The Race to Displace: The Long-Run Causal Effect of the 1996 Olympic Legacy Program on Residential Locations in Atlanta, GA

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Abstract

In this paper, I estimate the long-run causal effect of the Olympic Legacy Program, an initiative staged by the city of Atlanta to use public and private funding to demolish and revitalize several public housing projects in the lead up to the 1996 Olympics. This initiative marked the first mixed-finance public housing development created under HOPE VI, a federal program launched in 1992 to redevelop the worst public housing projects in the United States. Residents of the demolished public housing units were guaranteed Section 8 Housing Vouchers to relocate. Using a unique longitudinal dataset from Infutor, I follow the residential locations of these households from 1985-2005. My research design compares a treatment group of individuals living in housing projects demolished leading up to the 1996 Olympics to a control group living in unaffected housing projects. I find that 10 years after the demolitions began, individuals in the treatment group on average live 6 miles further from their 1990 address and in neighborhoods that have poverty rates that are 6 percentage points lower, both relative to the control group. However, most of these individuals continue to live very high poverty neighborhoods, suggesting that the provision of Section 8 Housing Vouchers is not enough to encourage households to "move to opportunity." I compare my estimates with those from prior work on public housing demolitions in Chicago and the landmark Moving to Opportunity Experiment. I discuss how these results support two distinct sets of existing literature: (1) research on effects of place-based policies on incumbent residents and (2) research on the impact of mega-events on residents of host cities.

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1 Introduction

In 1936, Atlanta's Techwood Homes opened as the first public housing development in the United States, replacing a mostly Black-occupied slum with an all-white project. Five years later, the Atlanta Housing Authority, a government agency that operates and manages public housing in the city, constructed a second project adjacent to Techwood Homes that was named Clark Howell Homes. The two projects were close enough that most outsiders considered them as a single complex called Techwood-Clark Howell. During the decades following the opening of Techwood and Clark Howell Homes, many changes took place in the City of Atlanta as well as its public housing population. By the 1970s, the city of Atlanta became known for its dangerous public housing communities, and these projects were no different. With high rates of crime, the influx of drugs, and severe signs of physical deterioration found in most of the city's public housing units, the late 20th century called for a new approach.

In the early 1990s, a near-perfect storm appeared to promote the revitalization of Atlanta's public housing stock. On September 18, 1990, the city of Atlanta was chosen as the site for the 1996 Summer Olympics. Two years later, the United States government passed HOPE VI, a program intended to revitalize the nation's worst public housing projects. With the crime-ridden Techwood Homes and Clark Howell Homes being the public housing projects located closest to the proposed Olympic Village, these projects were quickly singled out as the city of Atlanta looked to revitalize this neighborhood before it was put on the world stage. Soon after, the city applied for HOPE VI funding to demolish and revitalize the neighborhood containing Techwood and Clark Howell. In 1993, the city received notice of the acceptance of its HOPE VI application, and demolition of the projects was set to ensue. The people who lived in the Techwood and Clark Howell Homes at the time were forced to relocate. To compensate these individuals, Section 8 housing vouchers were provided to pay part of their rent in private rental units meeting certain Section 8 program requirements.

This left a unique situation at play. On the one hand, these people were forced to leave Techwood and Clark Howell Homes, disrupting the lives of a severely at-risk population. On the other hand, by 1990, these buildings were dilapidated and crime-ridden, and in general were not safe to live in (Newman 2002). Further, concentrated poverty such as that created by public housing projects is now thought to lead to especially adverse outcomes. In the case of the Olympic Legacy Program, affected families were guaranteed Section 8

housing vouchers to relocate, if they chose to remain in the public housing system (Keating 2000). One can imagine that the provision of Section 8 vouchers may have greatly benefited these individuals, relative to the counterfactual scenario of staying in these buildings. Whether the combined demolition of the buildings and provision of Section 8 vouchers was beneficial or harmful to these individuals in the long-run is ultimately an empirical question.

This paper seeks to add to our limited knowledge of the effects of demolition and displacement on residents, using the 1996 Summer Olympic Games as the catalyst for a quasi-experiment. Using a unique longitudinal dataset from Infutor, I study housing relocation decisions resulting from the Olympic Legacy Program, an initiative staged by the city of Atlanta to use HOPE VI funds in order to demolish and revitalize several public housing projects in the lead up to the 1996 Olympics. My empirical strategy for estimating the causal impacts of the program is based on the impact of the 1996 Olympics, which led to some housing projects being demolished earlier primarily due to their location relative to the main sites for the Olympic Games. I use a difference-in-differences research design to follow a treatment group (households who lived in the two public housing projects, Techwood Homes and Clark Howell Homes, that were demolished and revitalized starting in 1995) and a control group (households who lived in three housing projects that were not demolished revitalized until 2005) from 1985 through 2005. This paper contributes to the existing literature by considering the neighborhood quality of these families throughout the relevant time period. I measure neighborhood quality by linking the addresses from Infutor with the Opportunity Atlas, a publicly available dataset of children's outcomes in adulthood by Census tract across the United States.

My main results show that the demolition of Techwood-Clark Howell and associated mixed-income redevelopment caused former residents to relocate further from their origin site several years after demolition, relative to the control group. Using a reference year of 1990, individuals in the treatment group are living on average 6 miles further from their 1990 address compared to individuals in the control group, as measured 10 years after the Olympics demolitions. I also find that individuals in the treatment group are reported as living in neighborhoods that have a poverty rate that is 6 percentage points less than that of the control group 10 years after the Olympics demolitions, a statistically significant decrease. These results reflect the causal effect of moving from a high-poverty public housing project.

Over the past few decades, there has been a significant shift in public attention focusing on the eradication of high-poverty neighborhoods across the United States. Motivated by greater public interest in the effects of moving from high-poverty to low-poverty neighborhoods, the Moving to Opportunity (MTO) experiment of the U.S. Department of Housing and Urban Development offered a randomly selected subset of families living in high-poverty housing projects subsidized housing vouchers to move to lower-poverty neighborhoods in the mid-1990s. Families were randomly assigned to one of three groups: an experimental voucher group that was offered a subsidized housing voucher that came with a requirement to move to a Census tract with a poverty rate below 10%, a Section 8 voucher group that was offered a standard subsidized housing voucher with no additional contingencies, and a control group that was not offered a voucher (but retained access to public housing). A key finding of this paper was that children whose families took up the experimental voucher lived in Census tracts with 22 percentage point lower poverty rates than those in the control group on average until age 18. Those who were assigned to the Section 8 voucher group went on to live in Census tracts with 12 percentage point lower poverty rates than the control group (Chetty et. al 2015).

According to the U.S. Department of Housing and Urban Development, Section 8 housing vouchers are "the federal government's major program for assisting very low-income families, the elderly, and the disabled to afford decent, safe, and sanitary housing in the private market" (U.S. Department of Housing and Urban Development). While Section 8 housing vouchers give families a large degree of freedom in choosing a site to apply their vouchers, prior research has shown that individuals do not always optimize for high-economic opportunity neighborhoods when choosing a residential location (Chetty et. al 2015). In Bergman et. al (2020), researchers found evidence that suggests that there are significant barriers to mobility that prevent low-income families with vouchers from moving to higher-opportunity areas that they actually prefer ex-post. These barriers can take many forms such as a lack of information, frictions in the search process (e.g., a lack of credit or liquidity), or a reluctance among landlords to rent to them. While some families will move to high-opportunity neighborhoods if offered Section 8 vouchers, the work done in these studies suggests that not every family will "move to opportunity" if they solely receive Section 8 vouchers. Given that Section 8 vouchers were the primary means of housing assistance granted to affected individuals of the Olympic Legacy Program, this paper aims to study the extent to which individuals move to high opportunity neighborhoods

as a result of public housing demolition and mixed-income redevelopment.

This paper also adds to existing literature on the U.S. Department of Housing and Urban Development's (HUD's) HOPE VI program. The Olympic Legacy Program was the first initiative across the United States to receive funding through HOPE VI. This program focused on the demolition of public housing projects paired with support for existing residents to find alternative housing. Motivated by the principles of New Urbanism, HOPE VI was launched in 1992 as a way to revitalize the worst public housing projects in the United States into mixed-income developments. It required public housing authorities nationwide to apply for a limited set of grants, and grants were allocated to the highest priority projects. As of June 1, 2010, there have been 254 HOPE VI Revitalization grants awarded to 132 housing authorities since 1993 – totaling more than $6.1 billion (U.S. Department of Housing and Urban Development).

The results in this paper add to the limited research studying the causal effects of place-based policies on preexisting residents. Public housing redevelopment efforts via the HOPE VI program have improved the trajectories of high-poverty and racially segregated neighborhoods—but possibly by displacing poorer and non-white residents (Tach and Emory 2017). Given that the low-income residents of these areas are often the intended beneficiaries of such policies, it begs the question of whether or not these place-based policies improve prior residents' outcomes or simply displace them to different low-income neighborhoods (Chyn and Katz 2021).

Until very recently, it was very difficult to study the effects of place-based policies on preexisting residents. However, newly available longitudinal administrative data sets has allowed this to be studied (Chyn and Katz 2021). Using data from the HOPE VI Panel Study and the HOPE VI Tracking Study, two studies focused on HOPE VI relocations commissioned by Congress and conducted by the Urban Institute, Popkin et al. (2009) conclude that for the most part results show significant improvements in the quality of life of relocated residents. Most displaced households end up living in neighborhoods that are safer and have lower-poverty levels than public housing. Chyn (2016) studies the effects of moving out of disadvantaged neighborhoods on the long-run outcomes of children. Using building records from the Chicago Housing Authority and social assistance case files from the Illinois Department of Human Services, Chyn is able to create a sample of children who lived in public housing and were affected by demolition during the 1990s. By tracking these

former residents of demolished apartments in Chicago, he is able to find that displaced children were more likely to live in low poverty neighborhoods compared to the control group. Additionally, Haltiwanger et. al (2020) presents more recent evidence exploring the demolition of 160 nationwide public housing projects under HOPE VI. This paper shows that households affected by HOPE VI demolitions led to a 15 to 18 percentage point reduction in the probability that the household head lives in the same housing project five years after the demolition (Haltiwanger et. al 2020). This paper studies similar questions and compares results to these studies.

Another area of research that this paper explores is the impact of mega-events on host cities. When cities prepare to host large-scale events such as major sporting, cultural or political gatherings, many people may find themselves displaced, sometimes forcibly, while others are disproportionately affected by rising housing prices. Marginalized communities are often discriminated against as a city undergoes the significant redevelopment considered necessary in order to put it "on the world map" (COHRE 2006). Often, these harms are presented as necessary outcomes or downplayed as marginal compared to the benefits brought by mega-events. To the best of my knowledge, this paper provides the first causal estimates of the impacts of sports-induced housing displacement on affected individuals. Therefore, the results discussed in this paper are deeply important for multiple reasons.

First, housing such mega-events relies on massive investments by their host cities, and there are often concerns that the return on these investments is not being equitably distributed amongst society. In the last two decades, the Olympics have become not just a sporting event but a vehicle for urban renewal, with cities pouring hundreds of millions — if not billions — of dollars into infrastructure and other projects that are intended to leave a positive, long-term legacy. The total cost of the 1996 Summer Olympics was estimated to be around US $1.7 billion, and the average cost for the Summer Games since 1960 is $5.2 billion (Engle 1999). In Atlanta, Rio de Janeiro, and elsewhere, politicians have pitched these investments as a way to improve the city as a whole, for the benefit of everyone. However, this is hardly ever the case. Oftentimes, the Olympics have led to the increased marginalization (and even criminalization) of homeless people. In the lead-up to the Atlanta Olympics, over 9,000 arrest citations were issued to homeless persons, mostly African-Americans. The Olympic Games can also bring a significant flow of investment, creating opportunities for new housing

and other general infrastructure projects which are unrelated to the construction of Olympic infrastructure. As was the case in Atlanta, these new investments have the potential to negatively affect the current housing situation of the local population, in particular the already disadvantaged and marginalized (Vale et. al 2013). Gentrification is one of the most commonly seen effects of the construction of Olympics-led infrastructure projects, often exacerbating the state of the poor in host cities.

Additionally, these results provide some of the first causal estimates to support literature focused on this very topic. The best account to date is *Fair Play for Housing Rights: Mega-Events, Olympic Games and Housing Rights*, a lengthy report by the Geneva-based Centre on Housing Rights and Evictions. Produced in collaboration with several U.N. agencies and academic institutions, Fair Play is comprehensive — covering Seoul (1988), Barcelona (1992), Atlanta (1996), Athens (2000), Sydney (2004) and Beijing (2008). This report claims that more than two million residents, mostly poor, were displaced by Olympic development in the past two decades. A result of nearly three years of intensive research by the Centre on Housing Rights and Evictions (COHRE) and partners, reports like these have signaled a need to study this trend much more carefully (COHRE 2006).

Targeted studies on individual mega-events have traditionally focused on displacement alone. Analyzing document data, Davis (2011) found that around 48,000 buildings were removed between 1983 and 1988, displacing 720,000 residents in densely populated, low-income districts of Seoul. This paper used official documents to show that the Seoul city hall actively used the 1988 Games to promote "city beautification", which included movements to demolish old buildings and revitalize poor communities (Davis 2011, Rocha et. al 2022). Sanchez et. al (2007) reported that for the 1992 Summer Olympics in Barcelona, 147 families were removed for the construction of the Olympic village.

More recently, the 2008 Olympics in Beijing have been an important case study for the effects of mega-events on housing displacement. Overall, the studies report that the state-sponsored gentrification efforts in Beijing led to evictions and displacement of low-income groups. Zheng and Kahn (2013) found that the gentrified area close to the Olympic Village attracted people with higher incomes and higher levels of formal education, pushing poor residents to farther remote suburban areas. Shin and Li (2013) investigated the effects of hosting on recent migrants. They found that after the 2008 Olympics in Beijing, migrants had their

houses demolished and received neither cash nor in-kind compensation. They were likely to be the most marginalized group of residents in the city. These studies show that gentrification was a defining feature of the Beijing Olympics, and for families that were fortunate enough to not be evicted, they often found themselves in communities that were drastically different from ones that preceded the Olympics.

To date, the Rio Olympics in 2016 is regarded as the peak of the use of revitalization to gentrify areas and displace marginalized residents, largely taking place in favelas around the city. A dossier prepared by an independent agency revealed that 77,206 residents were displaced to make way for Olympic infrastructure in Rio (Robertson, 2015; Boykoff, 2017).

