54	-0.63	***	47.39	47.39	0	
Black non-Hispanic (%)	16.22	5.47	0.35	***	16.22	16.22	0	
Asian non-Hispanic (%)	6.9	6.9	0		6.9	6.9	0	
Other non-Hispanic (%)	2.18	1.11	0.08	***	2.18	2.18	0	
Hispanic (%)	27.3	9.97	0.46	***	27.3	27.3	0	
Pre-move tract characteristics								
Median household income	54,371	67,576	-0.46	***	54,371	54,354	0	
Percent below poverty (%)	18.48	12.93	0.45	***	18.48	18.47	0	
White (%)	66.98	77.04	-0.46	***	66.98	66.97	0	
Black (%)	13.47	7.93	0.37	***	13.47	13.45	0	
Asian (%)	5.91	6.53	-0.08	*	5.91	5.95	-0.01	
Hispanic (%)	19.28	11.34	0.43	***	19.28	19.27	0	
Moved from out of state (%)	12.56	19.64	-0.19	***	12.56	18.1	-0.15	***
Birthing parents' education								
< High school (%)	4.21	1.56	0.16	***	4.21	4.01	0.01	
High school degree (%)	23.28	11.39	0.32	***	23.28	20.15	0.08	***
≥ College (%)	71.96	86.63	-0.37	***	71.96	75.13	-0.07	**

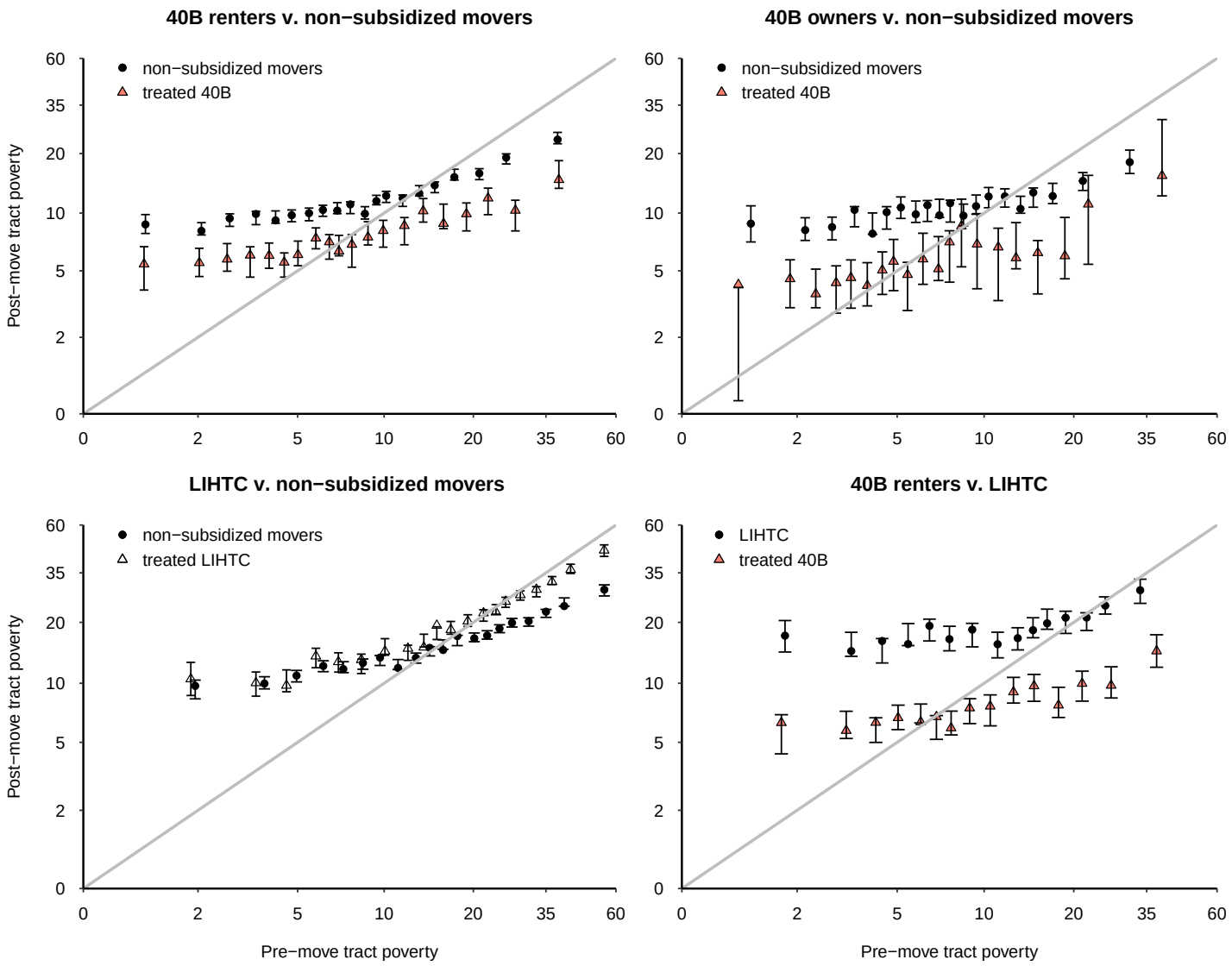
* $p<0.05$, ** $p<0.01$,*** $p<0.001$. Note: pre- and post-match means only correspond to the year prior to a move to 40B or to some other location. Time-varying characteristics such as birthing parents' health behaviors and education may vary in the overall sample. Median household income (in 2010 dollars), tract-level racial demographics, and the percent below poverty are drawn from the 2010 U.S. census. State of origin and year of move are based on Infutor records. The birthing parent's age, self-reported age/ethnicity, educational attainment, age at birth, and health behaviors are based on birth records.

Figure C.I: Pre- and post-move neighborhood-level median household income†, treated beneficiaries v. matched controls



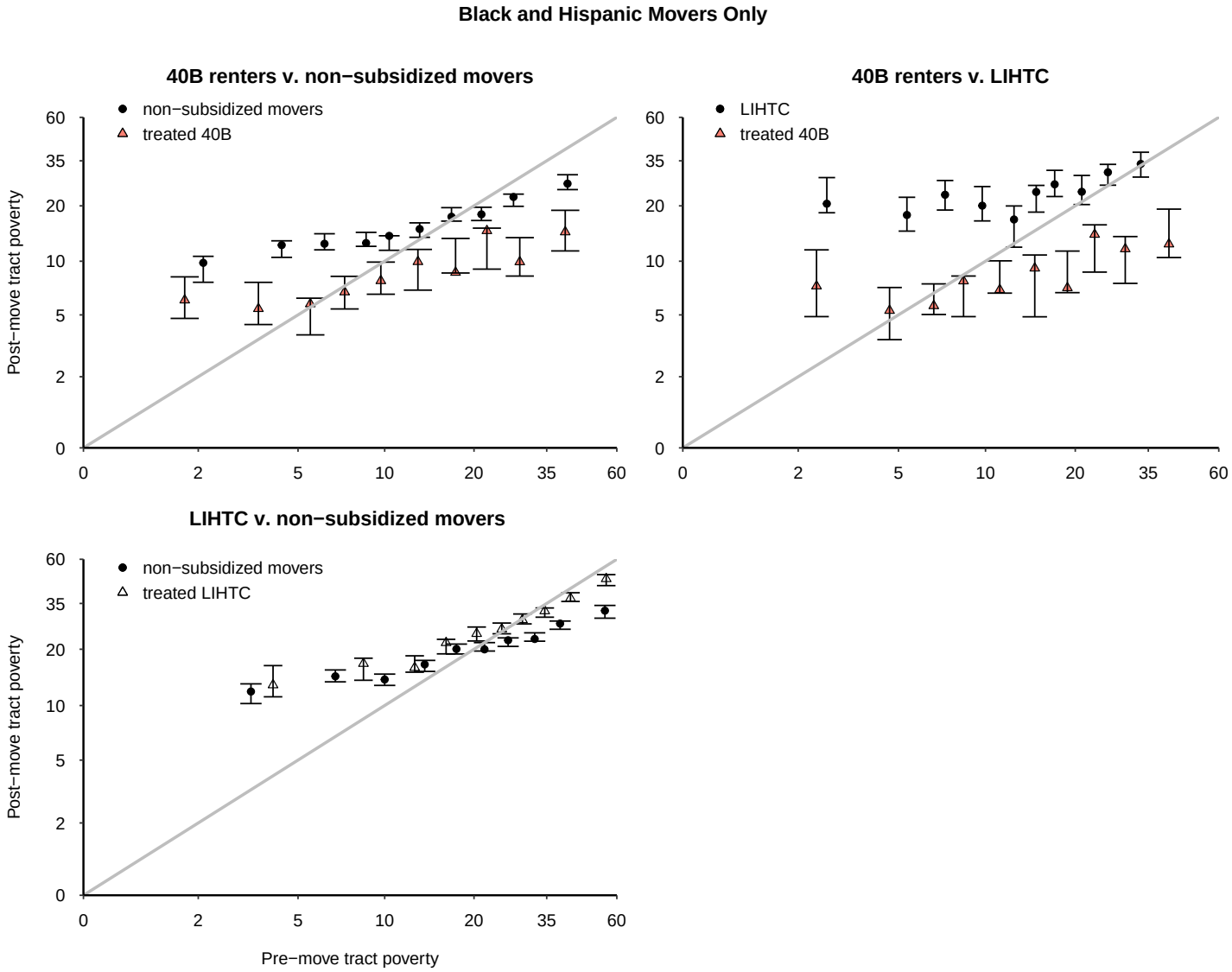
† Neighborhood-level poverty refers to the percent of residents living below the poverty line in the 2010 census, where neighborhoods are proxied by 2010 census tracts. The comparison of 40B owners v. non-subsidized movers is not included due to insufficient Black and Hispanic 40B owners for plotting.

