UNINTENDED CONSEQUENCES:
AN EXAMINATION OF PUBLIC SCHOOL ENROLLMENT PATTERNS
ASSOCIATED WITH URBAN RENEWAL

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Candace Bacchus Hollingsworth, B.A.

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Thesis Advisor: Laura LoGerfo, Ph.D.

ABSTRACT

This study examines the relationship between indicators of urban renewal and public school enrollment during the period 2005-2007. Tiebout’s theory of public expenditures (1956) and Park and Burgess’ characterization of the American city (1925) have influenced cities’ approaches to urban renewal. Most recently, federal legislation under HOPE VI codified broad goals of urban renewal making neighborhood revitalization as much an issue of social change through poverty reduction as economic growth. In this light, previous research has evaluated the effectiveness of urban renewal programs in meeting its social and/or economic goals. Absent from these analyses are discussions of the role of public education (K-12) in sustaining renewal. Scholars have, however, recognized that access to high-quality education is critical to mitigating cycles of poverty and have also examined the relationship between housing and school choice. This study is an extension of that research of these two complementary, but separate research threads.

In their efforts to attract professionals and upwardly mobile families to the city center, urban planners have ignored the potential impact of these individuals and the
preferences they have for education on the schools that rely on the urban population for longevity. Using a first-difference estimation model, this study demonstrates that public school enrollment in urban areas undergoing renewal is influenced heavily by the change in demographics characteristic of urban revitalization – increases in family income, professional couples without children and families with children whose housing decisions are not yet influenced by school quality. While this study does not aim to explore the reasons behind decisions made by parents in search of quality education, it instead uses what is known of parents’ decisions regarding housing and education to examine the relationship between renewal and a subsequent decline in public school enrollment.
This thesis is dedicated to Ellis and Zora.

Were it not for your boundless potential I would have given up a long time ago.

You deserve it.

Mommy
INTRODUCTION

With the introduction of the HOPE VI program in 1992, the Department of Housing and Urban Development (HUD) made urban revitalization an agency priority for the next 16 years. The program’s design placed the fundamentals of New Urbanism at the core of its efforts to create safe, attractive and livable spaces in areas plagued by poverty, violence, cramped and dilapidated public housing, and minimal aesthetic appeal. Though not the sole source of funding for urban renewal projects (several community revitalization investments and development projects have been funded by private developers) the HOPE VI program has catapulted similar investments in major US cities including Atlanta, GA, Chicago, IL and Washington, DC, Chicago, IL.

Yet, HOPE VI revitalization zones and other privately funded projects have documented little success in developing the mixed-income communities that they strive to create (Popkin, Katz, Cunningham, Brown, Gustafson & Turner, 2004; National Housing Law Project, 2002). By subscribing to New Urbanism, which places commerce, transit and housing at the center of its model for urban planning the HOPE VI program ignores one of the largest public investments – public schools. The availability of better housing, transportation and businesses attracts those for whom the level of provision of these goods is optimal. When a variety of school choice options are available to parents within the metropolitan area, families can remove the quality of
area schools from their choice set. Because the option to obtain higher quality education is available outside of the residential area, a family can continue to live in an area with poor schools provided their preferences for all other goods are met. Optional school choice programs and demographic changes work together in influencing parents’ decisions regarding where to live and where to send children to school (Barrow, 2002; Reback, 2005; Reback 2008). Without intentional and deliberate improvements in housing, local business and mass transportation, US cities risk further concentration of low-income students in low-performing schools and/or school closures due to a draining of students from the public school systems. These are all the unintended, but very real consequences that policymakers must face when school reform vis-à-vis program and curricular design and property improvements is not included or considered in the development of policies impacting urban renewal.