This paper aims to build on the findings of these papers by looking at the impacts of displacement on individuals. While most of these papers focus on displacement as a primary outcome, I instead study whether or not displacement led to individuals moving to better or worse neighborhoods. To my knowledge, this paper finds the first causal estimates of public housing displacement on affected individuals resulting from the 1996 Olympics in Atlanta. Motivated by the work done in these prior studies, this paper aims to add to the existing literature by providing causal effects of forced displacement on the well-being of low-income residents in these host cities.

In this paper, I use Grier and Grier's (1978) definition of displacement, where a displacement occurs when households are forced to move from its residence by conditions that affect the dwelling or its immediate surroundings, and that: (a) are beyond the household's reasonable ability to control or prevent, (b) occur despite the household's having met all previously imposed conditions of occupancy, and (c) make continued occupancy by that household impossible, hazardous, or unaffordable" (Grier et. al 1978, Rocha et. al 2022). In this paper, I primarily focus on direct displacement caused by the demolition of residential areas, but I also acknowledge in Section 7 that indirect displacement, such as gentrification, is also an important effect to study.

For the current study, I also use Müller's (2015) definition of mega-events, which are defined as "one-off events of a fixed duration that attract a large number of visitors, have a large mediated reach, come with large costs, and have large social and environmental impacts" (Rocha et. al 2022). Muller builds upon previous definitions of mega-events (Roche, 1994; Hiller, 1999; Horne, 2007; Gold et. al, 2016) to identify

four key factors that separate mega-events from other events: tourist attraction, media reach, costs, and host place transformation. Existing literature has emphasized the Olympic Games and the FIFA World Cup as examples of sports mega-events. However, other sporting events can also be considered mega-events, depending on their characteristics related to the key factors (Müller, 2015). The 1996 Olympics clearly falls within this umbrella, but I also discuss the implications of these findings on other mega-events in Section 7.

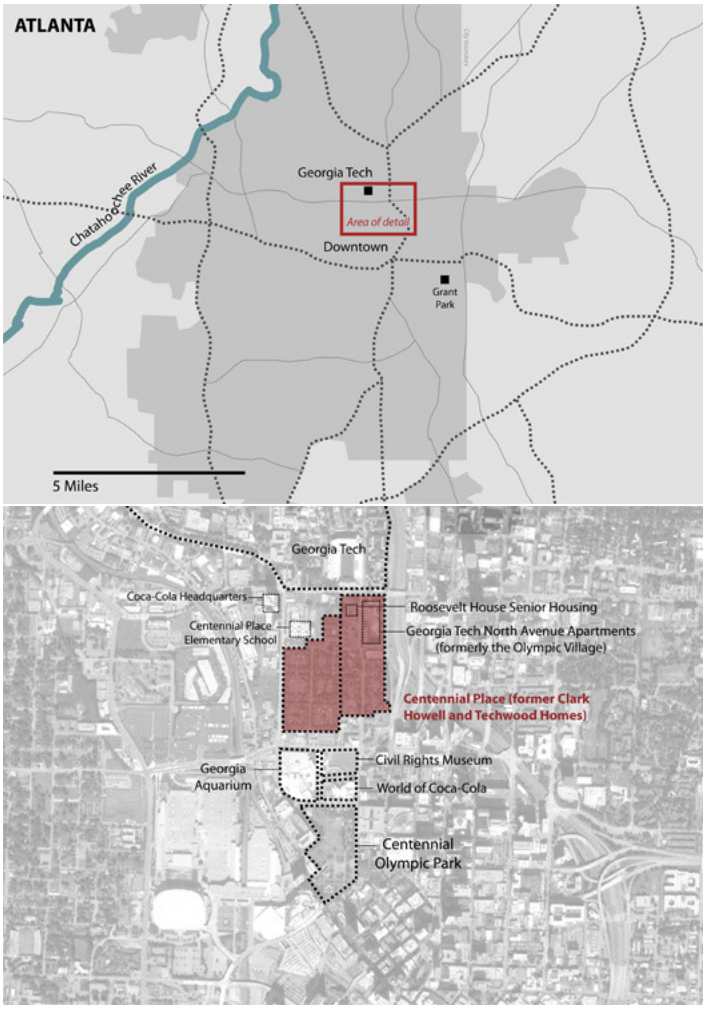
The rest of this paper proceeds as follows. Section 2 discusses the history of Atlanta's public housing projects and how the Olympic Legacy Program fits into this history. Section 3 introduces the research questions explored in this study. Section 4 describes the data sources and how the treatment and control groups were constructed. Section 5 describes the initial research design used to compare the treatment and control groups, and I present the results from this model. In Section 6, I present a difference-in-differences model and present the results from this model. In Section 7, I frame these results in the context of other studies, and in Section 8, I conclude.

2 History of The Olympic Legacy Program

In the mid-1930s, Atlanta's Techwood Homes opened as the first public housing development in the United States, replacing a mostly Black-occupied slum with an all-white project. Five years later, the Atlanta Housing Authority constructed a second project adjacent to Techwood Homes named Clark Howell Homes. These projects were located on valuable land in the city of Atlanta, occupying the space between downtown Atlanta and the campus of Georgia Tech. The two projects were close enough that most considered them as a single complex, resulting in them being linked together for most of their history. (Keating 2000). The location of these housing projects is shown in Figure 1.

During the decades that followed the opening of Techwood and Clark Howell Homes, many changes took place in the City of Atlanta as well as its public housing population. As a result of desegregation and urban renewal projects in the 1960s and 1970s, the city's population grew rapidly and went through drastic demographic changes. Among the most significant was the rapid expansion of public housing projects during the 1960s and 70s as many low-income neighborhoods surrounding the city were eliminated by the policies of expressway construction and urban renewal. For example, during the period from 1956 to 1966, more

Figure 1: A map of Clark Howell and Techwood Homes in relation to other landmarks in the city of Atlanta



Source: Vale (2013)

than 67,000 people had their housing disrupted as a result of these two public policies (Newman 2002). At least 77 percent of those affected were African Americans. While this disruption increased the demand for public housing, fewer than 11 percent of those whose neighborhoods were destroyed were able to relocate to public housing (Eric Hill Associates 1966).

This expansion of public housing left the City of Atlanta with one of the highest concentrations of public housing residents per capita of any city in the nation. While cities such as New York and Chicago had larger numbers of citizens living in public housing, Atlanta had a higher ratio of public housing residents compared to those not living in public housing. Almost one out of every ten residents of the City of Atlanta lived in public housing. The presence of other poor residents in the city gave Atlanta the second-highest concentration of poverty (behind Newark, New Jersey) of any city in the US. Having such a large poverty population in the central city and the contraction of the supply of low- and moderate-income housing as a result of expressway construction and urban renewal increased the demand for public housing in the City of Atlanta (Newman 2002). With surrounding jurisdictions outside the city unwilling to allow the construction of public housing units, the bulk of public housing for the entire metropolitan area was located inside the central city. According to a study by Research Atlanta, the concentration of poverty declined in the Atlanta metropolitan region between 1980 and 1990 but increased within the central city during the same period. At the same time, the neighborhoods defined as extreme poverty increased within the City of Atlanta from 41.5 percent in 1980 to 44.1 percent in 1990. With many white citizens leaving the city of Atlanta while Black residents continued to enter, the inner city was rife with poverty (Vale 2013). Breaking this concentration of poverty became one of the most vexing problems facing the City of Atlanta.

Another important change was the result of the civil rights movement. In 1962, President Kennedy issued an executive order mandating the desegregation of public housing. In 1966, Techwood-Clark Howell had no Black residents. By October 1974, the projects were approximately 50 percent Black (Keating 2000). Those seeking to enter public housing would no longer be screened on the basis of race, family composition, and employment. By June 1990, the population was 95.5 percent Black.

As a result of these changes, housing projects in the city soon became overcrowded with low-income families looking for affordable places to live. Once units were filled, applicants for public housing were placed

on a waiting list. In 1971, 30,000 people were on the waiting list for low-rent public housing administered by the AHA. 90% of the people on these waiting lists were Black. Once the applicant reached the top of the queue, the applicant was offered two units that met the applicant's need (e.g., family size, disability condition, senior, and so on). If the applicant rejected the units, the applicant had to reapply and would be placed at the bottom of the waiting list. At one point, the applicant even had to wait one year before reapplying. Once the tenant was in a public housing unit, the tenant could move only if there was a change in status, such as family size, although even this was not automatic (Anil et. al 2010). Because most families on the waitlist jumped at the opportunity to live in an AHA-operated unit, there is little reason to believe that there was significant sorting by families between the 48 conventional public housing projects offered across the city in 1990 (AHA).

With overflowing populations, many of these AHA projects displayed signs of severe social distress. A lack of effective social programs to assist tenants and a deterioration in the maintenance of the properties led to the decline of housing projects across the city. A report written by AHA staff in the late 1960s reported that "generally speaking, the management of public housing was completely divorced from welfare and social services." An Inspector General's Audit Report on the AHA found conditions unsafe, unsanitary and poorly managed. Eighty-eight percent of inspected units did not meet minimum safety and sanitary standards, and there was a backlog of 7,100 maintenance work orders. Many units were boarded up, and current tenants reported missing or defective windows and doors, electrical hazards, leaking and backed-up toilets, rodent infestations, and lead-based paint (Boston 2005). As the city's focus seemed to shift towards central Atlanta's business community during this period, the AHA became increasingly unable to meet the needs of the city's low-income population throughout the 1970s and 1980s. Redevelopment was needed to improve the quality of life for the residents of these housing projects, but the issue was always low on the list of priorities for the greater city government.

Techwood-Clark Howell was a prime example of the dilapidated housing projects found in the city. In spite of its proximity to major sites in the city such as Georgia Tech, the World of Coca-Cola, and the Georgia Aquarium, the Techwood-Clark Howell neighborhood was considered one of the worst neighborhoods in Atlanta. Crime rates were among the highest in the city, and incomes were amongst the lowest. Despite $15

million of repairs in 1981, the units in Techwood-Clark Howell had outdated heating, sewer, and plumbing systems as well as lead-based paint. More than 1,000 emergency work orders—nearly one per unit—remained outstanding. The public housing community was isolated with few services or amenities, a deteriorating elementary school, and little, if any, private investment (Turbov et. al 2005).

By the early 1990s, local, national, and international factors combined to offer the city's policy leaders the perfect conditions to support bold redevelopment endeavors. On September 18, 1990, the International Olympic Committee awarded the 1996 Centennial Olympic Games to the city of Atlanta, Georgia. Preparations for the games provided the city with an opportunity for redevelopment on a scale not seen in Atlanta since General Sherman's departure in 1864.

This sparked the strategy to demolish troubled projects, known by the AHA as the Olympic Legacy Program. With Georgia Tech serving as the site for several Olympic venues and the downtown area at the heart of events connected to the games, the Techwood-Clark Howell Homes complex emerged as an ideal location for the Olympic Village where athletes would be housed. These two adjoining public housing projects, located only blocks outside Atlanta's central business district and in the center of Atlanta's Olympic redevelopment plans, would be integral in the city's Olympic plans.

At the same time, in 1992, Congress had passed new legislation called HOPE VI that made grants available to local housing authorities for the revitalization of the most distressed public housing. HOPE VI was in response to the report by the National Commission on Severely Distressed Public Housing (NCSDPH), which, in 1992, found that 86,000 of the 1.4 million public housing units nationwide were classified as "severely distressed" (NCSPDH 1992). HOPE VI consisted of two main programs designed to address this issue: (1) the Demolition program, which provided funding for the demolition of public housing projects and the relocation of affected residents, and (2) the Revitalization program, which provided funding to redevelop neighborhoods with public housing into low-density, mixed-income communities (Haltiwanger et. al 2020). Displaced households are typically either offered an apartment in another public housing project, a voucher, or they are forced out of subsidized housing altogether (Popkin et. al 2009).

HOPE VI Demolition grants were awarded based on a competitive process where public housing authorities would apply to available grant openings. Any public housing authority was thus eligible to apply for

the demolition of severely distressed public housing developments (using the NCSDPH criteria). Each year, HUD classified applicants into one of four priority groups, and grants were awarded (conditional on eligibility and approval) on a first-come, first-served basis by priority group until funds were exhausted (Haltiwanger et. al 2020).

The initial HOPE VI program took a dramatic turn when HUD created the mixed-finance development method, a radical departure from traditional public housing development (Turbov et. al 2005). The mixed-finance approach enabled public housing authorities to enter into partnerships with private developers to create new mixed-income communities by combining HUD funding with private financing. Unlike previous policies, HOPE VI now encouraged public housing authorities to leverage private investment and eliminated the obligation to construct replacement public housing. This attracted city officials in Atlanta, who were desperately looking for a way to demolish and revitalize several of the city's failing public housing projects.

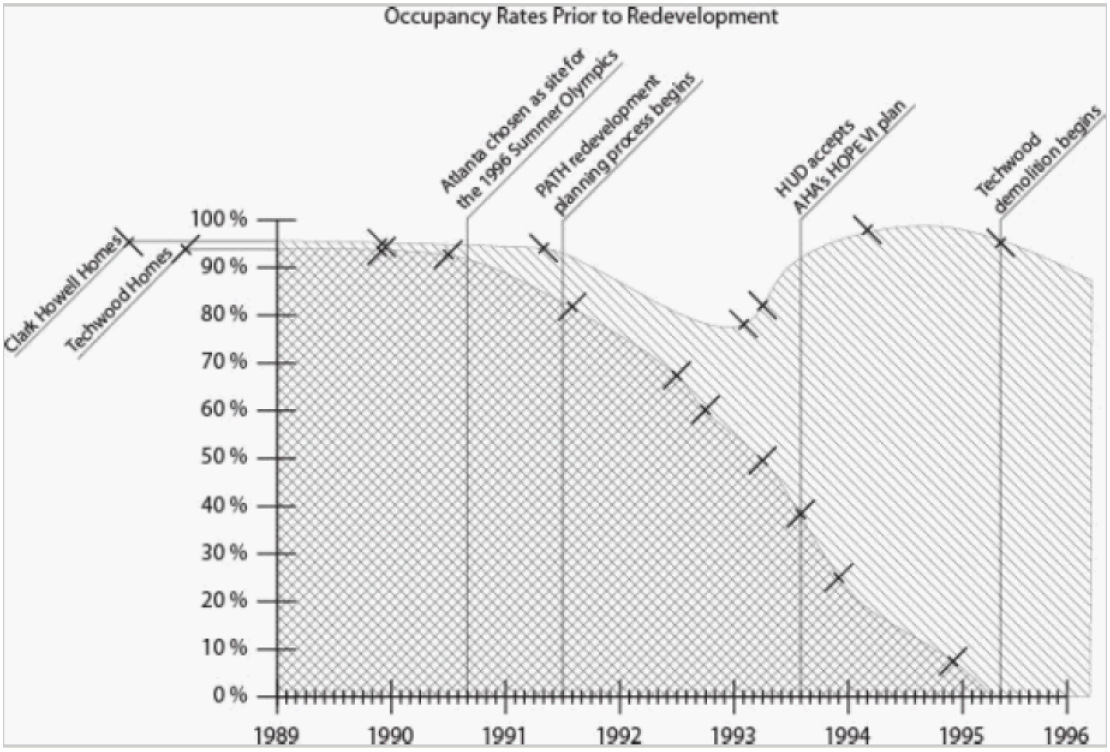
Chief Executive of the Atlanta Housing Authority Reneé Glover led the charge to take HOPE VI funding to demolish Atlanta's oldest public housing projects and turn them into mixed-income communities. Glover publicly expressed her desire to make Techwood-Clark Howell Homes "a part of the downtown agenda" and to integrate the redevelopment within Centennial Olympic Park (Vale 2013). She believed that public housing was fundamentally flawed, arguing that "it doesn't work and I am going to change it" (Keating 2000) She wanted to replace the concentrations of housing for poor people with lower-density, mixed-income housing to attract economic development, and HOPE VI provided a desirable way to make this happen. Under the leadership of Ms. Glover, the AHA proposed that the Clark Howell and Techwood Homes be demolished and replaced with units of mixed-income apartments.