Figure C.II: Pre- and post-move neighborhood-level poverty†, treated beneficiaries v. matched controls



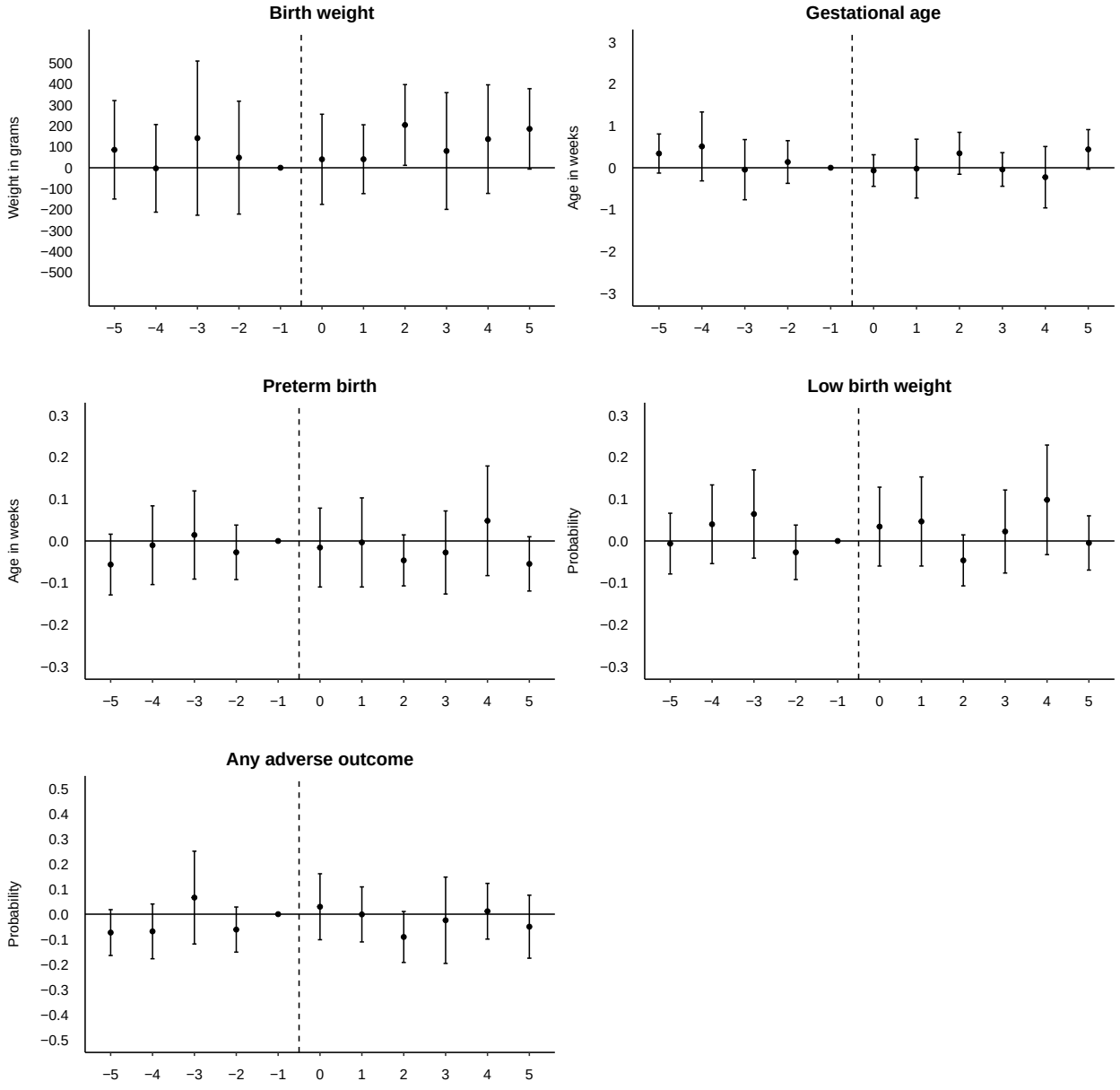
† Neighborhood-level poverty refers to the percent of residents living below the poverty line in the 2010 census, where neighborhoods are proxied by 2010 census tracts.

Figure C.III: Pre- and post-move neighborhood-level poverty†, treated beneficiaries v. matched controls



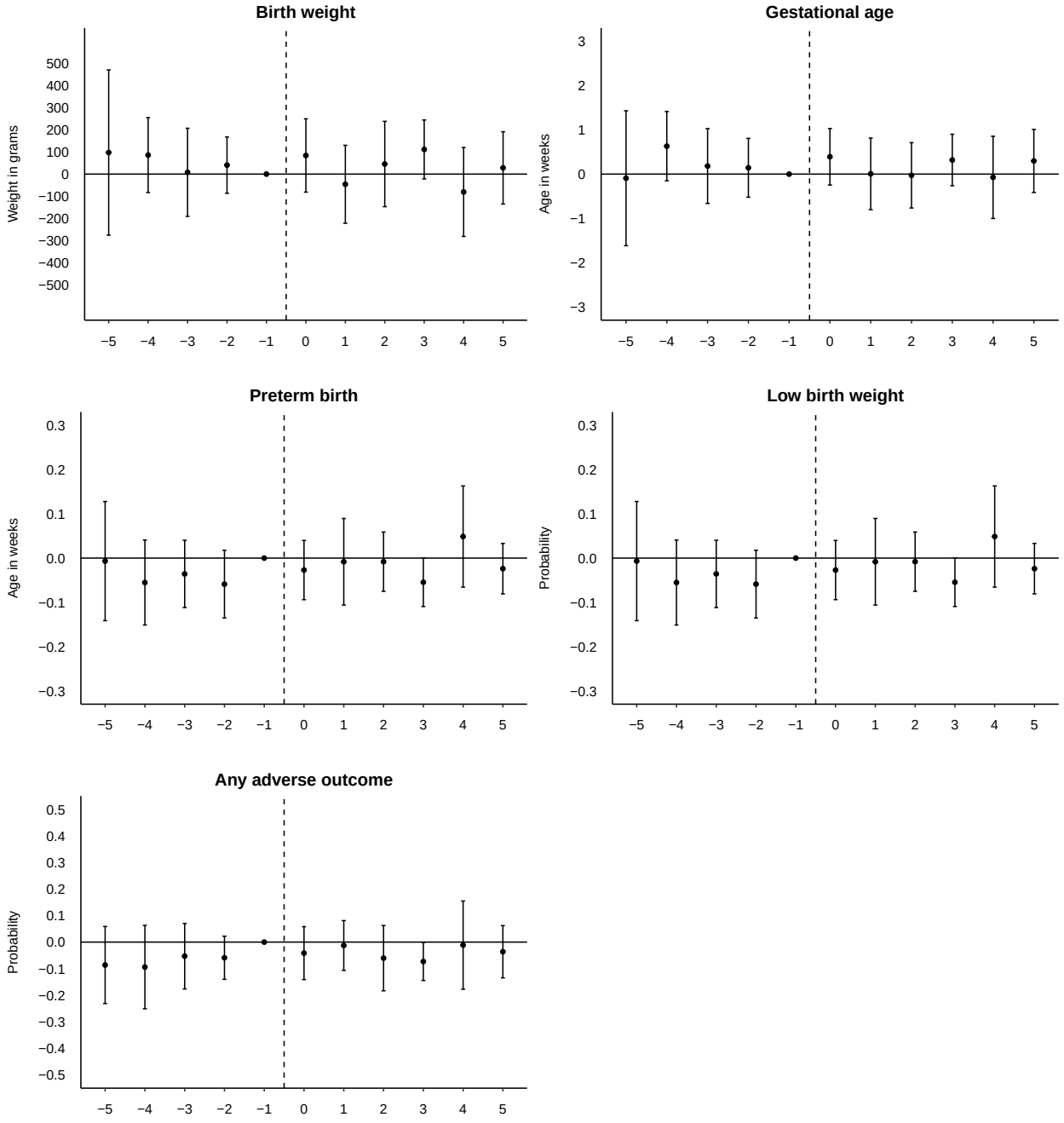
† Neighborhood-level poverty refers to the percent of residents living below the poverty line in the 2010 census, where neighborhoods are proxied by 2010 census tracts.

Figure D.I: Effects of moving to 40B housing on birth outcomes, 40B owners v. non-subsidized movers



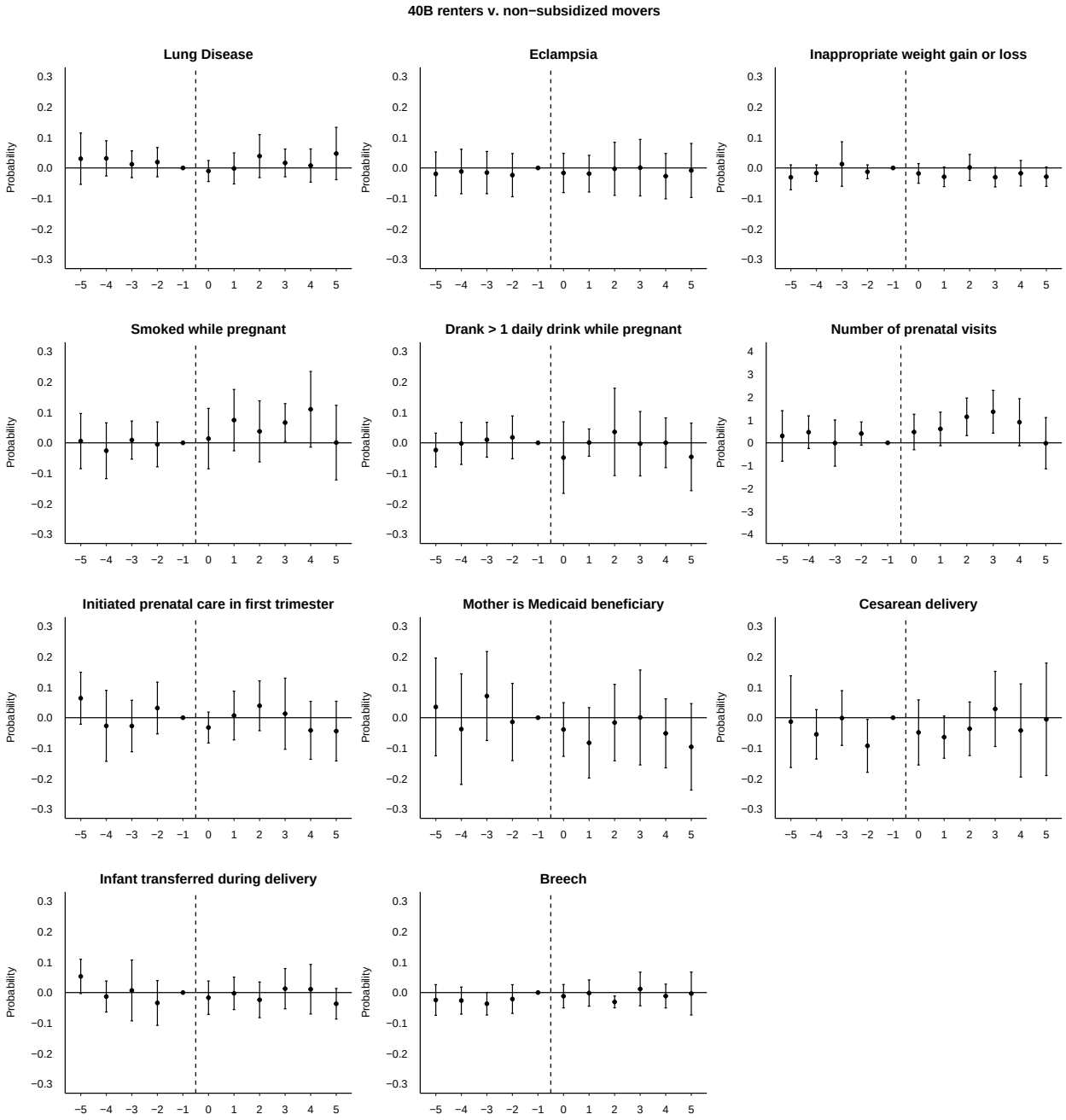
All models include covariates for the birthing parent's first birth, whether the birthing parent gave birth over the age of 35, and an indicator of multiple births.