This paper will establish a motive for inclusion of urban renewal, as exhibited through indicators such as income, construction and household demographics, in the conversation around school reform. The first section lays the foundation for studying urban renewal in the cities chosen – Atlanta, GA, Chicago, IL and Washington, DC. The second section reviews existing research that investigates the relationships between housing and parental preferences in education. By incorporating historical theoretical perspectives of renewal found in Tiebout’s seminal work examining the theory of public expenditures in American cities and Park and Burgess’
groundbreaking review of the spatial structure of US cities and legislative action most notably in the form of HOPE VI, I consolidate the lens through which housing and education reform are viewed. It is in this way that the connection between urban renewal and public school enrollment is established. The third section presents the data and methods used to estimate the relationship between indicators of urban renewal and changes in public school enrollment levels. Finally, a strategy for bringing urban renewal and city planning into the education reform conversation is presented alongside suggestions for additional research on the same subject.

**LITERATURE REVIEW**

*A Historical Perspective of Renewal in Atlanta, GA, Chicago, IL and Washington, DC*

Though each of the three cities to be examined in this study have undergone varying degrees of renewal in the past decade, the factors leading to renewal highlight the shared experiences of US cities seeking economic growth. In its earliest form, urban renewal was the result of President Franklin Roosevelt’s agenda to rid US cities of tenements and slum dwellings by providing government subsidized public housing. The creation of public housing required the demolition and clearing of slums and tenements to make room for multi-family and often multi-level housing in city centers. Following the Great Depression and World War II, northern cities such as Chicago and Washington, DC saw an influx of African-Americans seeking employment and refuge
from the Jim Crow South. This rise in the African-American population also increased
the number of families living in newly built public housing and prompted flight of
White families from the cities to suburban areas or, in the case of Washington, DC, the
creation of alley housing for poor families living within the same communities as
wealthy residents. In 1948, the US Supreme Court declared the use of restrictive
covenants unconstitutional paving the way for the later passing of the Fair Housing Act
under the Civil Rights Act of 1968 (Teaford, 2000). These pieces of legislation
allowed middle-income African-Americans to move to areas of the city and suburbs
that were previously off-limits due to discriminatory housing practices. The absence of
middle-income families to provide the economic support for the community
accompanied by other shifts in city demographics (racial and socioeconomic), some
sociologists argue led to creaming and thus, to the eventual demise of public housing.
The developing social structure of Atlanta, Chicago and Washington, DC set the stage
for the focus of urban renewal programs to be as much about mitigating poverty as
well as developing the economic infrastructure of the city.

Mass transit has played a much larger role in the renewal of Washington, DC
neighborhoods than of other cities included in this study. DCs mass transit system has
allowed for greater interaction among city residents that were previously unable to
access other sections of the city (Kahn, 2007). The most recent major additions to the
system were as late as 2001 with the expansions of the Green and Red Lines.
Neighborhoods along these corridors of the new rail system, such as Georgia-Petworth and Chinatown, saw an influx in businesses and commercial and residential properties. Residents in these areas noted changes in the demographics of the neighborhoods signaling that the once racially stratified DC was becoming more diverse, with more White families moving into historically predominantly African-American neighborhoods. While the spatial constraints for Washington, DC limit the breadth of physical space covered in the datasets used, the high concentration of poverty, wide income gaps and residential segregation offer a unique backdrop to the study and the conclusions drawn (Lazere, 2007).

A number of historical factors have contributed to the ability of urban renewal programs to address poverty and economic development and the pace at which such development occurs. In 1990 the city of Atlanta won the bid to host the 1996 Olympics, a move that prompted the development and revitalization of stadiums, parks and other arenas. The process for selecting areas for redevelopment highlighted the difficulty for Atlanta city administrators to balance competing interests in mitigating poverty and boosting the economy. In most cases, business interests outweighed those of poor, predominantly African-American community leaders. Residents, mostly middle-class and White, were successful at preventing the development of large arenas or other Olympic sites in their neighborhoods citing increase in traffic as a major concern. The same concerns existed for residents in the Summerhill neighborhood in
downtown Atlanta; however, Summerhill was designated to receive a significant amount of funds for development in anticipation of the summer games. Those opposed to the redevelopment of the Summerhill neighborhood supported the flow of money into the area, but were wary that this redevelopment would result in displacement of poor Atlantans to other areas of the city and neighboring suburbs (Newman, 1999; Stone, 1986).