After several failed attempts, the first HUD HOPE VI grant was awarded to the AHA in 1993 for the purpose of replacing older public housing projects. With a two-part grant that provided a total of $42.5 million, the AHA set out to demolish the vast majority of Techwood-Clark Howell (Keating 2000), in partnership with the Integral Partnership of Atlanta, a private housing developer. Together, the AHA and the Integral Partnership rallied the attention of local, state, and federal officials to expedite a new way of delivering mixed-income housing with quality services and amenities attractive to all households. However, what was once originally proposed as a plan for one-for-one replacement of housing units eventually shifted

to serve the interests of the developers rather than those of the affected families. Although the AHA's first Revised Revitalization Plan pledged to replace the 1081 affected units at Techwood/Clark Howell, this figure declined in each of the subsequent plans in partnership with the private development team. By 2000, only 216 of the on-site units were finished and only 360 were set to be finished (Keating 2000).

This paper restricts attention to residents who were living in a treatment or control site in 1990 because these are the residents who were directly affected by the demolitions caused by the Olympics. Soon after Atlanta was announced as the Olympics site in September of 1990, the AHA launched the Olympic Legacy Program, and it became clear that Techwood Homes and Clark Howell Homes were to be demolished. To begin assessing Techwood-Clark Howell Homes for redevelopment, the city investigated the residents' interest in relocating during the summer games. Initially, residents rejected the city's proposal for relocation. In response, city leadership hired PATH, a consortium of real estate developers, an investment bank, and an affordable housing nonprofit, to design and develop a redevelopment plan that residents and, ultimately, HUD would accept. The PATH plan proposed replacing Techwood-Clark Howell Homes with 800 newly constructed public housing units and leasing two acres to Coca-Cola, which intended to construct a forty-eight-story addition to its corporate headquarters (Diehl 2018). Although HUD rejected PATH's plan, it established Techwood-Clark Howell Homes' redevelopment as an essential component to Atlanta's Olympic "make-over" and, as residents saw their homes earmarked for demolition, occupancy rates dramatically decreased (Diehl 2018). Soon after, HUD granted Atlanta funds through HOPE VI to demolish the Techwood-Clark Howell projects before the Games, but most of the damage had been done to residents in the lead up to this action. In June 1990, three months before Atlanta was chosen to host the Olympic Games, the occupancy rate in Techwood was 92.8 percent. By August 1991, one month after the PATH planning process began, the occupancy rate was 81.8 percent. By April 1993, the occupancy rate was less than 50 percent. Once occupancy rates started to dip, other residents likely left because of security concerns created by the empty housing units (Keating 2000). Figure 2 shows the occupancy rates of Techwood-Clark Howell over the years 1989-1996. We can clearly see a decline beginning in 1990 after the Olympics have been announced.

Figure 2: Occupancy Rates Prior to Redevelopment



Source: Keating (2000)

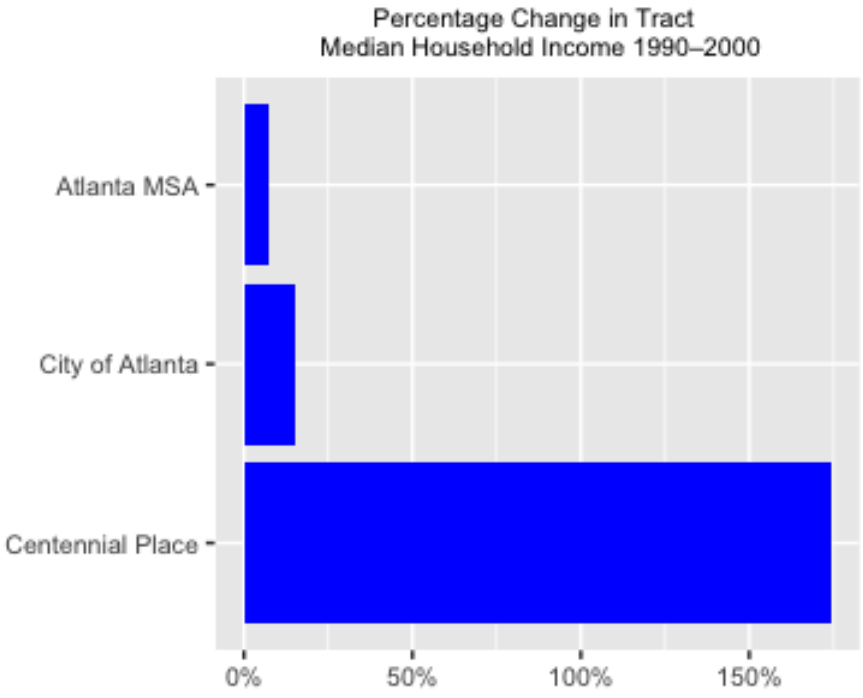
The role of the Atlanta Housing Authority in accelerating the vacancy rate can only be estimated. However, there is reasonable evidence to assume that they played an active role in the rapid decline in occupancy. First, vacancies occurring between August 1991 and March 1992 were more than twice the voluntary turnover or attrition rate. Second, the historical eight-year median length of residency in Techwood does not translate into a 94.1 percent vacancy rate in three and half years, without external stimuli. Third, Jane Fortson, former chair of the AHA Board of Commissioners, was even quoted saying that a 20 percent vacancy rate became a goal after the submission of the PATH plan (Keating 2000). As a result, families began to move out of Techwood-Clark Howell soon after the 1990 announcement, resulting in a 90 percent occupancy rate in June 1990 to a less than 50 percent occupancy rate in April 1993.

Of the 1,115 households in residence in 1990, a total of 545 households received relocation assistance from the AHA. Of this number, 367 received Section 8 housing voucher certificates and 178 moved to other public housing. This suggests that more than half of the total number of residents in 1990 moved or were evicted

without any assistance from the AHA (Keating 2000). This paper aims to study the relocation decisions of all incumbent residents of Techwood-Clark Howell as a result of the change to mixed-income housing started by the Olympic Legacy Program (Newman 2002).

Today, Techwood-Clark Howell, now known as the Centennial Place neighborhood, is a privately-owned and managed mixed-income development of 738 townhouse and garden-style rental apartments, of which 40 percent are public housing units, 20 percent tax credit units, and 40 percent market-rate rentals. The community operates as a joint venture between the Integral Partnership of Atlanta and the Atlanta Housing Authority. The AHA describes the development as a "market-rate development that includes public housing". Centennial Place Elementary School is one of the most desirable in Atlanta. Hundreds of millions of dollars of new private investment in housing, hotels, and retail development surround the redeveloped site. Crime rates plummeted by 93 percent between 1993 and 2004. Incomes are rising, unemployment is down, and the Centennial Place neighborhood is desirable and competitive. Figure 3 shows the change in median incomes in Centennial Place from 1990-2000, compared to that of the city of Atlanta and the Atlanta Metropolitan Statistical Area.

Figure 3: Change in Median Household Incomes



Source: US Census Bureau

These trends show that this redevelopment project was able to deconcentrate poverty away from Techwood-Clark Howell and dramatically change resident demographics, There are few remnants of the low-income community that preceded it, and there are few families that have remained through the changes of the past three decades, mostly due to the Olympic Legacy Program's impact on the neighborhood.

Centennial Place served as a catalyst for future mixed-income developments. In the years following the Centennial Place redevelopment, the AHA has revitalized dozens of former public housing sites and developed partnerships to place off-site public housing units in mixed-income developments in a number of Atlanta neighborhoods. By 2011, the city of Atlanta had demolished all of its conventional public housing projects in favor of mixed-income public-private partnerships (Garlock 2014). Today, the AHA operates as a holding company and asset manager, oversees all property management, and develops all housing through public/private partnerships. For a city once known for its supply of public housing, the Olympic Legacy Program marked a fundamental shift in housing policy for the city.

The rest of this paper explores the impacts of the Olympic Legacy Program on individuals living in the projects that were selected, focusing on individuals living in the housing projects in 1990.

3 Research Questions

Prior to the decision to demolish and rebuild the complexes, Techwood and Clark Howell Homes provided 1,195 units of public housing for more than 1,100 households. These households, living in either Techwood or Clark Howell Homes in the year 1990, comprise the treatment group for my study. To aid my research design, I compare this treatment group with a control group of 1,483 households who in the year 1990 lived in three housing projects that were not revitalized during the time frame covered by this study (Keating 2000).

Using this treatment group and control group, I plan to study the following questions:

1. Did public housing demolitions cause households to relocate to different neighborhoods?
2. Did the demolitions cause households in the treatment group to move further from their origin site compared to households in the treatment group?
3. How did the average neighborhood quality of the treatment group and the control group change over the study period?

4 Data

4.1 Infutor

To study these research questions, I leverage the Infutor dataset, which provides the entire address history of individuals who resided in Georgia at some point between the years of 1980 and 2019. The data include not only individuals' Georgia addresses, but any other address within the United States at which that individual lived during the period of 1980–2019. The dataset provides the exact street address, the month and year in which the individual lived at that particular location, the name of the individual, and some demographic

Table 1: City of Atlanta Statistics from Infutor

Number of Unique Individuals	2,983,586
Gender Coverage	45.72 % Female, 43.36% Male
1990 Residents	500019
2000 Residents	1487624

information including age and gender.[1]

Infutor contains new entries for individuals when their recorded address changes. Therefore, most individuals in Infutor are only seen a handful of times, though the data contains observations for over 40 years. In section 4.5, I explain how I use this fact about Infutor to construct a yearly panel dataset for the relevant individuals in this study.

To examine the representativeness of the Infutor data, I aggregate all individuals reported as living in Atlanta in 1990. I make similar population counts for the year 2000 and compare these Atlanta population counts to those reported in the 1990 and 2000 Census for adults 18 years old and above. For each person recorded in the 1990 Census, Infutor contains 0.35 people, suggesting we have a 35% sample of the population. The data is even better in the year 2000, where there appear to be 0.7 people in Infutor for each person observed in the 2000 US Census. Figure 4 shows Infutor coverage relative to Census counts from 1980 to 2010.[2]

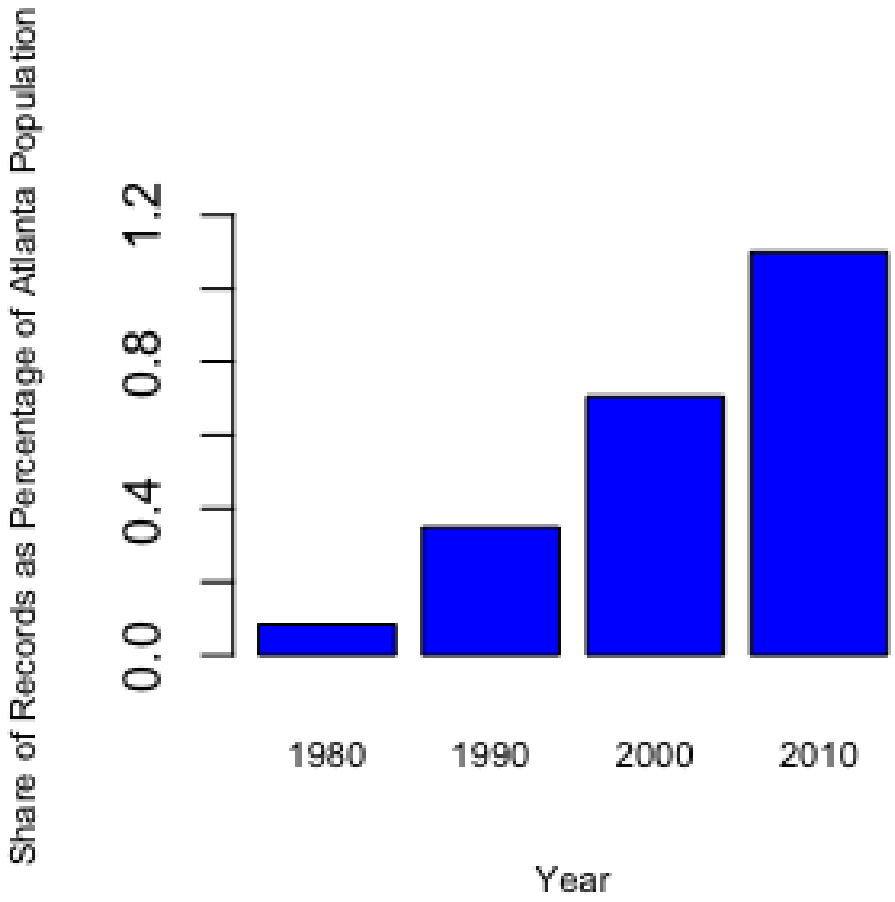
4.2 Opportunity Atlas

For my measures of neighborhood quality, I leverage the Opportunity Atlas, a publicly available atlas of children's outcomes in adulthood by Census tract using anonymized longitudinal data covering nearly the entire U.S. population. For each tract, the Atlas contains children0's earnings distributions, incarceration rates, and other outcomes in adulthood conditional on parent income levels in childhood (Chetty et. al 2020). This data shows that children's outcomes in adulthood vary sharply across neighborhoods, even conditional on parental income. For children with parents whose earnings are in the 1st percentile of the national household income distribution, the standard deviation (SD) of mean household income across tracts is approximately 8.6 percentile ranks in their mid-thirties. For each Census tract in the country, the Atlas

[1]Because of privacy concerns, I use the de-identified version of the Infutor address data. Therefore, I am unable to use individual names to infer race, a technique employed in Diamond et. al (2019)

[2]Because I do not condition on age of death, I am able to get more individuals than the actual population of Atlanta.