Figure D.II: Effects of moving to 40B housing on birth outcomes, LIHTC beneficiaries v. non-subsidized movers



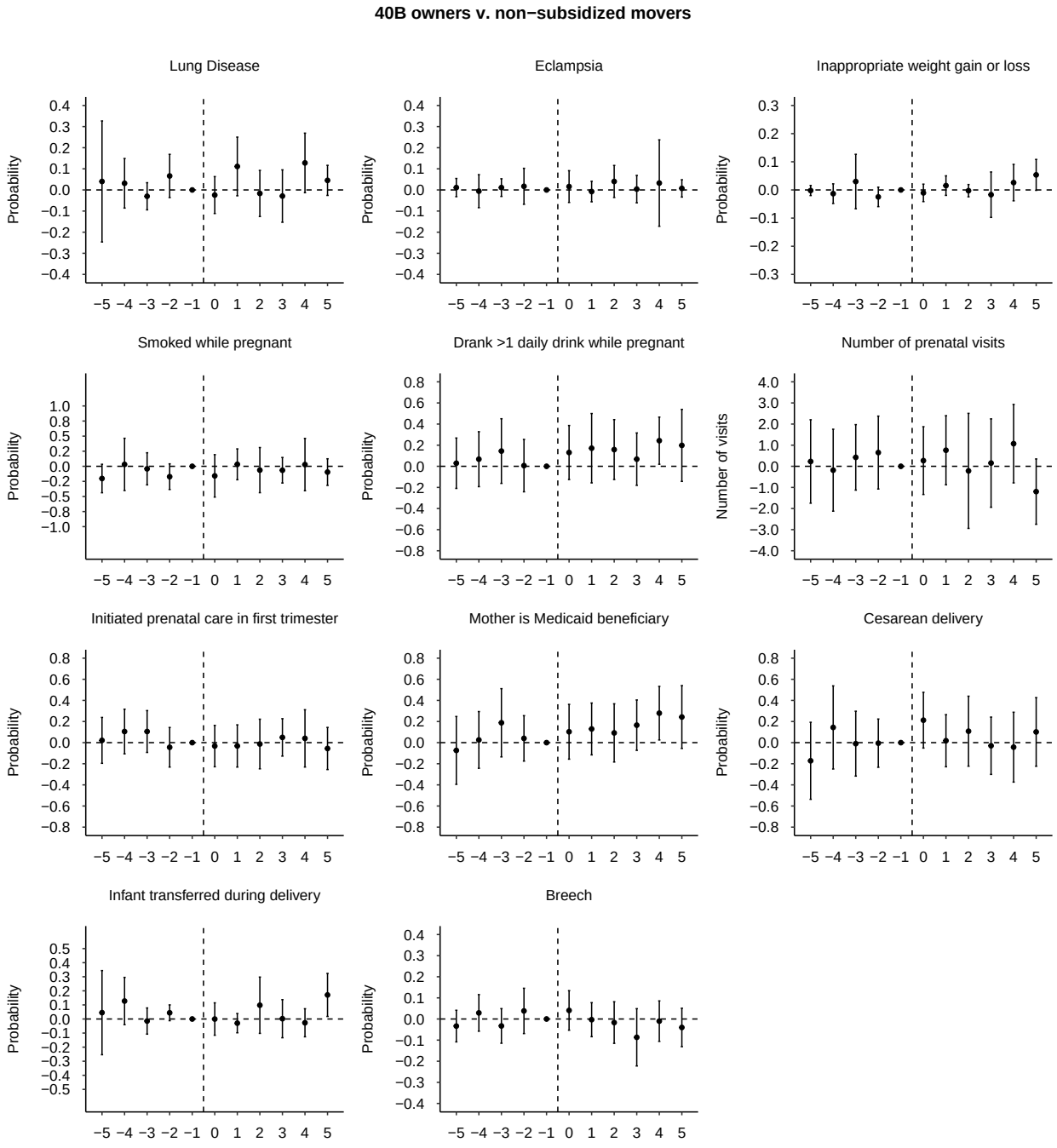
All models include covariates for the birthing parent's first birth, whether the birthing parent gave birth over the age of 35, and an indicator of multiple births.

Figure D.III: Effects of moving to 40B housing on birthing parents' health, 40B renters v. non-subsidized movers



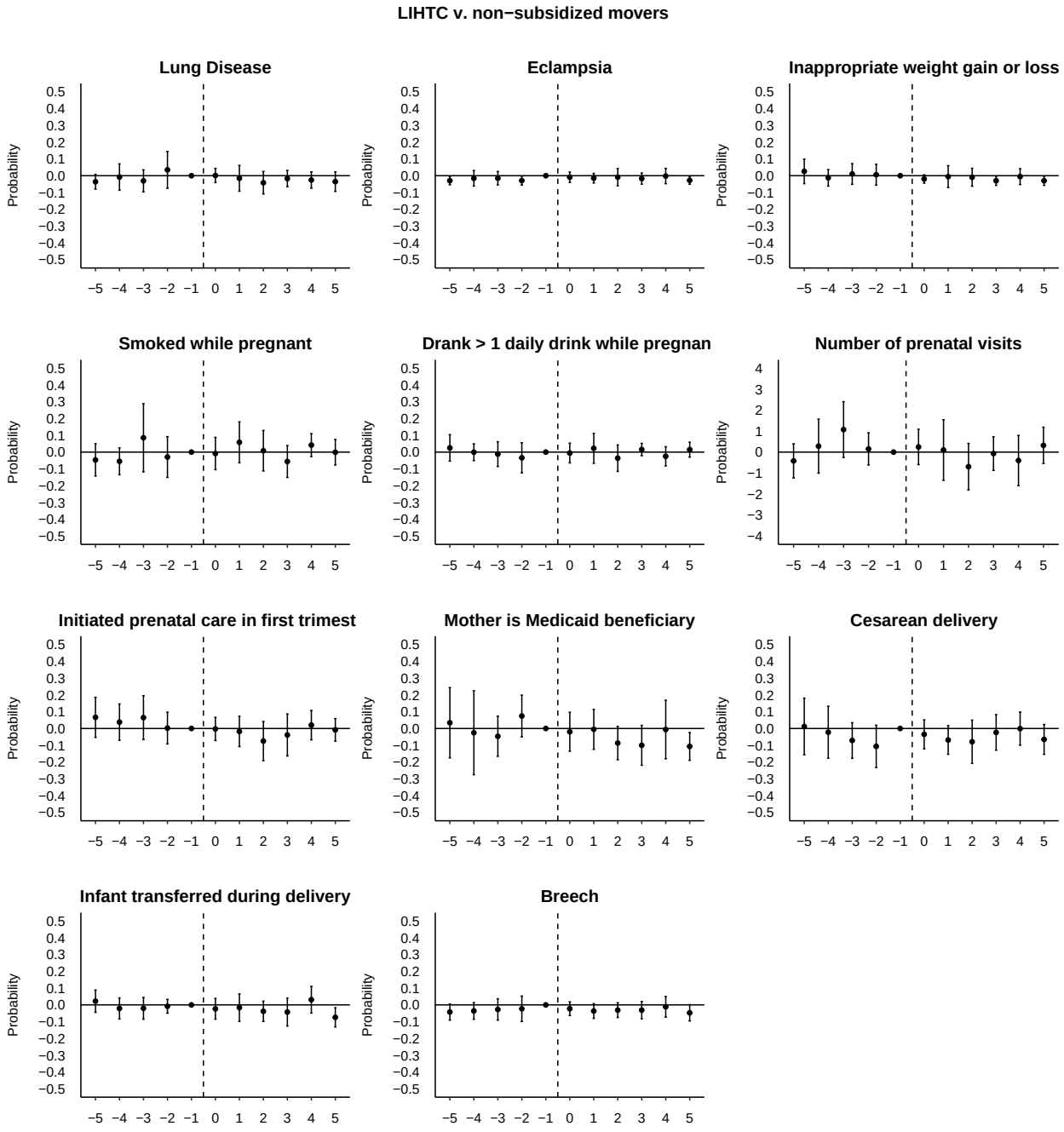
All models include covariates for the birthing parent's first birth, whether the birthing parent gave birth over the age of 35, and an indicator of multiple births.