The city of Chicago has experienced similar revitalization that situates business interests against those of city residents. In the 1966 case *Gautreaux v. Chicago Housing Authority*, Chicago residents led by Dorothy Gautreaux filed a lawsuit against the Chicago Housing Authority to argue that public housing was being built, intentionally, in predominantly African-American areas of the city where access to public resources were already limited. This discriminatory practice would further compound issues of race and class in Chicago. As a result of this case, the Gautreaux Project began in which CHA was required to provide housing vouchers to public housing residents who were currently in isolated housing without access to adequate public resources. Although there is a legal precedent in Chicago that addresses residential segregation and isolation from public resources, the city has also found difficulty balancing business interests with the social goals of urban renewal. Tax Increment Financing (TIF) has proven useful to the city in the redevelopment and revitalization of the city center (Zielenbach, 2005; Healey & McCormick, 1999).
Re-engineering access to public goods through urban renewal

As evidenced by the experiences in Atlanta, Chicago and DC, US cities have employed various approaches to urban renewal. Some approaches, like that seen in Chicago, IL make the economic growth of the city the clear objective for such renewal programs while others make the social goals of urban renewal more explicit and find difficulty balancing the two. Each of the cities studied here, however, identify that the best method to work toward achieving the economic and social goals of urban renewal is through intentional restructuring of the availability of public goods to city residents.

The optimal level for the provision of public goods (education, police and fire protection, hospitals, etc.) can be achieved when it is based on the individual preferences of those residing in an area (Tiebout, 1956). Likewise, city expenditures on local public goods are also often determined by the preferences of those living in the communities. Given that individuals will move to the community where the provision of public goods matches his/her preferences, policies that promote mobility should improve the allocation of expenditures on public goods and promote the self-sufficiency of community residents (Tiebout, 1956; Rosenbaum & DeLuca, 2000).

One organization, the Congress for the New Urbanism (CNU), articulated this need for communities to provide greater access to public goods in urban areas. Over the past 25 years, CNU has convened stakeholders in urban renewal including public officials, city planners and community organizers to develop an interdisciplinary
approach to solving suburban sprawl and promoting “real neighborhoods and diverse
districts” (Congress for the New Urbanism, 2008). In its *Charter of the New Urbanism*
(1996), CNU outlines the principles necessary to influence the policy and planning of
cities from the macro-level (metropolis) down to the micro-level (blocks). The
principles of *New Urbanism* are designed to achieve two explicit social goals: social
equity and common good (Talen, 2002). *Social equity* is defined as an effort to
“equalize access to public goods and encourage the spatial distribution of people and
resources” (Talen, 2002). In achieving social equity, area municipalities must be
careful to coordinate efforts in the provision of public services while avoiding
competition with other municipalities for the tax base (Congress for the New
Urbanism, 1996; Reback, 2005).

Recognizing that many of America’s urban centers had become characterized
by crime and victimization, dilapidated and/or vacant housing and declining
commercial activity, the Departments of Veterans Affairs (VA) and Housing and
Urban Development (HUD) announced its seminal program, HOPE VI, in 1992.
HOPE VI calls for and supports the re-development of urban centers throughout the
US by providing demolition and revitalization grants to city public housing authorities.
HOPE VI uses two funding mechanisms to meet its goals: Revitalization grants and
Main Street grants. While both provide funding to cities to support demolition and
construction of public housing, the peripheral interests differ between the two streams
of funding. In addition to funding demolition and construction, revitalization grants also provide significant funding for supportive services to residents in the new communities as well as those required to relocate as a result of the demolition. Conversely, Main Street grants provide funds to local housing authorities to implement new plans for use of commercial buildings to create affordable, though not necessarily public, housing around a central business district. It is through the principles of New Urbanism that HOPE VI also aims to address residential segregation, sprawl and lack of greenspace through modified urban design and planning. Communities planned using the principles of New Urbanism are pedestrian and commuter friendly. Through the addition of more sidewalks and public transportation routes, residents are able to easily access schools, grocery stores, restaurants and other businesses within a narrow radius by walking or using reliable public transportation (Congress for the New Urbanism, 1996). By providing increased access to jobs, housing, businesses and schools, it is through these design elements that renewal projects funded by HOPE VI aim to configure cities comprised of neighborhoods that promote social interaction and minimize spatial isolation. The resulting communities attract more businesses and higher income families seeking proximity to urban centers without the former hazards (poor housing, crime, etc). In the case of publicly funded renewal, the change in public goods provisions and the residents’ search for public goods reflecting their preferences
occurs almost simultaneously thereby creating a gradual shift in the demographics of revitalized areas.