Figure 4: Infutor Coverage Across Decades Comparing to Decennial Census

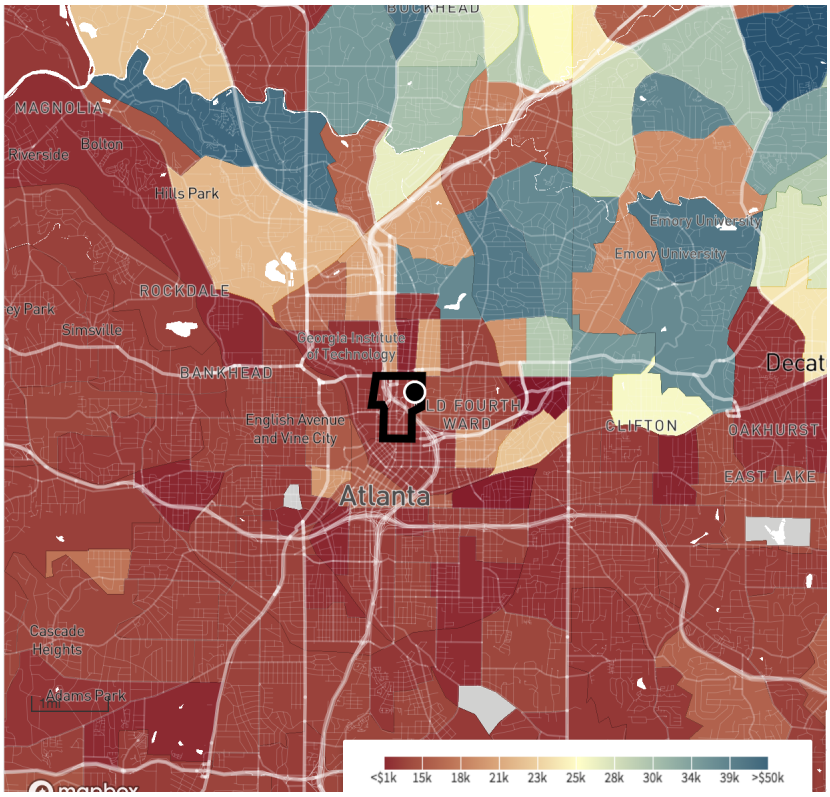


Note: This graph shows active Infutor records compared to total US population. A record in Infutor is active in a given year if information about an individual has been recorded before or in that year and more information will be recorded about that individual in or after that year

reports the mean income in adulthood for children whose parents are at the 1st percentile of the national household income distribution. Public housing residents often represent those with the lowest incomes in society, which made this a relevant metric for this study.

This value will serve as one measure of neighborhood quality for each tract, as this represents one way to quantify the level of upward mobility within every tract in the United States. A major focus of the Olympic Legacy Program was to move children to better neighborhoods (Newman 2002), and this measure can help quantify a neighborhood-quality measure that focuses on children's outcomes in adulthood. Chetty et. al (2020) find that observational estimates are highly predictive of neighborhoods' causal effects, meaning

Figure 5: Estimates of Upward Mobility in Atlanta



Note: This map displays mean outcomes in adulthood of children who grew up to parents in the 1st percentile of the national income distribution in the city of Atlanta.

that different observed upward mobility estimates can be indicative of different causal effects on children's outcomes in adulthood. For the remainder of this paper, the term "upward mobility" will refer to the predicted income in adulthood for children whose parents are at the 1st percentile of the income distribution. Figure 5 shows a map of these estimates for the Census tracts surrounding the treatment sites.

Here, I see that most of the Census tracts surrounding the treatment sites are indicative of low mobility for children growing up at the 1st percentile of the income distribution. To the North, there are some higher-opportunity neighborhoods, but to the South, virtually all of the nearby neighborhoods are lower-opportunity. If individuals end up moving to higher-opportunity neighborhoods, it likely means that they moved to geographically far neighborhoods from the treatment sites. This is an important consideration to take into account as I compare neighborhood quality of affected individuals before and after the treatment takes place.

In addition to the measures of neighborhood quality provided by the Opportunity Atlas, I also construct variables to identify the highest quality neighborhoods. Using the same definition as the MTO study, I define "low-poverty" neighborhoods as Census tracts with poverty rates less than 10% (Chetty et. al 2015). I also define "high-opportunity" neighborhoods as Census tracts that have historical rates of upward income mobility in approximately the top third of tracts in the Atlanta Commuting Zone, inspired by the definition used in Bergman et. al (2020).

4.3 Treatment and Control Group

For my treatment group, I chose the Techwood-Clark Howell housing projects. There are three main reasons for this decision. (1) As explained in Section 2, Techwood-Clark Howell were the housing projects that were the most directly affected by the impending Olympic Games. Due to their location near many of the sites chosen for the Olympics, these projects were singled out long before the Games as a possible demolition and revitalization site. Because the main goal of this project is to analyze the effects of the Olympics on housing demolitions, these housing projects make a strong treatment group since they were the primary sites for Olympics-related demolitions. (2) These housing projects had not started revitalization efforts before the start of my study period, which is the year 1985. Before the announcement that Atlanta had received the Olympic Games, Techwood-Clark Howell was still intact. In June of 1990, the housing project had a 90 percent occupancy rate. This rapidly declined following the September 1990 announcement that Atlanta had been awarded the Olympic Games, and I argue that this decline can be tied to the movement to demolish Techwood-Clark Howell before the 1996 Olympics. (3) These housing projects had been fully revitalized by the end of my study period, which is the year 2005. According to records from the AHA, Techwood-Clark Howell had been renovated into the mixed-income community, named Centennial Place, by 2001.

For my control group, I similarly used three criteria to select housing projects. (1) The average characteristics of households were similar in the treatment group and control group Census tracts in 1995. (2) Housing projects selected for the treatment group were still intact in 1990. That is, neither household relocation nor the demolition phase of revitalization had started at the time of the initial observation. (3) Projects in the control group did not undergo revitalization during the 20 year study period of 1985 to 2005.

Table 2: Census Tract Characteristics in 1990

	Treatment Group		**Control Group**		
	Techwood-Clark Howell		Carver Homes	Capitol Homes	Grady Homes
Poverty Rate	75%	70%	69%	78%	64%
Single Parent Share	100%	89%	93%	100%	97%
Median HH Income	$8172	$4999	$5209	$5632	$6043

Note: This table includes the 1990 characteristics of the Census tracts including the public housing projects used in this study. For Techwood-Clark Howell, the projects have addresses in two different Census tracts, therefore there are two columns included.

According to records from the AHA, four other housing projects were considered for the initial use of HOPE VI funding in the early 1990s. These projects include Carver Homes, Capitol Homes, East Lake Meadows, and Grady Homes, and these were the other housing projects that were the primary focus of the Olympic Legacy Program (Newman 2002). Each of these projects was named in the initial documents for the Olympic Legacy Program but was primarily not chosen because of their location within the city of Atlanta. Because East Lake Meadows was revitalized in 2001, and therefore did not meet criterion (3), I chose to exclude it from this study. Therefore, I selected Carver Homes, Capitol Homes, and Grady Homes as the three sites that composed my control group.

Table 1 records statistics in Infutor for the City of Atlanta. Table 2 records the 1990 characteristics of the Census tracts where these projects were located. Techwood-Clark Howell spans two separate Census tracts, which is why there are two observations included.

4.4 Study Time Period

For this design, I use the period between 1990 as the year to define members of my treatment and control groups. This means that the sample is restricted to individuals who were reported to have been living in one of the treatment or control sites in the year 1990 using Infutor.

This paper restricts the dataset to residents who were living in a treatment or control site in 1990 because these are the residents who were directly affected by the demolitions caused by the Olympics.

As explained in Section 2, individuals began to move out of Techwood-Clark Howell soon after the 1990 announcement, resulting in a 90 percent occupancy rate in June 1990 to a less than 50 percent occupancy

rate in April 1993. While demolition did not begin in 1990, it is sensible to claim that any family living in these projects in 1990 was affected by the Olympics announcement and subsequent proposition of demolition. While families were not officially forced out of the complexes until the mid-1990s, the impending demolitions and the worsening state of the units left many families with no choice but to find other housing. Therefore, this paper will define treated individuals as those living in the treated sites in 1990, when the Olympics decision was announced.

4.5 Sample Construction

The sample is constructed by leveraging the panel data on housing addresses provided by Infutor. The first step in constructing the sample is to find the street addresses associated with the treated and control group. This was done by contacting the Atlanta Housing Authority and collecting public housing records for each of the sites used in this study.[3] Then, I select individuals living in a treated or control site at some time in Infutor and were first observed in Infutor before the year 1995.

After doing this, I use Infutor to construct a balanced panel of these individuals' complete set of addresses from 1985-2005. I do this in two steps. First, I assume that an individual is living at his or her reported address until the year in which I observe another address in Infutor. For example, assume that there is an entry saying that an individual is living at Address 1 in 1989 and that there is an entry for address 2 in 1997. I assume that the individual is living at Address 1 for all years between 1989-1996, and that they begin living at Address 2 starting in 1997. I repeat this for all subsequent addresses that I observe the individual living at. Next, I balance the panel for the first years in Infutor for each individual, using their first reported address. Using the same example, if the individual is first reported in Infutor at Address 1 in 1989, I assume that they are living there as early as 1985, which is the first date used in this study.

Individuals living at the treated sites in 1990 thus comprised the treatment group for this study, and individuals living at the control sites in 1990 thus comprised the control group for this study. I define the *origin site* as the public housing project where individuals in these groups are living during this time period.

[3]The treatment sites (Techwood Homes and Clark Howell Homes) consisted of the following addresses in 1990: 410-429 Techwood Drive NW, 114-119 Merritts Avenue NW, and 406-584 Lovejoy Street. The control sites (Capitol Homes, Carver Homes, East Lake Meadows and Grady Homes) consisted of the following addresses in 1990: 140 Meldon Avenue, 89 Memorial Drive, 380 East Lake Boulevard and 100 Bell Street).

I define *tenure* as the amount of time that residents have been living in their origin site before 1990. Using these definitions of the treatment and control group, I turn to the relocation patterns of tenants displaced by these public housing demolitions.

5 Comparison of Treated and Control Individuals

To study the research questions introduced in Section 3, I analyze my data using two research designs. The first research design focuses on the differences I observe between the treatment and control group at certain years after the Olympic Legacy Program began. The second research design, which I explore in section 6, uses a difference-in-differences model, which controls for differences between the groups that may appear before the Olympic Legacy Program took place.

Motivated by the work done in Chyn (2016), I begin by doing a simple comparison of the treatment and control groups. To do this, I study the impact of the Olympic Legacy Program by exploiting the fact that the AHA selected a limited number of buildings for demolition due to their proximity to the main sites for the 1996 Olympics. Hence, my empirical strategy exploits plausibly exogenous variation in the demolitions based on their proximity to the Olympic venues. The empirical analysis consists of two parts. First, I start with a descriptive analysis of the residents in the various housing projects that compose my treatment and control sites. Second, I estimate the short and long-run causal effect of the demolitions on various outcome variables. Absent the Olympics and the associated demolitions, I assume that the two groups would have evolved similarly over the relevant time period. To the extent that individuals were randomly assigned across public housing projects within the city of Atlanta in the period before 1990, subsequent differences in outcomes across the relevant time period can be attributed to the demolition and relocation. To evaluate this design, I estimate the following specification:

$$y_{it} = \alpha + \beta Treat_i + \epsilon_{i,t} \tag{1}$$

where i represents individual i and t represents year t. y_{it} refers to the vector of outcome variables for individual i at year t, $Treat_i$ is an indicator for a family being in a demolished housing projects. Hence,

if there are no differences between the treatment and control group before the Olympic Legacy Program began, β represents the net impact of displacement due to demolition on the outcomes of interest. In my baseline specifications, I include the $Treat_i$ indicator but no additional covariates. For all analyses using (1), I report standard errors clustered by origin Census tract.

Estimates of β have a causal interpretation if the AHA's selection of buildings for demolition was unrelated to resident characteristics. Due to the program's focus on demolishing projects near the Olympic Village, this condition seems plausible. All of the housing projects that comprise the treatment and control groups consist of sites that were demolished between 1995-2010, yet the primary reason why Techwood Homes and Clark Howell Homes were demolished first was due to their location. Moreover, there should be little difference between residents living in demolished and non-demolished buildings because the tenant allocation process restricted the ability of households to sort into different buildings. Because public housing is not an entitlement, eligible families typically spent years on waiting lists and usually accepted the first public housing unit that was offered to them. As a result, it seems plausible that selection bias is not a large concern across the public housing projects studied in this paper. To validate this claim, I test for significant differences on observable variables in the following subsection.

5.1 Baseline Comparisons Prior to Demolition

The validity of my research design depends on whether the selection of buildings for demolition was uncorrelated with the characteristics of individuals living in public housing. To provide support for this assumption, I start by comparing individuals living in buildings marked for demolition (treated) and comparison group (control) buildings. Specifically, I examine characteristics measured in 1990 prior to building closure for demolition. Table 3 compares individuals living in treated and control buildings by estimating equation (1).

Column 1 of the Table 3 shows means for various outcomes for all non-displaced individuals living in comparison group public housing buildings. The second column reports the mean difference between control and treated individuals from the regression model. If the selection of buildings was uncorrelated with family characteristics, we expect that the mean difference would equal 0. As shown in the table, none of the variables are significantly different between the two groups at the 5% level. Despite the fact there are few

Table 3: Sample Characteristics in 1990

	Control Mean	Treated - Control	P-Value
Sample Size	1138	−811	
Male	52.5%	0.5%	0.807
Age in 1990	40 years	8 years	0.820
Average Tenure	3.82 years	0.01 years	0.912

Note: The control mean statistics in column 1 refers to the averages for individuals in the control group for my sample. For each outcome (row), I compute the difference between displaced (treated) and non-displaced (control) individuals using equation (1). Tenure is defined as length of time that an individual is living at their origin site before 1990.

demographic variables in Infutor, this finding is consistent the assumption that the groups were similar before the demolitions took place. I assume the same holds for unobservables.