Figure D.IV: Effects of moving to 40B housing on birthing parents' health, 40B owners v. non-subsidized movers



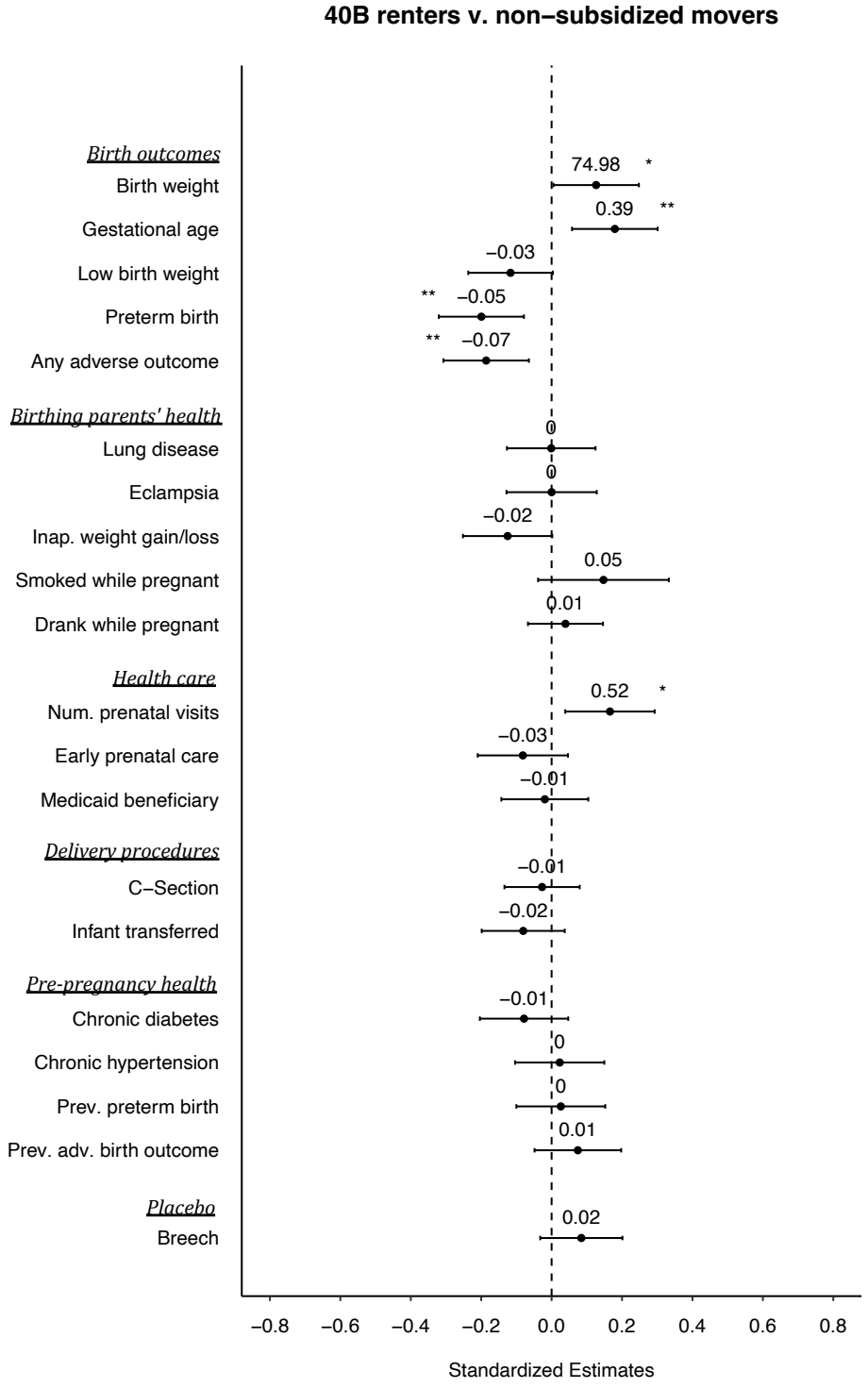
All models include covariates for the birthing parent's first birth, whether the birthing parent gave birth over the age of 35, and an indicator of multiple births.

Figure D.V: Effects of moving to 40B housing on birthing parents' health, LIHTC beneficiaries v. non-subsidized movers



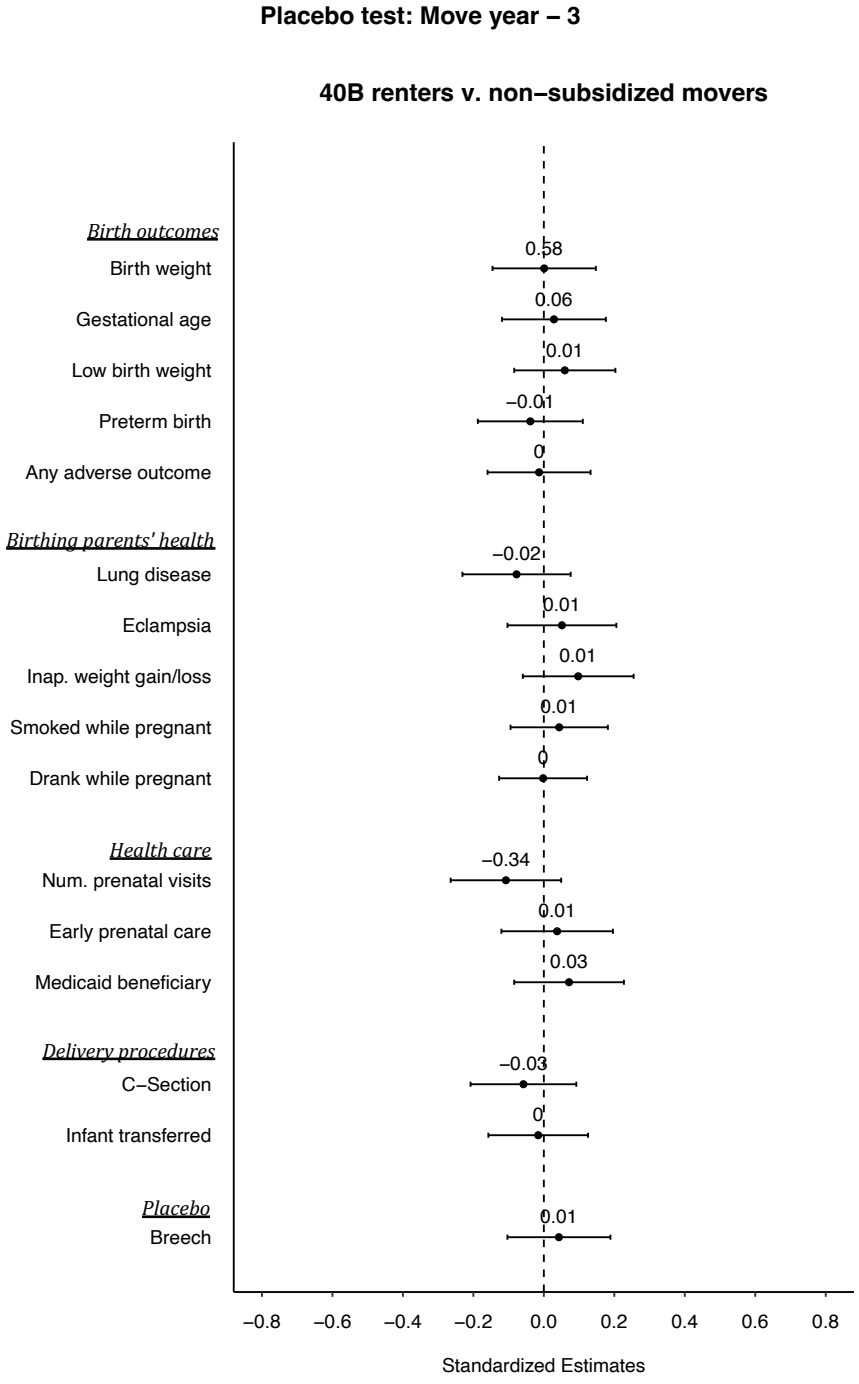
All models include covariates for the birthing parent's first birth, whether the birthing parent gave birth over the age of 35, and an indicator of multiple births.

Figure E.I: Pooled difference-in-difference estimates for samples constructed based on exact neighborhood of origin match, 40B renters v. non-subsidized movers



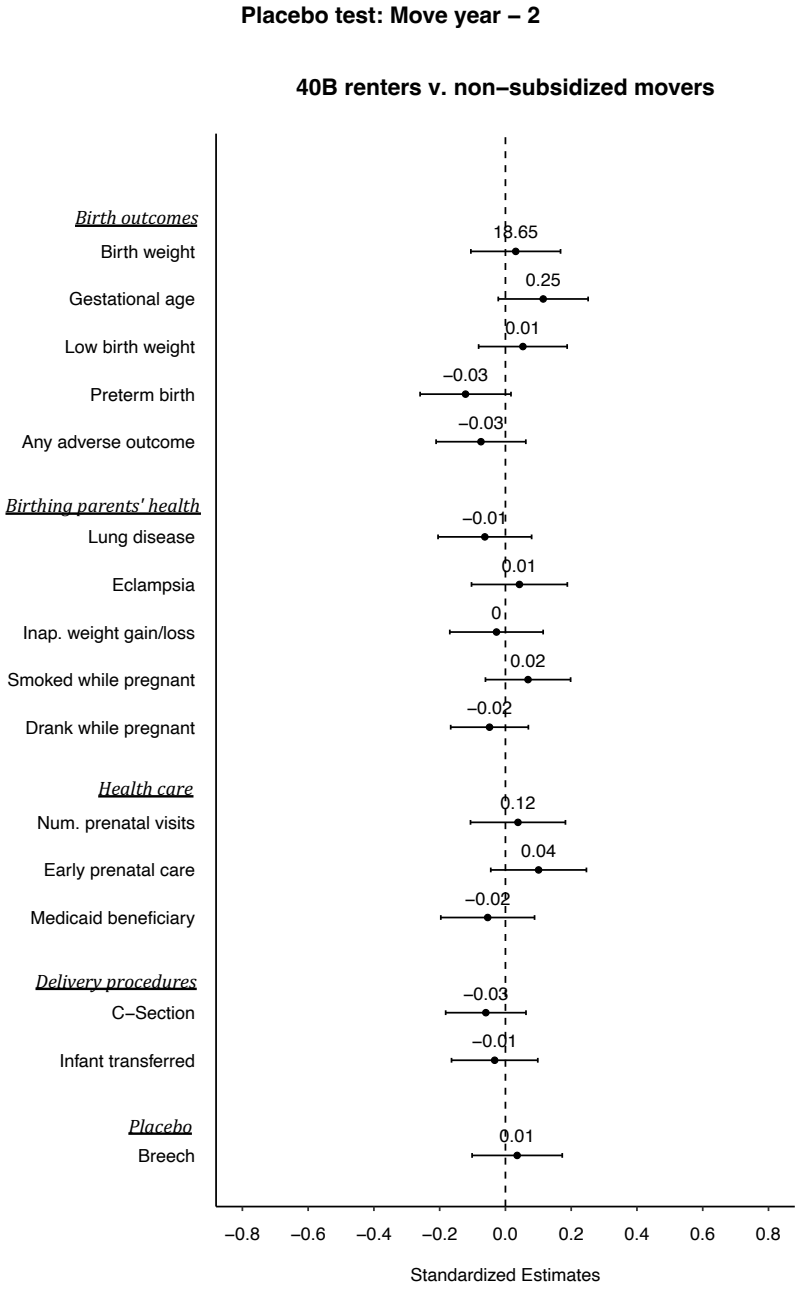
* p<0.05, ** p<0.01,*** p<0.001. All regressions include covariates for the birthing parent's first birth, whether the birthing parent gave birth over the age of 35, and an indicator of multiple births. Birth outcomes also include an indicator of previous adverse outcomes (e.g., previous preterm births). Cesarean deliveries and breech also include an indicator of a previous cesarean delivery.