*Urban renewal shifts demographics of US cities*

In their groundbreaking research on the American city, Park and Burgess (1925) pioneered the theory that communities are constructed in relation to the city and the availability of public goods and other resources in the city. In this theory, Park and Burgess find that cities are formed in a five (5) zone concentric pattern that widens and contracts as residents move throughout the city in response to the availability of housing and jobs or the restrictions imposed by the same. The *concentric zone theory* as developed by Park and Burgess reveals that the city follows the following pattern:

**Figure 1: The Growth of the City**

- Zone 1: Central Business District
- Zone 2: Areas of Deterioration/ Transition (Business and Light Manufacturing)
- Zone 3: Workingmen’s Zone
- Zone 4: Residential Zone/ Restricted Housing
- Zone 5: Commuter Zone

Source: Park and Burgess, 1925.
In this model, the central business district is the anchor for the American city that provides job opportunities for those residents in Zones 2 and 3 to obtain work and access to resources via public transportation. When the central business district is compromised, Zones 2 and 3 are subject to become areas characterized by poverty and few public resources. Zones 4 and 5 are typically more stable due to the higher levels of income held by the families inhabiting these areas; they are increasingly self-sufficient due to the mobility afforded to them through personal means of transportation. Due to their distance from the central business district, these residents must have reliable transportation in order to access jobs unlike their counterparts in Zones 2 and 3 who must rely on public transportation to secure employment (Park 1915). The communities that form within the concentric zones are typically of similar race, ethnicity and socioeconomic status and have come to perpetuate residential segregation and reinforce the idea that US cities are made of a “mosaic of little worlds which touch but do not interpenetrate” (Park, 1915).

The communities resulting from HOPE VI and privately funded renewal projects are mixed income communities made up of diverse housing types (apartments, condominiums, single-family homes, etc.) and smaller, more compact pedestrian communities. Most notably, the residents of these areas post-revitalization are significantly wealthier than those of the communities they replaced. Using HOPE VI as a vehicle, New Urbanism can increase the ability for low-income residents to obtain
access to the public goods and resources previously unattainable due to urban blight. Attractive housing, access to public transportation, and an influx of businesses provide incentives for individuals to live, work and plan in urban centers. As a result, however, the residents living in communities formed through HOPE VI and other renewal programs/projects following *New Urbanism* principles are typically middle- to high-income and predominantly white. This is a dramatic shift in demographics for areas that were previously low-income and minority concentrated. Despite such shifts in demographics, the social, economic and cultural diversity that results is necessary to create equity in availability and access to public goods and resources for low-income residents (Rosenbaum, et al., 2000). The attractiveness of the housing, proximity to work and recreation and access to local public goods contribute to these shifts in demographics, but are not sufficient enough to sustain these shifts over time. In order to retain new residents and attract new residents exhibiting similar characteristics (professional, upwardly mobile) there must be additional incentives to the individual that exceed aesthetic appeal. A sustained increase in property values over time have allowed cities like Atlanta, GA, Chicago, IL and Washington, DC to maintain these populations in the areas post-revitalization.