5.2 Effects of Demolition on Number of Addresses Seen

Using this model, the first comparison between the treatment and control groups that I conduct focuses on the number of distinct addresses that I observe for each individual. On average, I find that the individuals in the treatment group on average have 4.1 reported addresses in Infutor from the period 1985 - 2005. In the control group, I find that this average is 3.6. This difference is statistically significant with a p-value of 1.79×10^{-6}, and this result provides some evidence to the fact that the treatment group was displaced from their original place of residence.

5.3 Effects of Demolition on Return to Origin Site

In Table 4, I conduct a simple comparison of means between the treatment and control group using a similar technique to Table 2 in Chyn (2016). Here, I compare the outcomes of individuals in the treatment group and the control group in 2000 and 2005, which correspond to 5 and 10 years after the Techwood-Clark Howell demolitions. If there are no initial differences between the two groups, the difference in means (β) that are observed after 1990 can be attributed to the causal effect of demolition and relocation for these affected individuals.

With the demolition of Techwood-Clark Howell Homes, Atlanta's affordable housing policy shifted from publicly-owned to privately-owned units whose rents were subsidized through voucher programs. AHA CEO Reneé Glover, a strong proponent of vouchers, claimed that there were "a lot of good choices" for displaced

Table 4: Impact of Demolition on Household Neighborhood Characteristics

	2000		*2005*	
	Control Mean	Treatment-Control	Control Mean	Treatment-Control
	(1)	(2)	(3)	(4)
Individual in Origin Tract	−0.514	−0.150***	−0.453	−0.139***
	(0.014)	(0.030)	(0.014)	(0.031)
Distance From Origin Tract	4.610	3.542***	5.177	5.920***
	(0.461)	(0.967)	(0.538)	(1.142)
Fraction Below Poverty	0.508	−0.052***	0.489	−0.062***
	(0.007)	(0.016)	(0.007)	(0.016)
Individual in Low-Poverty Neighborhood	0.109	0.050*	0.114	0.089***
	(0.009)	(0.018)	(0.010)	(0.020)
Upward Mobility	21.863	1.488***	21.946	2.098***
	(0.128)	(0.269)	(0.136)	(0.288)
Individual in High-Opportunity Neighborhood	0.019	0.026**	0.020	0.039 ***
	(0.005)	(0.01)	(0.004)	(0.009)
Observations:	1521	1485	1521	1485

Note: In this table, I conduct a simple comparison of means between the treatment and control group using a similar technique to Table 2 in Chyn (2016). The control mean statistics in columns 1 and 3 refer to averages for individuals in the control group. The mean difference between displaced and non-displaced households are reported in columns 2 and 4 as computed from a regression specified in equation (1). Standard errors are presented in parentheses and clustered at the Census Tract level. *p<0.1; **p<0.05; ***p<0.01

families to move to (Keating 2000). At the beginning of relocation, AHA entered into legal agreements that guaranteed a housing voucher to each household displaced by revitalization. Households were also given the option to move into another public housing project. Finally, households who expressed a preference to move into the mixed-income communities once they were completed were placed at the top of the waiting lists for those communities.

I first ask: Did public housing demolitions cause households to relocate to different neighborhoods? For each individual, I compare their address in each year to their origin site. Table 4 depicts these results across the study period.

According to the first column of Table 4, individuals in the treatment group were 13 percentage points less likely to be living in the same tract as their origin site in 2000 compared to those in the control group. In 2005, the same trend is true, as there is also a 13 percentage point difference between groups.

Because Techwood-Clark Howell was completely revitalized by 2000, this provides evidence that supports the hypothesis that forced displacement has an effect on long-term housing locations. Even after the original treatment sites were revitalized, there is no significant increase in the number of individuals that moved back to Techwood-Clark Howell (renamed Centennial Place after the revitalization project). There are several reasons why this took place. One major reason is that Centennial Place was a vastly different housing community from the Techwood-Clark Howell projects that preceded it. The Centennial Place housing community effectively removed the indigenous poor and replaced their housing with 360 units of market-rate housing. Of the 900 units at Centennial Place, 360 (40 percent) were for former public housing residents, an additional 180 (20 percent) were tax credit units offering residents a smaller subsidy, and 360 are market-rate apartments. According to Keating (2000), "income limits for Centennial Place were substantially higher than previous public housing incomes. The median income in Techwood prior to redevelopment was $3,219 per year. By 2007, income limits were increased to $34,000 for a household with two people and to $38,250 for a household with three occupants." Therefore, even if former residents who were displaced wanted to return to Centennial Place after the revitalization was complete, they faced stiff competition in order to get a unit in this new housing community. Centennial Place was a vastly different neighborhood from Techwood-Clark Howell, part of the Atlanta Housing Authority's concerted effort to rid the neighborhood's legacy as

a high-poverty, high-crime community.

Another explanation to explain these trends is rooted in recent research studying housing displacement. In Haltiwanger et. al (2020), the authors find that HOPE VI-forced migrations increased the likelihood of migration to new neighborhoods. Desmond et. al (2015) find that low incomes are associated with higher rates of residential mobility due to poorer renters' greater exposure to forced displacement. A forced move often compels renters to accept substandard housing, which drives them to soon move again. Because of the high standards needed to get accepted as a tenant in the new Centennial Place and the time-sensitive nature of most low-income household moves, it seems unlikely that many displaced individuals would be able to find a unit at the time when Centennial Place reopened. Therefore, individuals were left settling for short-term housing which left them susceptible to further moves.

5.4 Effects of Demolition on Displacement Distance

The second question that I hope to answer centers around where displaced individuals relocated to. To test this, I study the individual address data from Infutor, which makes it possible to examine precise household locations using latitude and longitude values. Table 4 depicts these results across the study period.

The second row of the Table 4 shows that individuals in the treatment group were living nearly 2.76 miles further from their origin site than the control group in 2000. From 2000 to 2005, the difference between the two groups nearly doubles from 2.76 miles to over 5.31 miles. By the year 2005, individuals in the treatment group were living on average 8 miles from their origin site, compared to 5.5 miles in 2000. This provides evidence to support the hypothesis that displaced individuals in the treatment group continued to move after being initially displaced in the early 1990s.

5.5 Effects of Demolition on Neighborhood Quality

The third research question that I have chosen to study is: How did the average neighborhood quality of the treatment group and the control group change over the study period? Similar to the previous research question, I test whether displaced public housing residents moved to higher opportunity neighborhoods using

address information from Infutor. To test this, I use Infutor address data from January 1, 2000 and report the Census tract for each individual in the treated and control group. Then, using data from the Opportunity Atlas, I report both the Census tract poverty rate in 1990, defined as the fraction of persons below the federal poverty line, and an indicator for whether an individual is in a destination Census tract that has greater than a 10% poverty rate.

Rows 3 and 4 of Table 4 show that displaced (treated) individuals moved to lower-poverty quality neighborhoods relative to their non-displaced (control) peers. In 2000, individuals in the treatment group are living in neighborhoods that have poverty rates that are 5.2 percentage points lower than individuals in the control group. Similarly, in 2005, individuals in the treatment group are living in neighborhoods that have poverty rates that are 6.2 percentage points than their control group counterparts. I also see that individuals in the treatment group are more likely to live in low-poverty neighborhoods both in 2000 and 2005, relative to the control group.

Rows 5 and 6 show that displaced individuals also moved to neighborhoods characterized by higher levels of upward mobility. In 2000, individuals in the treatment group are living in neighborhoods with upward mobility figures that are 1.5 ranks higher than those in the control group. I also find that individuals in the treatment group are 2.6 percentage points more likely to live in a high-opportunity neighborhood relative to their control group counterparts. Similar to the poverty measures, these differences increase from 2000 to 2005. These findings support the hypothesis that individuals were moving to better and better neighborhoods even in the years after they were initially displaced.

6 Event Study Model

One concern with these results is that they may not be valid if there is a noticeable difference in these measures between the treatment and control groups before the demolitions took place. Then, the measured effects may not necessarily be attributable to the shock of the demolition, since the differences are present absent the treatment. To mitigate this concern, I employ a difference-in-differences research design to supplement the findings in the previous section.

To evaluate this design, I will estimate two variations of difference-in-differences models. The first uses the following specification:

$$y_{it} = \alpha + \beta Treat_i + \gamma Post + \lambda(Treat_i * Post) + \epsilon_{i,t} \tag{2}$$

where, i represents individual i and t represents year t. y_{it} refers to an outcome variables for individual i at year t. $Treat_i$ is an indicator for a family being in a demolished housing project, $Post$ is an indicator for whether or not the observation occurs after the year 1990. As explained in section 5.2, 1990 is chosen as the relevant year for the treatment. The coefficient of interest will be λ, which represents the interaction term between the post-1990 period and being in the treatment group.

Here, λ represents the average impact of relocation due to demolition on an individual's outcomes in the years after the demolition took place. Estimates of λ have a causal interpretation if the parallel trends assumption holds, which states that the treatment group, absent the demolition program, would have followed the same time trend as the control group (for the outcome variable of interest). In this setting, the identification assumption implies that the outcomes must be evolving similarly for both the control group and the treatment group before the treatment (demolition) took place. To evaluate whether or not this trend held true, I exploit the panel nature of my data. Then, I restrict to the set of addresses seen before the individual moves to his or her respective origin tract. Finally, I test whether or not there are parallel trends between the neighborhood quality of the treatment group and the control group in the pre-treatment period. For each of the outcome variables of interest, I find no statistically significant difference between the treatment and control groups during the pre-treatment period. These results are shown in more detail in each of the following subsections. Since parallel trends are fundamentally unobservable, I must rely on assumptions to validate this design. Because of the lack of significant differences in the pre-treatment period, I assume that the treatment group would have behaved in a similar trend as the control group if the demolitions had not taken place.

I modify this specification by replacing $(Treat_i * Post)$ with $(Treat_i * Short$, $(Treat_i * Medium$, and $(Treat_i * Long)$ to estimate the short, medium, and long-run impact. Short is an indicator for whether or not the observation occurs between 1990-1994, Medium is an indicator for whether or not the observation

occurs between 1995-1999, and Long is an indicator for whether or not the observation occurs after the year 2000-2004. I refer to this as the multiple time period difference-in-differences model.

The second specification uses yearly fixed effects in a standard event study framework:

$$y_{it} = \alpha + \beta Treat_i + \sum_t \gamma_t Year_t + \sum_t \lambda_t (Treat_i * Year_t) + \epsilon_{i,t} \tag{3}$$

where $Year_t$ is an indicator for each year in the study period. The coefficient of interest will be $lambda_t$, which represents the interaction term between year and being in the treatment group.

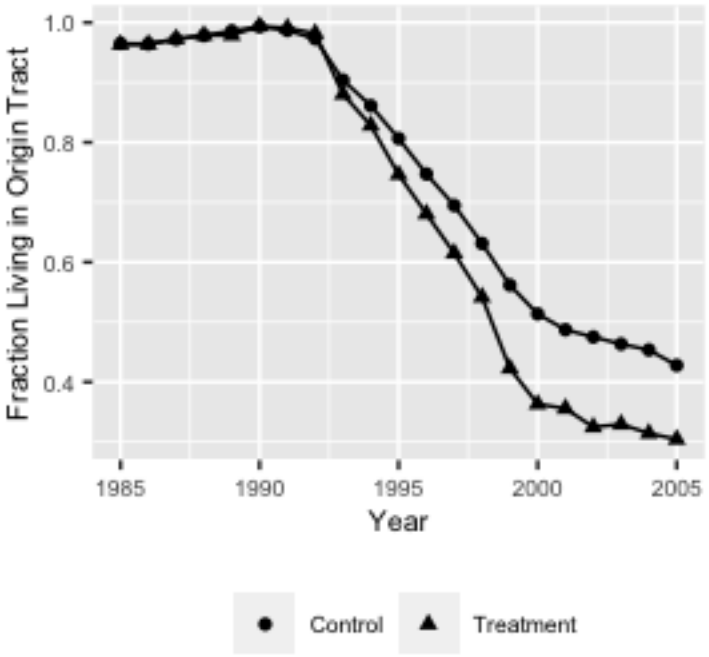
Here, λ_t years after demolition represents the impact of relocation due to demolition on an individual's outcomes in year t. Similarly, estimates of λ_t have a causal interpretation if the parallel trends assumption holds.

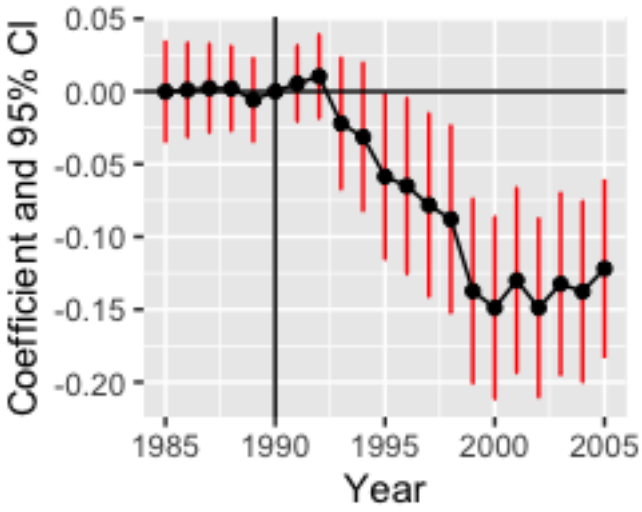
Table 5: Difference-in-Differences Estimates

Same Census Tract	-0.084^{***}
	(0.010)
Miles From Origin Tract	2.499^{***}
	(0.357)
Poverty Rate	-0.028^{***}
	(0.006)
Low Poverty Tract	0.006
	(0.008)
Upward Mobility	0.282^{*}
	(0.132)
High Opportunity Neighborhood	-0.001
	(0.004)
Observations	28489

Note: This table reports estimates of λ from equation (2). Each row represents a separate regression, with the columns as independent variables and the rows as the dependent variable. Standard errors are presented in parentheses and clustered at the Census Tract level. *p<0.1; **p<0.05; ***p<0.01

Figure 6: Fraction Living in Origin Tract Over Time





Note: In the top image, I report the fraction living in their origin tract for the treatment group and the control group for the years included in this study. In the bottom image, I plot the λ_t coefficients from equation (3) with fraction living in their origin tract as the outcome variable.