Figure E.II: Placebo Test: Pooled difference-in-difference estimates based on treatment shifted three years prior to actual move, 40B renters v. non-subsidized movers



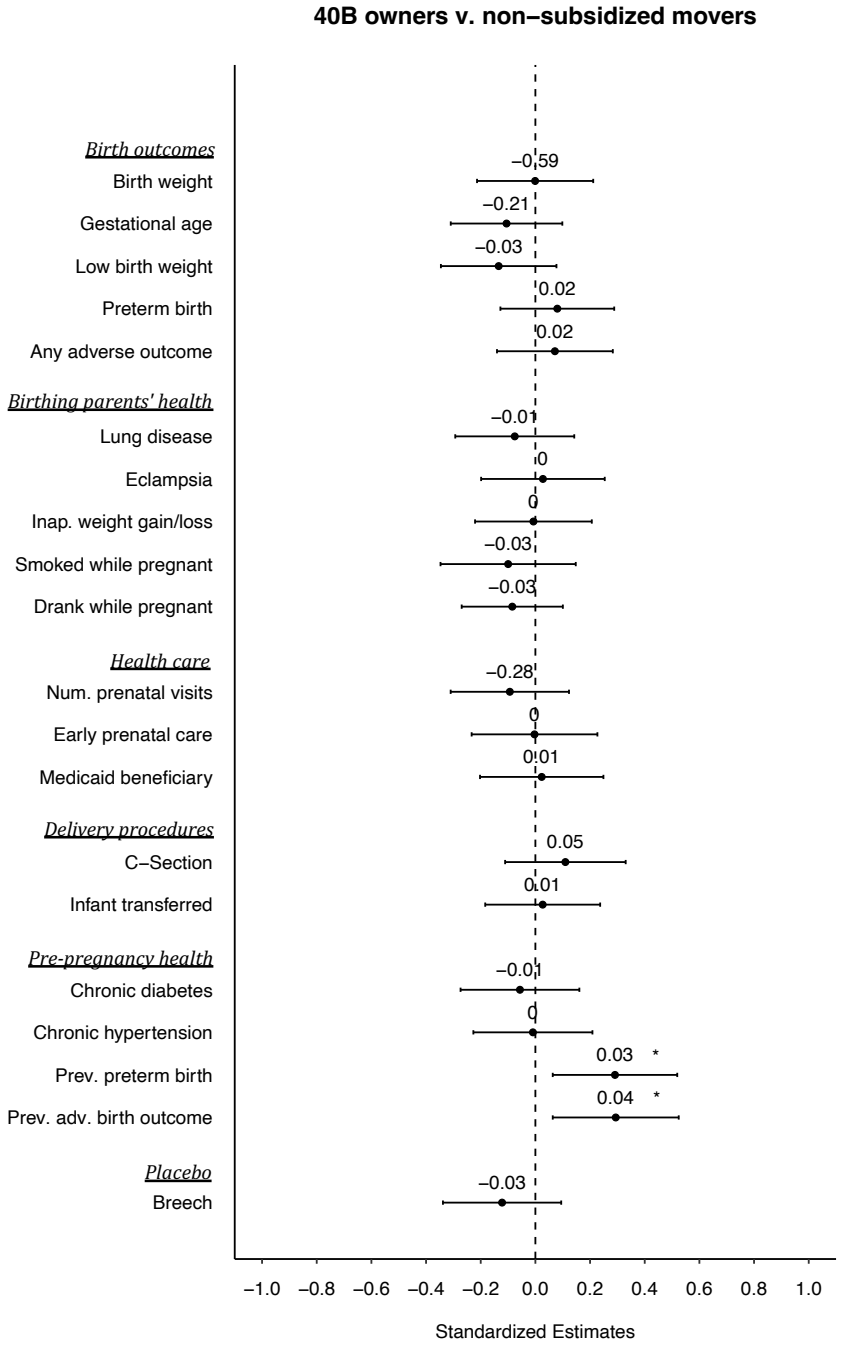
* p<0.05, ** p<0.01,*** p<0.001. All regressions include covariates for the birthing parent's first birth, whether the birthing parent gave birth over the age of 35, and an indicator of multiple births. Birth outcomes also include an indicator of previous adverse outcomes (e.g., previous preterm births). Cesarean deliveries and breech also include an indicator of a previous cesarean delivery.

Figure E.III: Placebo Test: Pooled difference-in-difference estimates based on treatment shifted two years prior to actual move, 40B renters v. non-subsidized movers



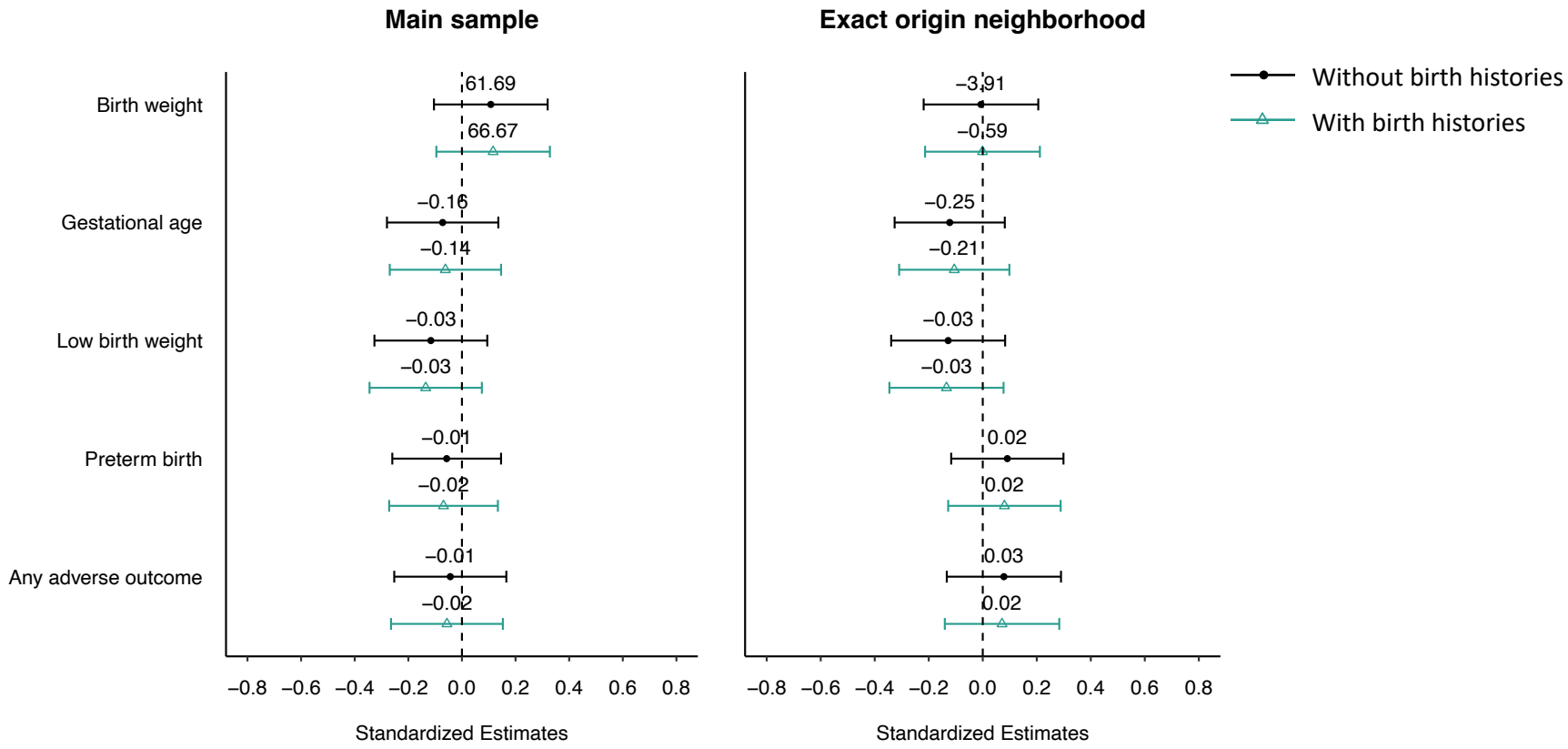
* p<0.05, ** p<0.01,*** p<0.001. All regressions include covariates for the birthing parent's first birth, whether the birthing parent gave birth over the age of 35, and an indicator of multiple births. Birth outcomes also include an indicator of previous adverse outcomes (e.g., previous preterm births). Cesarean deliveries and breech also include an indicator of a previous cesarean delivery.