Parents choose where they live based on how highly they value the public services provided; education is no exception (Tiebout, 1956; Barrow, 2002). While enrolling students in private or charter schools is an option for parents to exercise
choice in educating their children, this form of school choice is not utilized as frequently as inter-/intra-district transfers. School choice advocates believe that by allowing parents to choose, schools will compete with each other to provide better quality schools, teachers and co-/extra-curricular activities (Milton and Rose D. Friedman Foundation, 2008; Fairlie, 2006; Reback, 2005). Opponents of school choice however, believe that such programs particularly voucher programs, effectively shift demographics of lower performing public schools to private schools without any demonstrable increases in overall school quality (Cullen, et al., 2005; Fairlie, 2006). Both arguments assume a unilateral preference of parents to place students in high-performing schools. However, there are some families who continue to reside in areas with low-performing schools (Barrow, 2002; Cullen, et al., 2005). There are inevitably students remaining in low-performing schools provided one or more of the non-academic preferences take priority (Cullen, et al., 2005). Current research offers differing perspectives of residents’ exercise of preference in pursuit of quality education through residential relocation, attendance in private or charter schools, or inter-/intra-district transfers.

The availability of a school choice program through vouchers, charter schools or open enrollment will affect housing patterns and values (Barrow, 2002; Reback, 2005; Reback, 2008). Families with children are more likely to relocate to areas within a city that provide access to schools with higher indicators of quality such as SAT
scores, extracurricular activities, etc (Barrow, 2002; Reback, 2005; Reback, 2008; Cullen, et al., 2005). Whether located in urban centers or rural areas, African-American families typically reside in areas with lower performing schools because of the tradeoffs made between school quality and housing costs (Barrow, 2002; Massey & Denton, 1993). Barrow’s 2002 study found that while African-American and White families have similar preferences for education for their children. White families tend to exercise school choice through housing relocation more freely than African-American families due to budget constraints affecting African-American families’ abilities to relocate (Barrow, 2002). That African-American families reside in areas with lower performing schools, however, is not indicative of a lower preference for school quality. It is difficult to isolate African-American families’ preferences for education due to the significance of additional preferences such as proximity to work or community contacts and a desire to place children in demographically similar educational environments (Hastings, Kane & Staiger, 2005; Fairlie, 2006). As a result, researchers cannot conclude that African-American or other low-income families continue to reside in areas with low-performing schools due to a real and pervasive preference for low quality schools. Families not facing budget or other constraints will often use income to “purchase” school quality by choosing to reside, through initial choice or relocation, in areas with higher performing schools.
Even when parents do not relocate to choose higher quality schools, housing patterns remain affected by school choice. As seen in Barrow’s 2002 study, many families continue to reside in areas with low-performing schools. Residence in these areas, however, does not require the family to send its children to the same schools within the area. Reback’s 2005 and 2008 analyses of the effects of Minnesota’s open enrollment program provide additional data to examine the effects of school choice on housing. Participation in open enrollment programs is the most commonly exercised form of school choice and does not require residential relocation to improve access to higher quality education (Reback, 2005; Reback, 2008). The availability of an open enrollment program, however, increases housing values particularly for homes located in areas with low-performing schools (Barrow, 2002; Reback, 2005; Reback, 2008). As seen in Minnesota’s open enrollment program, families residing in districts with low-performing schools are more likely to transfer the student out of the district to districts with higher quality, high-performing schools (Reback, 2005). Contrary to previous studies that show an increase in housing values in areas located near high-quality schools, home values when school choice and inter/intra-district transfers are allowed are typically higher in areas with lower-performing schools because parents can choose a school not necessarily near their home (Barrow, 2002; Reback, 2005). The housing market responds to local decisions regarding education; an increase in
housing values can be the result of an open enrollment program as much as the parent’s decision to relocate to another district altogether.

Open enrollment encourages an increase in housing value because it institutionalizes parental choice in education. Whether or not parents exercise the choice to send their students to other schools, that families have the choice is an additional incentive to live in the area. Since parents no longer have to reside in an area with high-performing schools in order to send their children to those schools, the need for homes in areas with high-performing schools is not as strong. Likewise, buyers (with and without children) are not discouraged from purchasing homes in areas with low-performing schools simply because the preferences for school quality are not satisfied. This provides families greater choice in deciding where to live. By removing the requirement for immediate, remote access to high-quality education from the preference sets of individuals choosing to reside in an area with low-performing schools, open enrollment policies also alter the typical demographics of an area that is likely characterized by poverty, poor housing and work options, and poor schools.