6.1 Effects of Demolition on Return to Origin Site

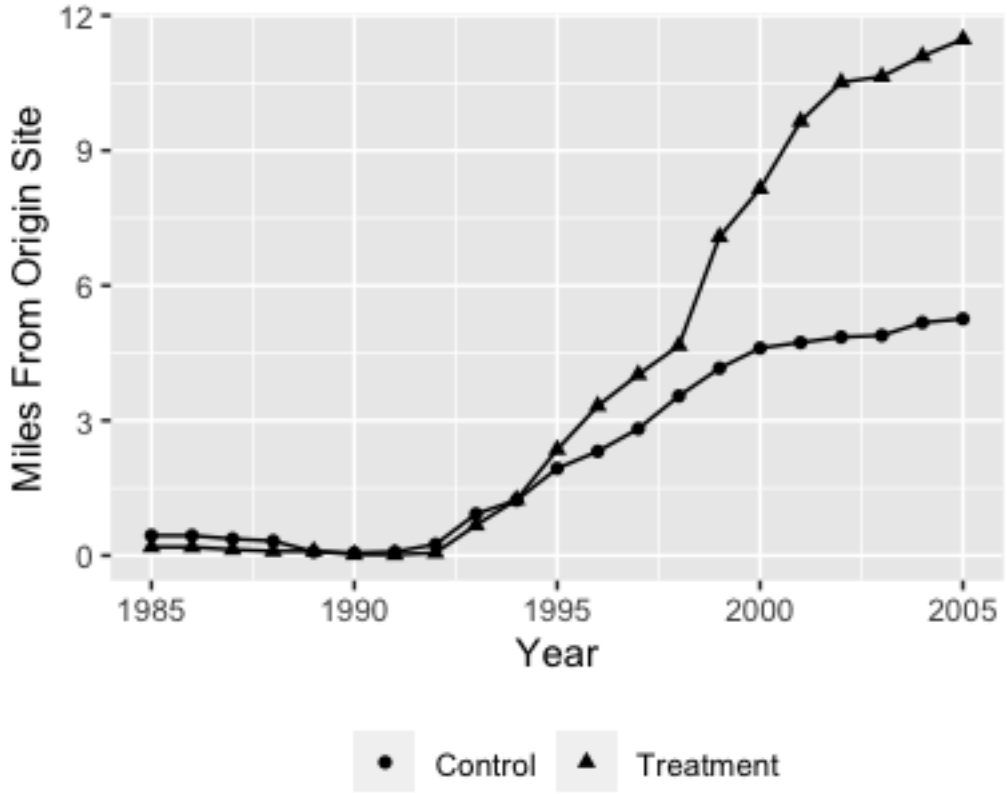
Returning to the main research questions, I again study whether the demolitions affect individuals' likelihood to live in their origin site. In row 1 of Table 5, I estimate equation (2) on the likelihood that an individual is seen as living in their origin Census tract, using 1990 as the year of the treatment, and report λ for different outcome variables. Here, I find that in the years after demolition, individuals in the treatment group are 8.4 percentage points less likely to be living in their origin tract.

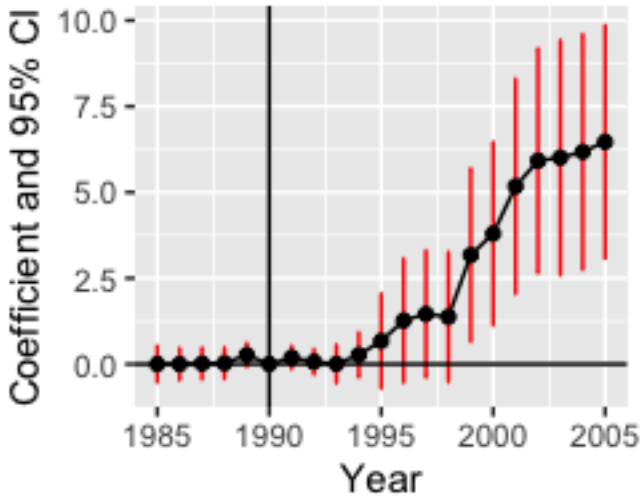
In Figure 6, I plot the results from equation (3) using likelihood that an individual is seen as living in their origin Census tract as the outcome variable. In each of the years from 1986-1994, I observe no statistically significant difference between the treatment and control group's propensity to live in their origin tract. This supports the parallel trends assumption that makes a difference-in-differences research design valid. Beginning in the year 1995, there is a statistically significant difference between the treatment and control group's propensity to live in their origin tract. Given that 1995 was when the demolition program officially began, this supports the hypothesis that the demolitions caused households to move outside of their origin Census tract. In 1995, individuals in the treatment group were 5 percentage points less likely to live in their origin tract, compared to 2.5 percentage points a year prior. In each of the years after that, there is a statistically significant difference. This difference also increases in 7 of the 9 years that are observed after the demolition takes place, supporting the hypothesis that the demolitions caused subsequent moves among affected individuals.

6.2 Effects of Demolition on Displacement Distance

I employ a similar approach to study the second research question. In row 2 of Table 5, I estimate (2) on the distance an individual is living from their origin site. Here, I find that in the years after demolition, individuals in the treatment group are living 2 miles from their origin site, a statistically significant result. In Figure 7, I plot the results from equation (3) using distance from their their origin Census tract as the outcome variable. In each of the years from 1986-1994, I observe no statistically significant difference between the treatment and control group's propensity to live in their origin tract. This supports the parallel trends assumption that makes a difference-in-differences research design valid. Beginning in the year 1999,

Figure 7: Average Distance from Origin Site Over Time





Note: In the top image, I report the fraction living in their origin tract for the treatment group and the control group for the years included in this study. In the bottom image, I plot the λ_t coefficients from equation (3) with distance from origin tract as the outcome variable.

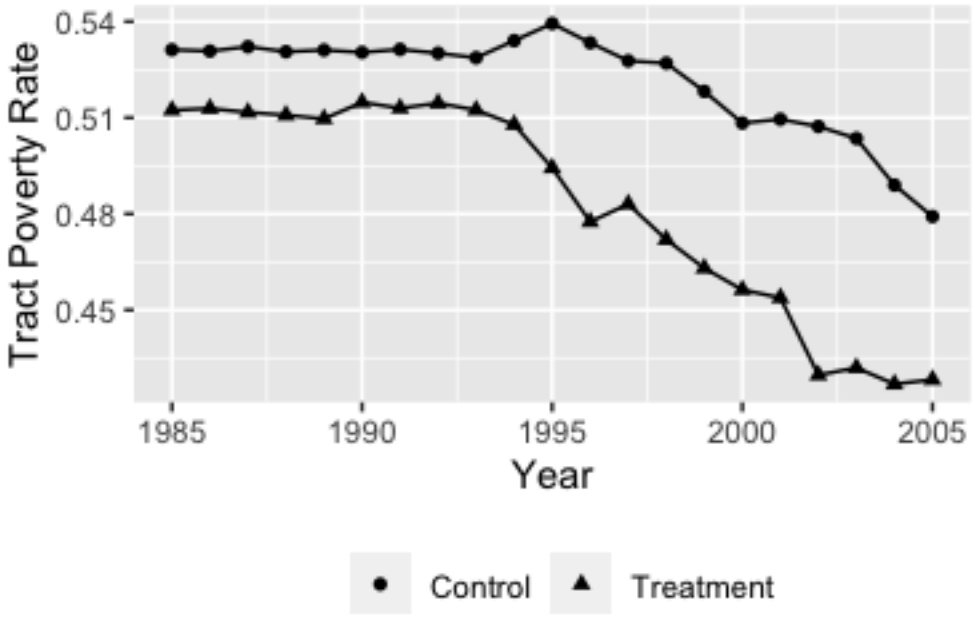
there is a statistically significant difference between the average distance from the origin site between the treatment and control groups. In each of the years after that, there is a statistically significant difference. This difference also increases in each of the years that are observed after the demolition takes place, further supporting the hypothesis that the demolitions caused subsequent moves among affected individuals.

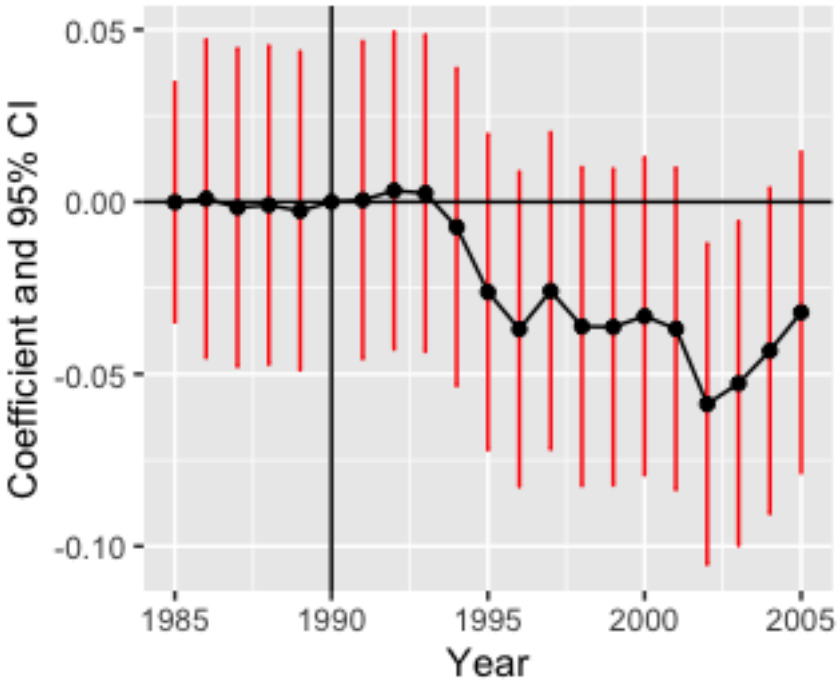
6.3 Effects of Demolition on Neighborhood Quality

Finally, I employ a similar approach to study the third research question. In rows 3 and 4 of Table 5, I estimate (2) on outcome variables related to Census tract poverty rates. For average poverty rates, I find that individuals in the treatment group are living in Census tracts that have significantly less poverty than individuals in the control group. However, I find no significant impact on the propensity to live in a "low-poverty" neighborhood.

In Figure 8, I show the results of estimating (3) on the poverty rate variable. Again, I find statistically significant differences for average poverty rates after the treatment (in this case, starting in 2001).

Figure 8: Average Census Tract Poverty Rate Over Time





Note: In the top image, I report the fraction living in their origin tract for the treatment group and the control group for the years included in this study. In the bottom image, I plot the λ_t coefficients from equation (3) with average census tract poverty rate as the outcome variable.

In rows 5 and 6 of Table 5, I estimate (2) on outcome variables related to upward mobility. For average upward mobility, I find similar results. I find that individuals in the treatment group are living in Census tracts that have significantly higher levels of upward mobility than individuals in the control group. However, I find no significant impact on the propensity to live in a "high-opportunity" neighborhood, and I find that individuals are actually slightly less likely to live in a "high-opportunity" neighborhood after 1990 compared to the control group. The results of estimating (3) on the upward mobility variable are shown in Figure 12 in the appendix.

These results suggest that while individuals in the treatment group move to better neighborhoods using these measures of neighborhood quality, they are not necessarily moving to the "highest quality" neighborhoods available.

6.4 Subgroup Heterogeneity

Table 6: Difference-in-Differences Estimates By Gender

	Male	Female
Same Census Tract	-0.079^{***}	-0.089^{***}
	(0.011)	(0.09)
Miles From Origin Tract	5.237^{***}	0.642^{*}
	(0.775)	(0.390)
Poverty Rate	-0.008	-0.010^{*}
	(0.011)	(0.006)
High Poverty Tract	-0.013	0.003
	(0.025)	(0.018)
Upward Mobility	0.130	0.031
	(0.246)	(0.184)
High Opportunity Tract	-0.019	-0.014
	(0.008)	(0.006)
Observations	9230	14837

Note: Each cell represents a separate regression, with the rows as dependent variables and the columns representing the sample used. *p<0.1; **p<0.05; ***p<0.01

With this model, I also look at possible heterogeneous effects. I first turn to gender. By estimating (2) and

restricting first to males and next to females, I notice several heterogeneous effects from the estimates of λ. These results are represented in Table 6. One is that men move much further from their origin site (5.2 miles on average) compared to women (0.6 miles on average). One possibility for this discrepancy is that many of the women in these housing projects were caring for children, which gave them less flexibility to search for sites across Georgia in order to use their housing vouchers. Table 2, which shows single parent share, shows that the 94.3% of families in living in the same tract as the treatment group only had one parent. Since many of these are single mothers, the relative lack of mobility for women can likely be traced to the propensity of single mothers in the treatment group. Because men move further, they are also more likely to end up in higher quality neighborhoods compared to women, since there is a positive correlation between distance from the city center and neighborhood quality in the Atlanta Commuting Zone (Opportunity Atlas). However, these results are very noisy due to the limited sample I have, and further tests do not find a statistically significant impact by gender for any of the outcome variables except distance from origin site.

Figure 9: Age Distribution for Full Sample

I then turn to age and replicate my analyses. Figure 9 shows the age distribution for the entire sample used in this study, and Table 7 reports the difference-in-differences estimates by age. Here, I see a general

Table 7: Difference-in-Differences Estimates By Age

	Below 15 Years Old	15 − 30 Years Old	30 − 60 Years Old	Above 60 Years Old
Same Census Tract	−0.054	−0.053*	−0.032	−0.294***
	(0.036)	(0.023)	(0.09)	(0.112)
Miles From Origin Tract	5.341***	2.754***	1.562·	−0.055
	(2.025)	(0.865)	(0.861)	(0.622)
Poverty Rate	-0.034***	−0.062***	−0.003	−0.077
	(0.016)	(0.013)	(0.010)	(0.06)
Low Poverty Tract	0.0187	−0.0176	−0.007	−0.094
	(0.036)	(0.012)	(0.010)	(0.06)
Upward Mobility	0.001	−0.001	−0.273	−0.222
	(0.286)	(0.329)	(0.354)	(0.789)
High Opportunity Tract	0.016	− 0.030***	−0.273	−0.222
	(0.021)	(0.009)	(0.354)	(0.789)
Observations	2398	8436	5112	2526

Note: Each cell represents a separate regression, with the rows as dependent variables and the columns representing the sample used. *p<0.1; **p<0.05; ***p<0.01

trend between younger individuals and displacement. On average, individuals below 30 years old move the furthest, and move to significantly lower-poverty neighborhoods. These results show significant heterogeneity in the moves made based on an individual's age, as I find that younger individuals in my sample are more mobile.

Table 9 in the appendix presents estimates of the effect of being in the treatment group interacted with different individual characteristics. For each set of characteristics, I find that the interaction terms are statistically significant at the 10% level. Thus, there is some evidence that there are heterogeneous treatment effects based on the individual characteristics I have access to in Infutor. Men on average moved further from their origin tract, as do younger individuals in my sample.