Figure E.IV: Pooled difference-in-difference estimates for samples constructed based on exact neighborhood of origin match, 40B owners v. non-subsidized movers



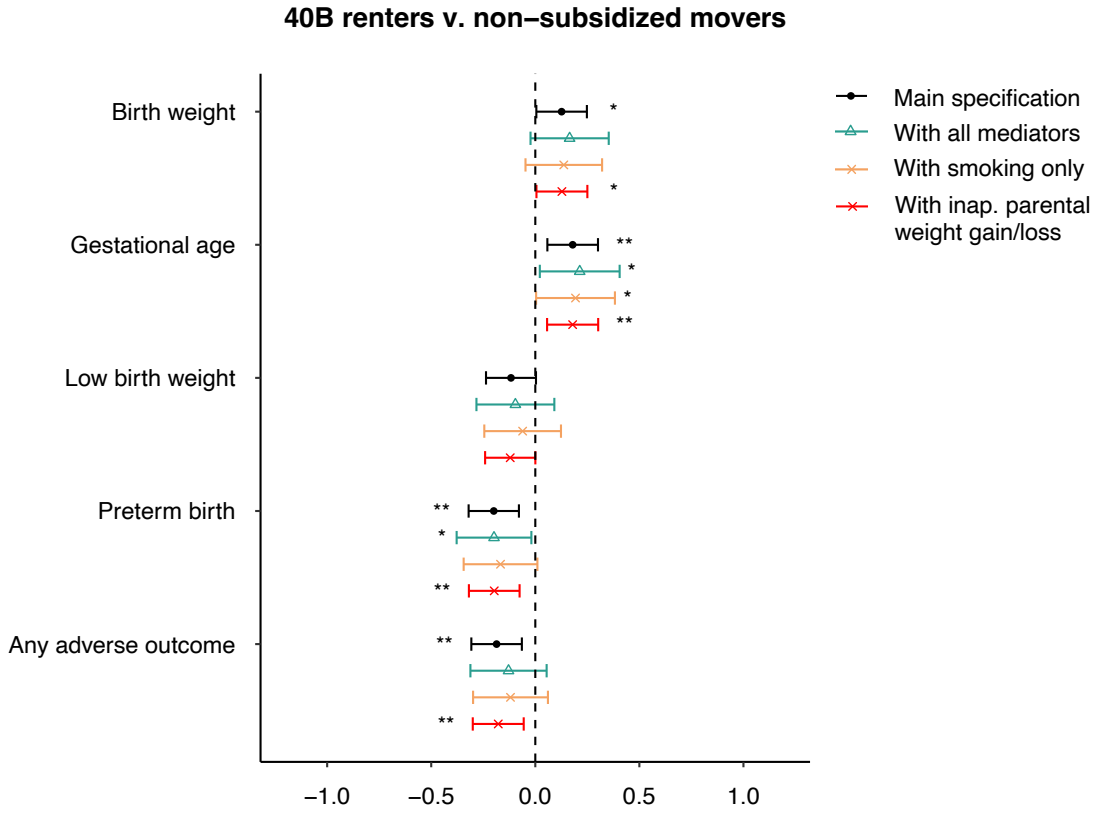
* p<0.05, ** p<0.01,*** p<0.001. All regressions include covariates for the birthing parent's first birth, whether the birthing parent gave birth over the age of 35, and an indicator of multiple births. Birth outcomes also include an indicator of previous adverse outcomes (e.g., previous preterm births). Cesarean deliveries and breech also include an indicator of a previous cesarean delivery.

Figure E.V: 40B owners v. non-subsidized movers, birth outcomes with and without covariates for preterm birth and previous adverse birth outcomes



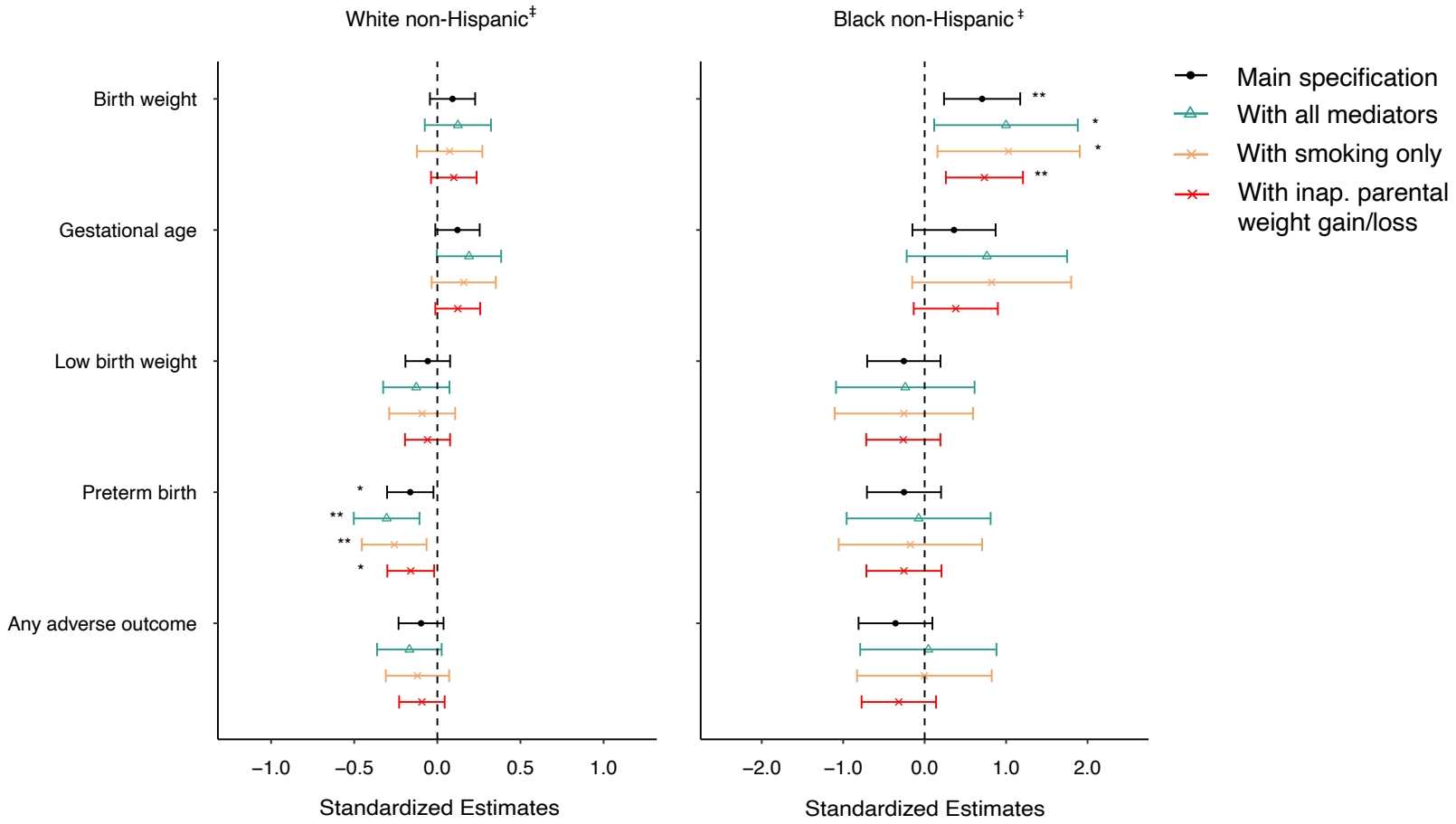
* p<0.05, ** p<0.01,*** p<0.001. Figure depicts the results of equation (2) for 40B owners. All models include covariates for the birthing parent's first birth, whether the birthing parent gave birth over the age of 35, and an indicator of multiple births. Models with birth histories also include covariates indicating whether the birthing parent had at least one previous preterm birth and whether the birthing parent had any previous adverse outcome.

Figure F.I: Potential parental health mechanisms for sample matched on exact origin neighborhood, 40B renters v. non-subsidized movers



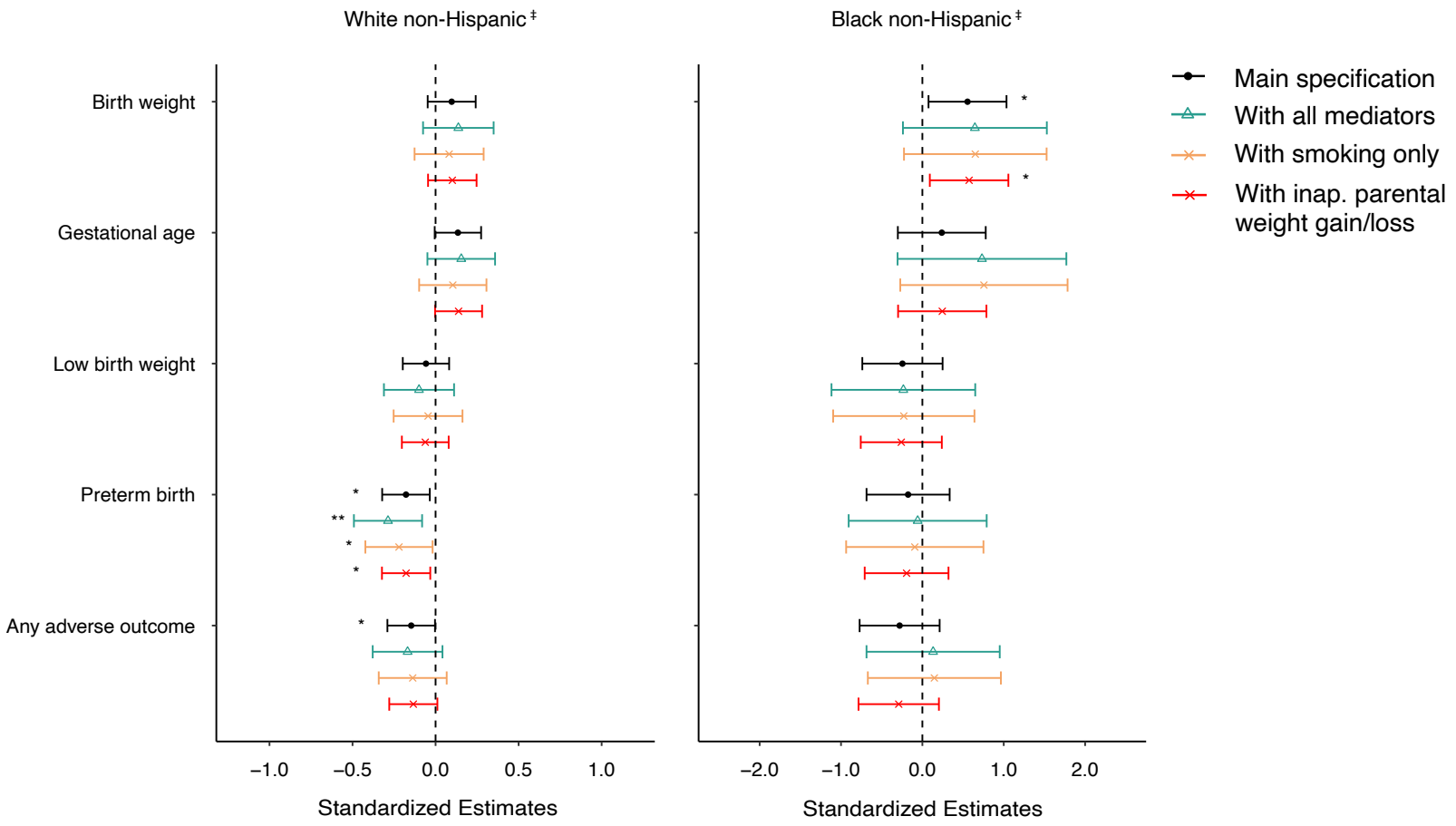
* p<0.05, ** p<0.01,*** p<0.001. Covariates included in main regressions are indicator for the birthing parent's first birth, an indicator of previous adverse outcomes (e.g., previous preterm births), an indicator of multiple births, and indicator for birthing parents over the age of 35. All mediators include: indicators of ever smoking while pregnant, drinking more than one daily drink while pregnant, and inappropriate weight gain or loss

Figure F.II: Potential parental health mechanisms by birthing parents' race ethnicity, 40B renters v. non-subsidized movers



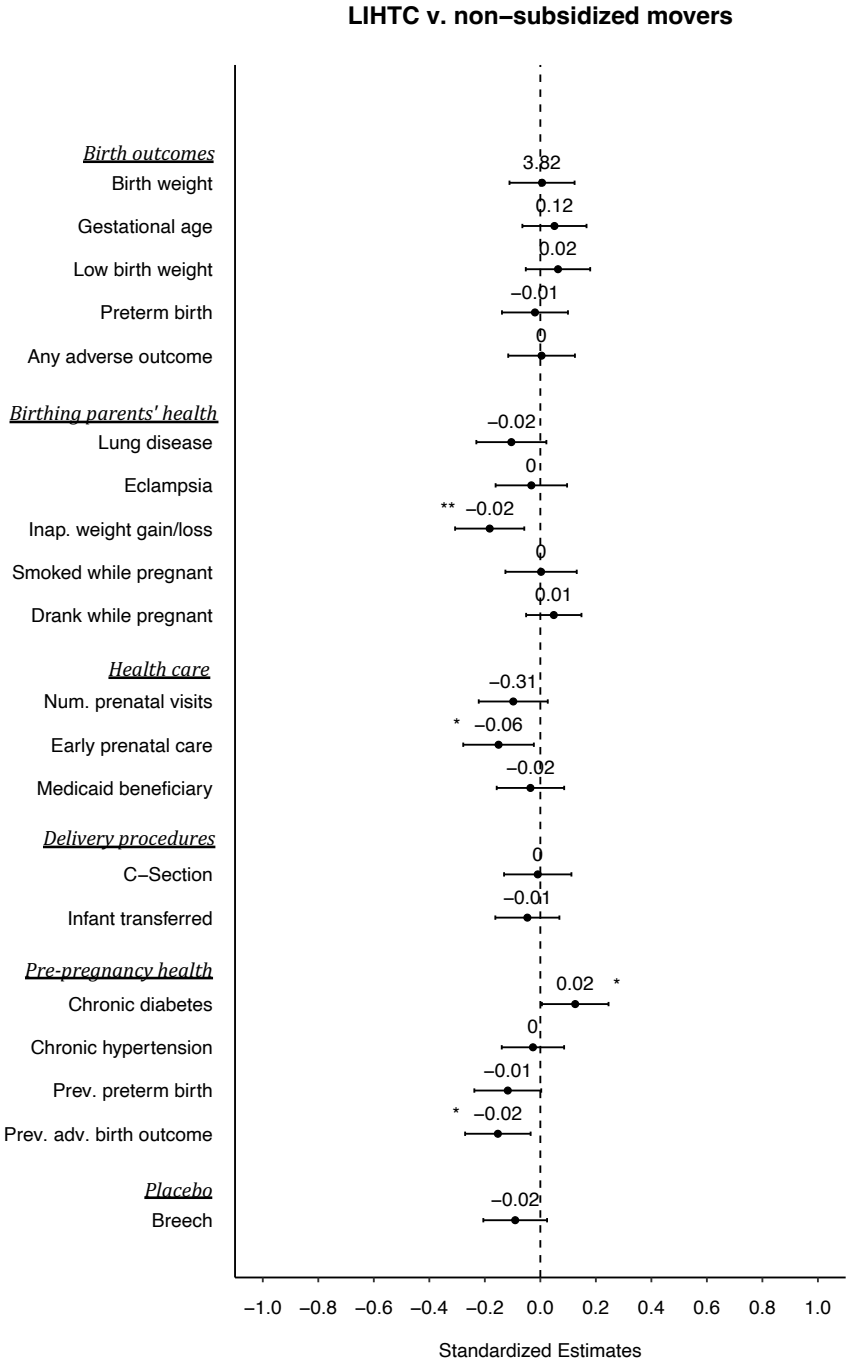
‡ Note different scales for left and right panels. * $p<0.05$, ** $p<0.01$,*** $p<0.001$. Covariates included in main regressions are indicator for the birthing parent's first birth, an indicator of previous adverse outcomes (e.g., previous preterm births), an indicator of multiple births, and indicator for birthing parents over the age of 35. All mediators include: indicators of ever smoking while pregnant, drinking more than one daily drink while pregnant, inappropriate weight gain or loss, and an indicator of being a Medicaid beneficiary.

Figure F.III: Potential parental health mechanisms by birthing parents' race ethnicity for sample matched on exact origin neighborhood, 40B renters v. non-subsidized movers



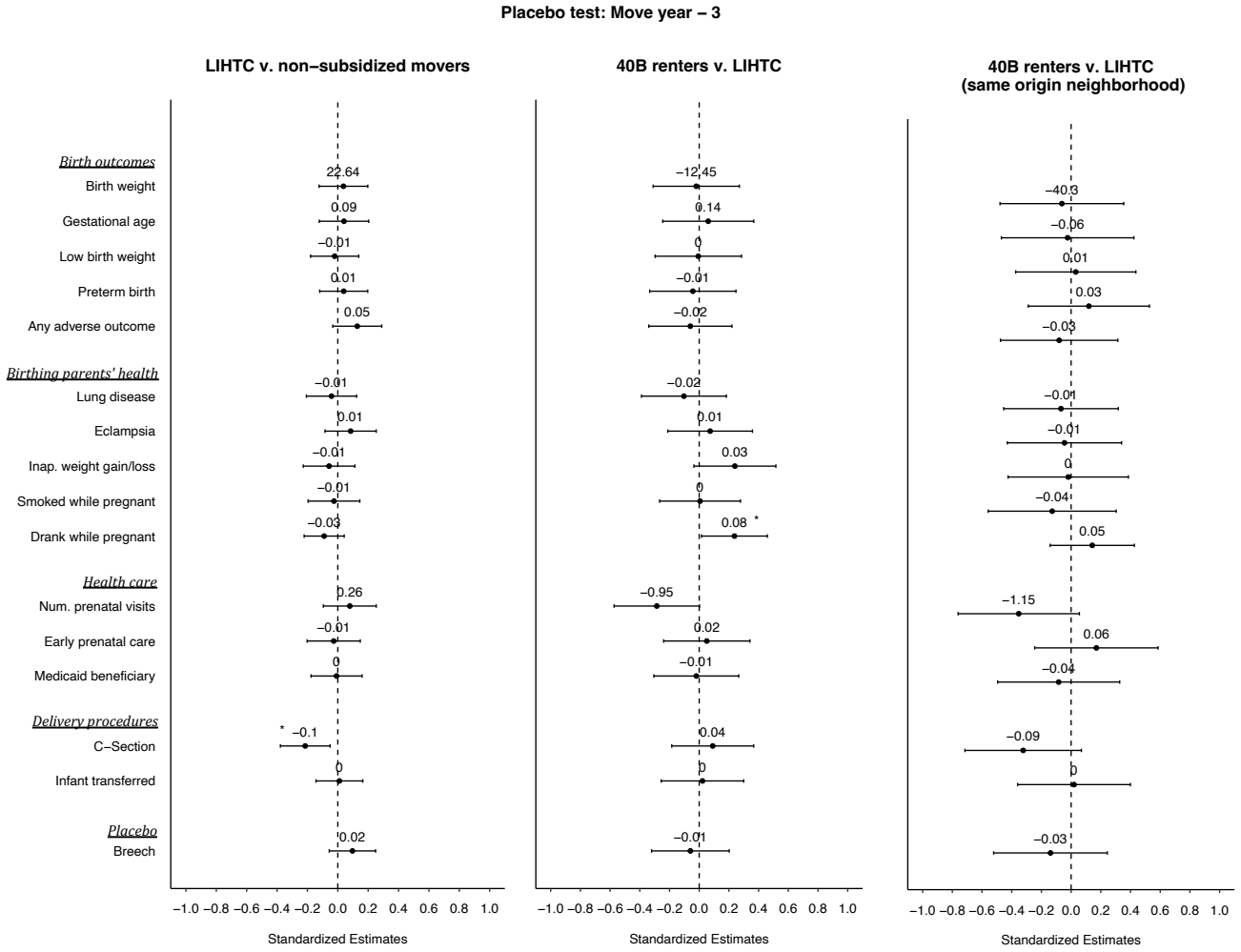
‡ Note different scales for left and right panels. * $p<0.05$, ** $p<0.01$,*** $p<0.001$. Covariates included in main regressions are indicator for the birthing parent's first birth, an indicator of previous adverse outcomes (e.g., previous preterm births), an indicator of multiple births, and indicator for birthing parents over the age of 35. All mediators include: indicators of ever smoking while pregnant, drinking more than one daily drink while pregnant, inappropriate weight gain or loss, and an indicator of being a Medicaid beneficiary.