7 Discussion

7.1 Comparison with Previous Studies

These results contribute to the growing literature surrounding the effects of exiting public housing projects. Studies of the MTO experiment provide some of the most credible evidence of the impacts of relocating children from disadvantaged neighborhoods.

One consistent finding in the MTO analysis and the results of this paper is that Section 8 vouchers are used to move to lower-poverty neighborhoods. In their analysis of the MTO study, Chetty et. al (2015) find that assignment to the Section 8 voucher group led to living in Census tracts that on average had poverty rates that were 8 percentage lower than the control group. In my study, those who were displaced moved to Census tracts with 6 percentage point lower poverty rates than the control group. These results provide further evidence that being offered Section 8 vouchers leads to individuals moving to lower-poverty neighborhoods.

These results also contribute to the literature surrounding the causal effect of public housing demolitions on affected individuals. Nearly 30 years since the first HOPE VI initiatives were launched, researchers have been curious to study the effects of HOPE VI and similar demolition efforts on affected families. As demolishing low-income housing projects and granting families vouchers has become a widespread policy to alleviate the concentration of inner-city poverty, focusing on the impacts on individual residents can be an effective way to measure the welfare effects of these movements.

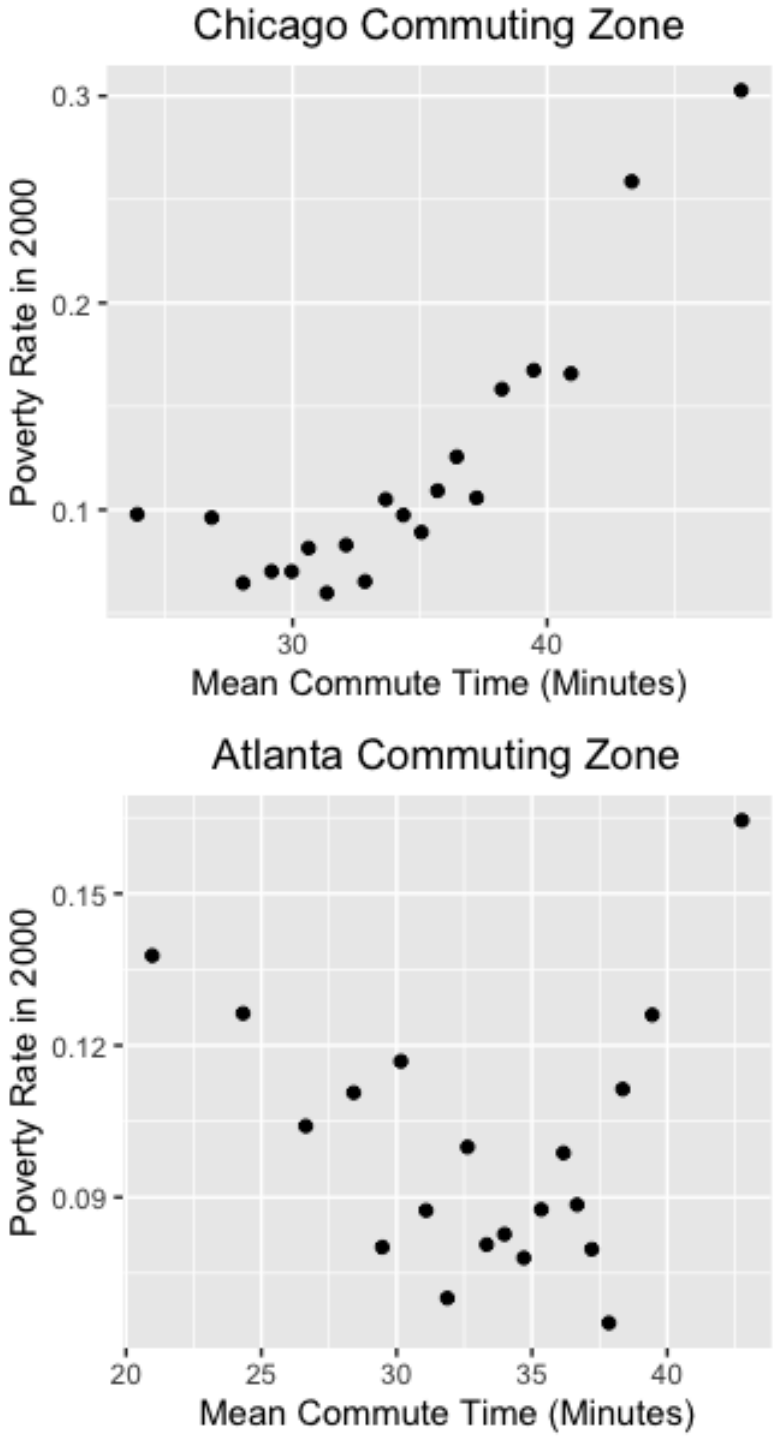
In other research that studies the relocation of families living demolished public housing projects, Clampet-Lundquist (2004), Boston (2005) and Chyn (2016) all find evidence that demolition causes families to move to higher quality neighborhoods. The results in this paper are consistent with these findings, as individuals in the treatment group are reported as living in significantly lower-poverty neighborhoods.

At the same time, the positive impacts of relocation due to public housing demolition contrast with analysis conducted in Chyn (2016), by finding that the effects become larger over time. In this study of public housing demolitions in Chicago, differences in neighborhood conditions became smaller over time. Eight years after displacement, Chyn finds no detectable differences between displaced and non-displaced

households.

Why might estimates of the impact of demolition differ from what one might expect based on the analysis in Chyn's paper? One reason may be because of the differences in the geography of neighborhood quality between Atlanta and Chicago. To study this, I study the relationship between poverty rates and mean commute times in 2000, which I use as a proxy for sprawl, using data on Census tracts in the Chicago and Atlanta commuting zones from the Opportunity Atlas. I find that in Chicago, there is a positive correlation (0.367) between a Census tract's 2000 poverty rate and their mean commute time, while in Atlanta, there is a negative correlation (-0.09). This is shown visually using binned scatter plots in Figure 10.

Figure 10: Relationship Between Mean Commute Times in 2000 and Poverty Rates in 2000



Note: This figure plots the binned means of these variables, using 20 bins. Mean commute time is given by the Opportunity Atlas, and this variable is constructed using 2000 Decennial Census data the share of workers commuting to work in specific bins ($<$ 5 minutes, 5-9 minutes, 10-14 minutes, etc.), imputing the mean time commuted in a given bin (i.e. for 5-9 minutes, imputing mean commute time of 7 minutes), and then calculating a sum of imputed mean commute times within each bin weighted by the share commuting (Chetty et. al 2020).

This trend signals that for Census tracts in Chicago with long commute times (typically those furthest from the city center), there is likely to be a higher rate of poverty compared to tracts in Atlanta with similar commute times. This relates to the findings in this paper because in Atlanta during 1990, poverty was concentrated much more in the inner city than it was in Chicago. Therefore, policies that aim to move individuals out of the city may be much more impactful in cities like Atlanta, where moving to the suburbs means that you are more likely to be in a low-poverty neighborhood.

It is also important to compare these results to papers that do not find significant positive effects of demolition on household neighborhood characteristics. In Haltiwanger et. al (2020), the authors find that there was no significant difference between the propensity to move out of public housing between the treatment and control group 5 years after demolition. They also find that HOPE VI did not lead households to move to higher quality neighborhoods as measured by Census tract school quality and poverty rate, or to demographically distinct neighborhoods. One noteworthy difference between the samples used in the Haltiwanger et. al (2020) paper and this study is that the individuals in the Haltiwanger et. al (2020) paper on average come from much lower poverty neighborhoods. The average poverty rate for the demolished housing sites for the treatment group is 37.4% in the Haltiwanger et. al paper, compared to 70.5% in this study. When controlling for origin tract poverty rates, the Haltiwanger et. al paper finds that HOPE VI had significant positive impacts on neighborhood quality and earnings in adulthood for affected children.

7.2 Implications for Demolition Policies

As the first-ever use of HOPE VI funding, this case study is an important one to study for the future of housing assistance.

This paper provides evidence that many of the policy objectives of the Atlanta Housing Authority under the leadership of its former Executive Director, Reneé Glover, have been achieved. One of the central goals was to reduce the concentration of low-income public housing residents in the Techwood-Clark Howell projects. Prior to the decision to demolish and rebuild the complexes, Techwood and Clark Howell Homes provided 1,195 units of public housing for more than 1,100 households. After rebuilding, the Centennial Place apartments contained 900 units of mixed-income housing, and of this, only 360 (40 percent) were

designated for former public housing residents. As a result, many of the original public housing residents were forced to find new housing, and this paper details the relocation decisions of these affected residents. Of the 1,115 households in residence in 1990, a total of 545 households received relocation assistance from the AHA. Of this number, 367 received Section 8 housing voucher certificates and 178 moved to other public housing. This suggests that more than half of the total number of residents in 1990 moved or were evicted without any assistance (Keating 2000).

Section 8 housing vouchers played a critical role in this initiative. Through the voucher program, qualifying families paid only a percentage of their income–originally 15 percent, but later amended to 30 percent–for rent; the vouchers paid the difference between that amount and the unit's rent. While I am unable to observe voucher usage in my dataset, reports from the Atlanta Housing Authority show that the vouchers were influential in dispersing poverty from Techwood-Clark Howell. The Section 8 recipients were scattered among 90 different neighborhoods in the city with each area receiving 10 percent or less of the total (B. Dona and Smith, Inc. 2000). This suggests that the AHA's policy shift to move residents from public housing in order to reduce isolated concentrations of poor people within the City of Atlanta is having some of its desired effects.

However, there are concerns raised by the focus of moving individuals from public housing to Section 8 housing by the AHA. One is that these Section 8 recipients may not have been able to receive the same level of social services that could be delivered to more concentrated groups of public housing residents. Another concern is attrition. Haltiwanger et. al (2020) provides evidence that households were displaced from assisted housing in the years after demolition. If these households rely on public housing assistance, being forced out of public housing due to demolition may negatively harm a household's level of welfare.

When looking at the effects of HOPE VI more generally, this also provides an important case study for the relationship between public and private entities and housing policy. The Olympic Legacy Program was the catalyst for the mixed-finance approach under HOPE VI, which set a precedent for public-private partnerships to revitalize impoverished communities. With the Olympic Legacy Program, the AHA transformed its portfolio from conventional public housing to high-performing, mixed-income real estate. Private sector developers became partners in rebuilding the mixed-income properties such as Centennial Place. Centennial

Place was redeveloped and is now managed by a consortium of private companies known as the Integral Partnership of Atlanta.

This shift towards public-private partnerships had a number of effects on the operations of the Atlanta Housing Authority. As a result of HUD policies that supported mixed-finance developments, the AHA severely cut the size of its staff and worked much more closely with private developers (Newman 2002). Functions that were once poorly performed by the Agency were now contracts open for private bidding. Over time, both managing new developments and overseeing existing projects became primarily handled by private entities. This shift had various effects on public housing residents. Private management companies overseeing these projects lacked an incentive to provide social services and recreation facilities for residents, meaning that amenities in these housing projects often declined in quality. They were also more strict landlords than the AHA, often applying a "one strike and you're out" management style for negligent tenants (Newman 2002). For housing projects meant to support the most economically vulnerable members of society, these new policies were often detrimental. While it is difficult to prove a causal link, the increase in public-private partnerships can be related to the increase in low-income out-migration from revitalized neighborhoods (Turbov et al 2005).

Lastly, and most broadly, these public-private partnerships accelerated trends of gentrification within the city. In the early 1990s, the city held the dubious title of having the highest proportion of its residents in public housing in the nation. Three decades later, that proportion has fallen to zero — Atlanta has demolished all of its former public housing stock. As public housing demolition became a more attractive, low-cost solution to the city's high concentration of inner-city poverty, Atlanta continued to systematically tear down its traditional brick and cinder block public housing projects throughout the 2000s. Former residents received vouchers to help pay for privately managed apartments and houses, and the city made plans to replace its public housing stock with mixed-income developments, much of it through further HOPE VI grants or private investment (Garlock 2014). As these new developments reduced housing supply and increased demand to live by these up-and-coming neighborhoods, the result was a dramatic increase in inner-city housing prices. Between 2000 and 2010, the typical inflation-adjusted rent in the city of Atlanta rose by 13 percent, even as the typical suburban rent fell by 9 percent. This priced out many low-income families,

pushing them to the suburbs (Kneebone et. al 2013).

As a result, the inner-city has become a more gentrified area, while the poor have been pushed out to the suburbs. Many of these former inner-city residents received vouchers to help pay for privately managed apartments and houses, often incentivizing them to move to the cheaper suburbs. We can see this through an analysis of where housing vouchers in the metropolitan area have been used. From 2000 to 2008, the share of the region's voucher holders in the suburbs increased dramatically, from 66 percent to 79 percent—the second-largest increase among major metropolitan areas (Kneebone et. al 2013). For voucher holders and middle-class families trying to make the most of their mortgage budget, moving to the suburbs, where currently the majority of the affordable housing in the area exists, is often the cheapest option.

This trend has culminated in an escalation of the rate of poverty in Atlanta's suburbs since 2000. Back in the 1970s, the number of poor in the city and suburbs was about equal. By 2010, 87 percent of metro Atlanta's poor people lived in suburbs (Burns 2013). Although this is representative of demographic trends seen across the US during this period, the shift has been much more dramatic in Atlanta. According to the Brookings Institution, the suburban poverty rate in metro Atlanta increased by 7.2 percentage points between 2000 and 2013, the largest change among the 25 largest metro areas in the nation (Kneebone and Berube 2013). Many studies have linked this trend to the change in housing policy by the AHA over the past decade, which can all be traced back to the Olympic Legacy Program (Brown 2009, Burns 2013, Kneebone and Berube 2013).

7.3 Implications for Mega-Events

Do these findings suggest that every mega-event should be used as a catalyst to displace individuals from high-poverty neighborhoods? Due to the limitations of this study, I would argue not.

Reports and conceptual papers cited in this paper have described that forced evictions or displacements of residents have happened in all host cities of sports mega-events in the last 30 years (Vale et. al 2013; Boykoff 2014; Zimbalist 2017). The case of Atlanta is no different, as this paper provides significant evidence of displacement, both direct and indirect, stemming from the Olympic Legacy Program. This fact seems to indicate the lack of commitment that the guardians of sport mega-events have had with the United Nations

Sustainable Development Goal (SDG) 11 – Make cities and human settlements inclusive, safe, resilient, and sustainable. While we do see evidence of positive side-effects of housing displacement on affected families, in no way do these results contradict the lack of commitment to this goal.