Figure G.I: Pooled difference-in-difference estimates for samples constructed based on exact neighborhood of origin match



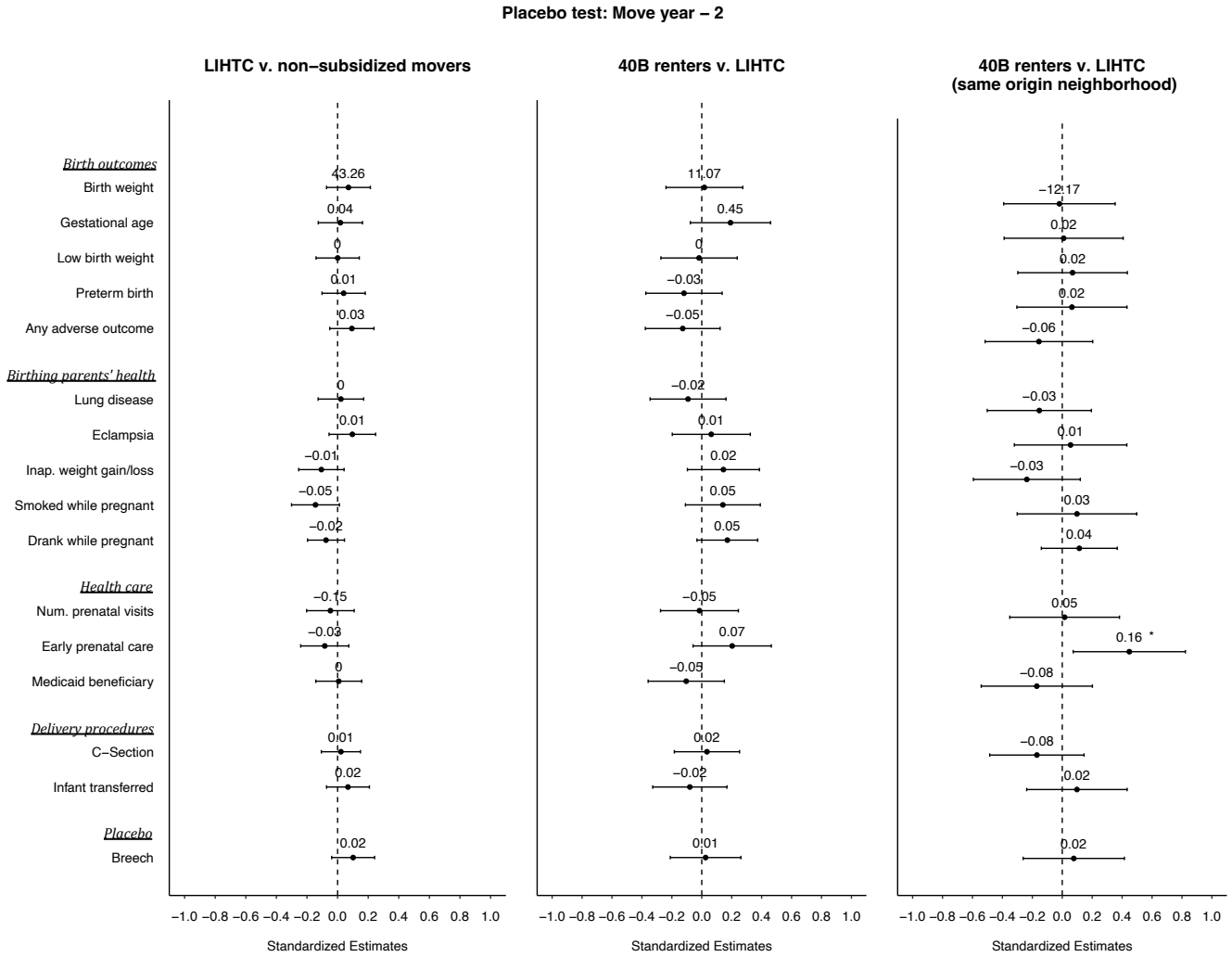
* p<0.05, ** p<0.01,*** p<0.001. All regressions include covariates for the birthing parent's first birth, whether the birthing parent gave birth over the age of 35, and an indicator of multiple births. Birth outcomes also include an indicator of previous adverse outcomes (e.g., previous preterm births). Cesarean deliveries and breech also include an indicator of a previous cesarean delivery.

Figure G.II: Placebo Test: Pooled difference-in-difference estimates based on treatment shifted three years prior to actual move



* p<0.05, ** p<0.01,*** p<0.001. All regressions include covariates for the birthing parent's first birth, whether the birthing parent gave birth over the age of 35, and an indicator of multiple births. Birth outcomes also include an indicator of previous adverse outcomes (e.g., previous preterm births). Cesarean deliveries and breech also include an indicator of a previous cesarean delivery.

Figure G.III: Placebo Test: Pooled difference-in-difference estimates based on treatment shifted two years prior to actual move



* p<0.05, ** p<0.01,*** p<0.001. All regressions include covariates for the birthing parent's first birth, whether the birthing parent gave birth over the age of 35, and an indicator of multiple births. Birth outcomes also include an indicator of previous adverse outcomes (e.g., previous preterm births). Cesarean deliveries and breech also include an indicator of a previous cesarean delivery.

Table H.I: Pre- and post-move neighborhood characteristics by race and ethnicity, 40B renters (treated beneficiaries only)

	White non-Hispanic		Black non-Hispanic		Hispanic		Asian non-Hispanic	
Neighborhood Characteristic	pre	post	pre	post	pre	post	pre	post
Demographic								
Median household income	$ 76,423	$ 83,457	$ 61,968	$ 76,430	$ 57,417	$ 71,766	$ 80,100	$ 91,986
Below poverty (pp)	9.0	7.3	14.1	9.9	17.3	11.1	10.0	7.3
White non-Hispanic (pp)	83.8	87	66.1	81.5	67.3	77.8	77.5	81.5
Black non-Hispanic (pp)	4.6	3.0	17.8	6.6	8.3	4.8	5.4	3.1
≥ College degree (pp)	40.7	43.1	33.2	42.6	29	36.7	51.4	53.8
Population density	6,027	3,382	8,369	5,363	9,966	6,528	7,392	4,320
Social mobility								
Incarceration rate	0.005	0.004	0.009	0.005	0.01	0.007	0.005	0.003
Incarceration rate, male only	0.01	0.007	0.018	0.008	0.019	0.013	0.009	0.006
Adult outcomes for children who grew in tract								
Median household income	$ 54,544	$ 57,772	$ 47,334	$ 55,644	$ 45,577	$ 52,440	$ 56,629	$ 60,873
Median household income, Black children	$ 34,541	$ 35,955	$ 33,630	$ 37,045	$ 32,881	$ 33,074	$ 37,543	$ 36,382
Median household income, low-income Black children	$ 30,179	$ 29,351	$ 28,848	$ 30,205	$ 29,350	$ 30,933	$ 32,734	$ 30,799
Economic								
Wage growth for high school graduates	0.031	0.036	0.08	0.018	0.056	0.013	0.099	-0.045
Job density	3,517	2,066	2,441	2,398	4,011	2,660	5,556	2,545
Tot. jobs within 5 miles	138,546	88,854	193,004	140,978	149,865	141,756	217,254	135,296
High paying jobs within 5 miles	84,669	52,744	120,330	87,281	91,165	87,022	137,425	83,514
Mean commute time (min)	29.0	29.4	29.3	28.8	27.4	28.3	28.8	29.3
Social capital								
Census mail return rate	79.6	81.2	75.0	80.0	74.1	77.7	79.1	81.0
Pollution								
Sulfur dioxide (SO_2)	2.92	2.42	2.81	2.26	3.01	2.55	2.80	2.37
Carbon monoxide (CO)	0.36	0.32	0.38	0.32	0.40	0.35	0.37	0.33
Ozone (O_3)	44.13	43.46	43.53	43.02	42.67	42.61	43.73	43.35
Nitrogen dioxide (NO_2)	10.45	8.78	11.73	9.48	11.78	10.41	11.50	9.56
PM_{10}	15.81	14.56	16.75	15.05	16.61	15.49	16.37	15.10
$PM_{2.5}$	9.20	8.57	9.23	8.59	9.11	8.80	9.26	8.74
Ultrafine particulate matter	7,383	6,919	9,077	7,831	9,164	8,198	8,685	7,595
Number of observations	6,343	5,502	702	572	1,123	994	701	707

Table refers only to the sample of treated 40B renters. Race and ethnicity are self-reported and drawn from birth certificate data. Incarceration is defined as residing in a federal detention center, federal prison, state prison, local jail, residential correctional facility, military jail, or juvenile correctional facility. Low-income children refer to the fraction of children with parents who have incomes in the bottom quartile of the national income distribution relative to parents who have children in the same birth cohort (Chetty et al., 2018). All outcomes except for those pertaining to racial demographics, education, and population density are logged for regressions before being converted back to their original scale. Median household income, the percent of residents below poverty, and the percent of residents with at least a college degree are drawn from the 2010 census. Mean commute time is measured in minutes and was drawn from the 2000 census. All pollution data are drawn from estimates developed by the Center for Air, Climate and Energy Solutions (CACES) using the models as described in Kim et al. (2020) and Saha et al. (2021). Ozone, sulfur dioxide, and nitrogen dioxide are measured in parts per billion (ppb); carbon monoxide is measured in parts per million (ppm); $PM_{2.5}$ and PM_{10} are measured in $\mu g/m^3$; and ultrafine particulate matter is measured based on population-weighted particle number concentrations (particle number/cm^3). All other variables are drawn from Opportunity Insights and the Opportunity Atlas (Chetty et al., 2018).