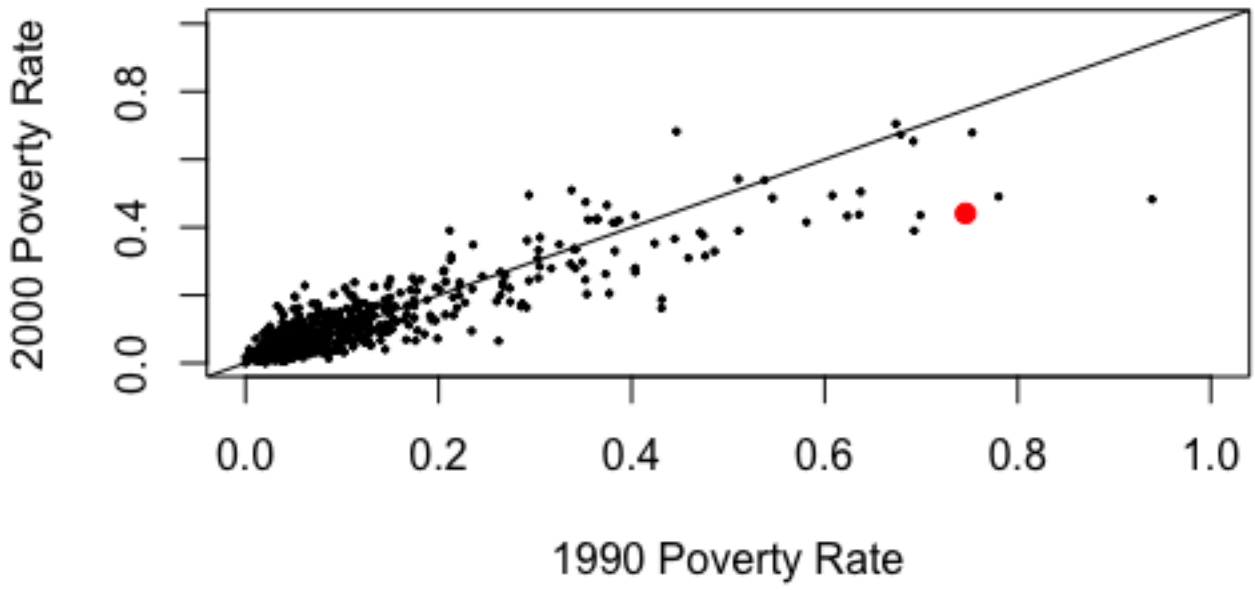
In the case of Atlanta, this paper does not explore an important outcome variable – incarceration. Throughout history, mega-events have been a catalyst for the increased criminalization of low-income people. In the lead-up to the Atlanta Olympics, some 9,000 poor Atlantans were arrested during the 18 months before the Opening Ceremonies (Vale et. al 2013). Anita Beaty, the Executive Director of the Metro Atlanta Task Force for the Homeless, said she came into possession of piles and piles of arrest citations pre-printed with the designations "homeless" and "African-American." All the arresting officer had to do was fill in a name (Vale et. al 2013). If individuals in the treatment group were disproportionately affected by this trend, then there is potential for bias in my estimates from this study. Since the Olympic Legacy Program escalated housing displacement, it is plausible that at least some individuals in the treatment group became homeless in the lead-up to the Olympics. However, because of limitations with my sample from Infutor, there is no way to determine whether or not an individual in my sample has been incarcerated. Since Infutor records are determined largely by transaction data, they likely systematically exclude those who are incarcerated. Therefore, any follow-up study should take into account incarceration records to more accurately determine an individual's place of residence throughout the relevant time period.

Another important-to-discuss limitation of this study is that I am lacking information on individuals' educational and employment-related outcomes. It is not immediate that moving to better neighborhoods will improve economic outcomes for everyone who moves. A key finding in Chetty and Hendren (2017) is that better neighborhoods have significant childhood exposure effects on income in adulthood. However, an important caveat in the paper is that exposure effects from moving to better neighborhoods scale linearly with time spent in a better neighborhood, and these effects do not persist after an individual is over 23 years old. If older individuals move to better, suburban neighborhoods but do not see an improvement in their economic outcomes, these policies simply spread out the poor population in the city. Because many people still associate poverty as an urban issue, this can make it even harder to get adequate assistance to the suburban poor. According to the Brookings Institute, agencies in Atlanta's suburbs get just $2 in nonprofit

grants per poor person annually, compared with the $72 awarded to their city counterparts (Allard and Roth 2010). Oftentimes people in these suburban communities even try to ignore the plight of their neighbors, as they convince themselves that the suburbs are where opportunities are abundant for all (Burns 2014). Further research linking housing displacement with tax records could better study how these moves relate to economic outcomes.

Lastly, a limitation of this study is that I largely use static measures of neighborhood quality. To measure the quality of destinations after displacement, I would ideally have access to poverty rates at the exact time when individuals move to their new address. However, I only have access to Census data every 10 years, and chose to present 1990 poverty rates as my measure of neighborhood quality throughout the study period.

Figure 11: Census Tract Poverty Rates in Atlanta Commuting Zone



Note: The red tract is the neighborhood containing Techwood-Clark Howell. A 45 degree line is provided for reference

Figure 11 shows how the poverty rates changed in the Census tract containing Centennial Place from

1990-2000, compared to the rest of the Atlanta commuting zone.[4] This neighborhood had one of the most dramatic changes in poverty rates from 1990-2000, with the poverty rate decreasing from 71% to 45% in this decade. Therefore, since I use 1990 baseline characteristics to measure neighborhood quality, my results may understate the impact of returning to this neighborhood post-displacement. By the measures of neighborhood quality used in this paper, the revitalized Centennial Place neighborhood was a much better community than the one that individuals were displaced from in 1990, and it is possible that the revitalization program led to an increase in economic opportunity for low-income families as a result.

Given these limitations, it is difficult to assess the external validity of these results on other mega-events or public housing revitalization programs more generally. However, this paper still has valuable findings. It shows clear evidence of forced displacement by the Olympic Legacy Program, as I observe affected individuals living significantly further from their origin site than individuals in the control group. Further research using economic outcomes is necessary to quantify this program's impact on the welfare of those directly affected.

8 Conclusion

For most of the 20th century, Atlanta was known for its public housing. The city had pioneered the concept in the 1930s, opening Techwood Homes as the nation's first government-owned housing project in 1936. By the early 1990s, the Atlanta Housing Authority owned roughly 14,000 individual units across 43 properties, though more than 5,000 of these dilapidated apartments had been deemed uninhabitable by then (Garlock). At the time, the city held the dubious title of having the highest proportion of its residents in public housing in the nation.

However, things began to change soon after the city of Atlanta was named as the host for the 1996 Summer Olympic Games. With the low-income neighborhoods of Techwood-Clark Howell in dire need of revitalization, the Atlanta Housing Authority used the Olympics as a catalyst to demolish these housing projects and build a new, mixed-income neighborhood. Known as the Olympic Legacy Program, the main goal of the initiative was to reduce the concentration of poverty in the city and improve neighborhoods, employment and education opportunities for affected families.

[4]This refers to Census tract 1312101900, which is where the majority of the revitalization took place

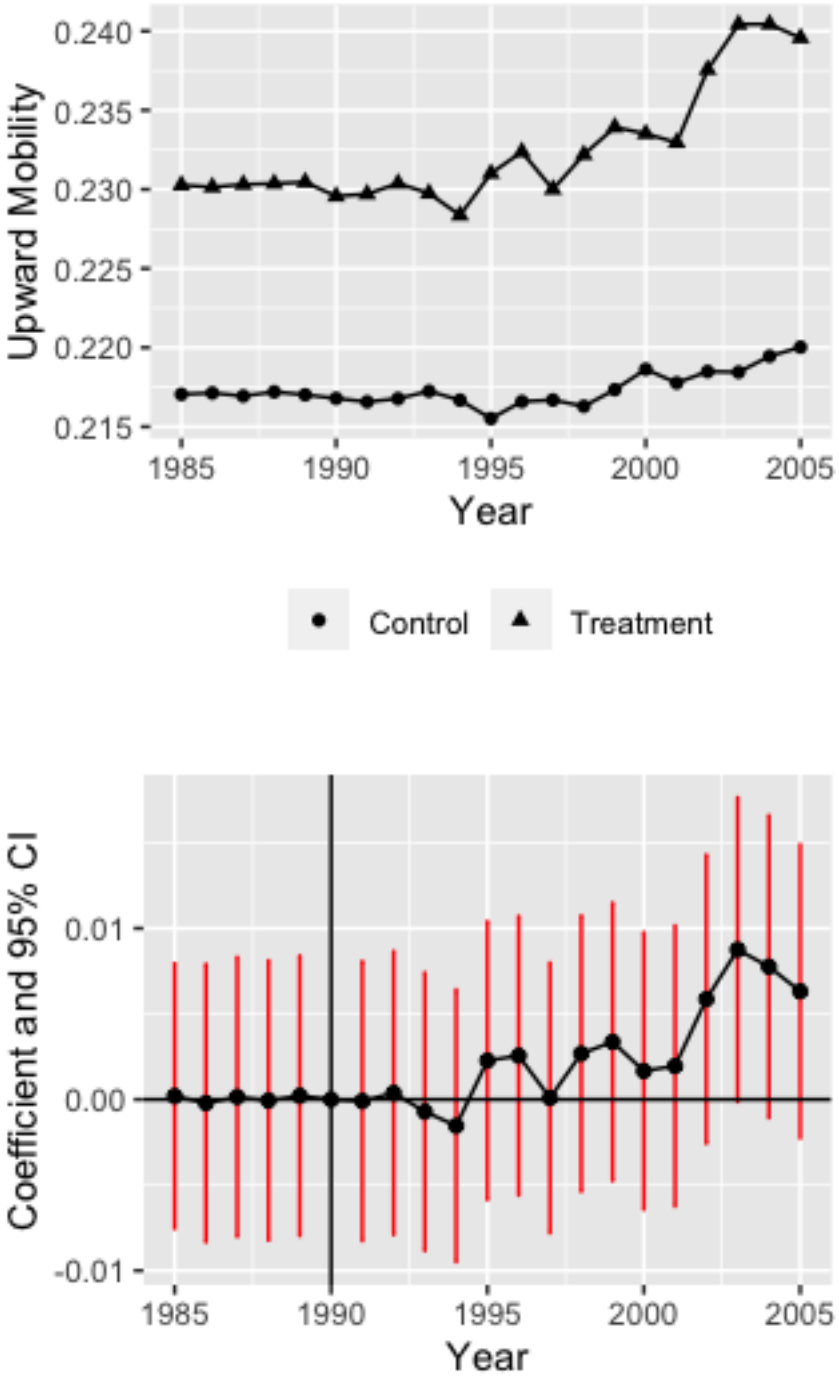
This paper uses data on individual addresses and to study how the Olympic Legacy Program in the city of Atlanta and its associated public housing demolitions affected the relocation decisions of affected individuals. Using a reference year of 1990, individuals in the treatment group are living on average 3.5 miles further from their 1990 address compared to individuals in the control group, as measured 5 years after the Olympics demolitions. This effect increases over time, as the average difference between the groups is nearly 6 miles, measured 10 years after the demolitions. I also find that individuals in the treatment group on average are living in Census tracts that have poverty rates that are 5 percentage points lower than those of the control group. I find that these effects are most significant for young men, who move the furthest from their origin site.

By accelerating the mobility of households away from high-poverty neighborhoods, the results in this paper provide evidence that mixed-income revitalization in Atlanta led affected individuals to move to lower-poverty neighborhoods. However, through my difference-in-differences model, I do not observe a significant change in the likelihood to live in either a low-poverty or high-opportunity neighborhood, therefore there may be limits to the extent to which this Program led individuals to move to the best neighborhoods available.

This paper adds to the growing research focusing on estimating of the impact of place-based policies to improve low-income neighborhoods on the intended beneficiaries — the incumbent adult residents and their children. Public housing redevelopment efforts via the federal HOPE VI program have improved the trajectories of high-poverty and racially segregated neighborhoods, and the Centennial Place redevelopment project is a great example of this. However, this paper details an important consequence of these private sector redevelopment efforts - many poorer and residents became displaced from their incumbent neighborhoods. Further research linking tax records and public assistance records would be a valuable addition in order to study how economic outcomes change as a result of place-based policies.

Appendix

Figure 12: Average Upward Mobility Over Time



Note: In the top image, I report the fraction living in their origin tract for the treatment group and the control group for the years included in this study. In the bottom image, I plot the λ_t coefficients from equation (3) with Census tract upward mobility as the outcome variable.

Table 8: Short-, Medium- and Long-Run Difference-in-Differences Estimates

	Short-Run	Medium-Run	Long-Run
Same Census Tract	0.0283*	−0.055*	− 0.0996*
	(0.015)	(0.015)	(0.015)
Miles From Origin Tract	−1.166**	0.540	4.522***
	(0.438)	(0.435)	(0.437)
Poverty Rate	0.010	−0.023	−0.038**
	(0.009)	(0.009)	(0.009)
Low Poverty Tract	0.001	0.005	0.015
	(0.011)	(0.011)	(0.011)
Upward Mobility	−0.335*	−0.067	0.322*
	(0.146)	(0.144)	(0.145)
High Opportunity Neighborhood	0.005	−0.003	−0.001
	(0.006)	(0.006)	(0.006)

Note: Short-Run refers to the period from 1990-1994, Medium-Run refers to the period from 1995-1999, and the Long-Run refers to 2000-2005. Each row represents a separate regression, with the columns as independent variables. *p<0.1; **p<0.05; ***p<0.01

Table 9: Heterogeneous Effects

	Distance From Origin Tract	
	(1)	(2)
Treatment Group	0.4021*	3.856***
	(0.223)	(0.498)
Treatment Group * Male	3.533***	
	(0.3551)	
Treatment Group * Between 15 and 30 Years Old		−1.992***
		(0.571)
Treatment Group * Between 30 and 60 Years Old		−2.803***
		(0.547)
Treatment Group * Above 60 Years Old		−3.926***
		(1.090)
Observations	31,338	31,338

Note: The outcome variable for this table is the distance from the origin tract. Each column presents results from a separate regression in which the indicator for the Treatment Group is interacted with a different individual-level variable. Note that there are 4 different age groups: Below 15 Years Old, Between 15 and 30 Years Old, Between 30 and 60 Years Old, and Above 60 Years Old. Standard errors are clustered at the Census tract level and are presented in parentheses. *p<0.1; **p<0.05; ***p<0.01

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