Areas undergoing urban renewal with active school choice programs (open enrollment, charter schools, and/or private school vouchers) are likely to exhibit moderate to strong changes in housing patterns and values during the period of renewal. Acknowledging that the two work in concert, the shifts in demographics resulting from urban renewal may help predict the likelihood of school transfer within a given area.
Local area heterogeneity as an indicator of likelihood of transfer

Social interaction among individuals of different racial, cultural and/or socioeconomic backgrounds is limited by stratified housing patterns and similar resulting school population demographics (Massey, et al., 1993; Reback, 2008). Heterogeneity of the local area increases the likelihood of neighborhood and school selection based on observable characteristics (race/ethnicity, socioeconomic status, etc); an individual will choose communities and schools that are most similar to his or her own. In the case of school transfers, the greater the racial and economic mix of an area, the higher the probability that students not fitting the existing demographics of a school will attempt to transfer. Though racial, ethnic and socioeconomic background are not used as criteria for selection, receiving schools in districts with open enrollment programs are more likely to reject students not meeting the socioeconomic or academic baselines as determined by the existing school population (Reback, 2008). In addition to constraints imposed on families by limited access to transportation, such patterns in rejections limit the ability of students and families to exercise full choice in education. For low-income families this means that their range of educational options is only as wide as the catchment area around their neighborhood. Schools within urban areas, particularly near current or former public housing, are traditionally under-performing. When these schools lose the ability to attract additional students either by improving school quality and/or altering the baseline population, they are positioned to become
perpetually under-performing and required to meet the needs of remaining students with fewer monetary resources.

The federally mandated No Child Left Behind (NCLB) act has expanded the use of inter-/intra-district choice by permitting parents to send students to better schools if their current school is not meeting annual yearly progress (AYP) on measures of success (Reback, 2008). Schools located in urban centers typically serve low-income students and are among the lowest-performing schools (Massey, et al., 2008). When the demographics of the city center change, the likelihood of transfers out of the catchment area to private or charter schools increase for new residents. This pattern of rejections limits the ability of students in low-performing schools, who are likely also from low-income families, to gain access to higher quality schools. Low-income students will remain within the catchment area while middle- to high-income students living in the same area are more likely to attend schools outside of the area (Reback, 2008). While urban renewal aims to promote racial, ethnic and socioeconomic diversity in the communities it creates, it does little to affect the demographics of the schools within the same communities. Families who are able to transfer will attend higher quality, high-performing schools outside of the revitalized area. Those students whose families cannot facilitate transfer due to budget constraints, transportation challenges or rejections, remain in low quality schools further concentrating low-income students in low-performing schools.
Research Question

An analysis of existing research has shown that urban areas that have undergone renewal attract a population for whom, due to a lack of access to appropriate public goods and services, including high-quality education, urban living was not traditionally desirable. With this change in population demographics and an increased availability of school choice options (private schools, charter schools, and open enrollment) there is room for substantial influence of population shifts on school enrollment rates in urban school districts. This paper seeks to determine whether an increase in household income within a metropolitan area will contribute to a decline in public school enrollment over time. Building upon a body of literature examining the goals and principles of urban renewal, this study attempts to define a link between urban renewal and efforts to equalize access to education as a public good. Previous research has examined housing and school choice as forces separate from the provision of quality education. It is assumed that school quality is influenced by other indicators related to education reform (class size, teacher quality, resources, etc.) rather than the policies which help create the urban environments in which these schools fail to thrive. Previous research has examined various methods taken by policymakers and families alike to equalize access to quality education through school choice and urban renewal. Policymakers have approved school choice and urban renewal initiatives without attention to the interaction of the two policy approaches. In reaction to these policies,
families make decisions to relocate to purchase school quality or exercise school choice options to receive higher quality education. In both cases, the existing public schools surrounding the central business district are ignored and face declining student enrollment. This analysis will provide an in-depth quantitative study of public school enrollment across metropolitan areas under renewal. The findings contained herein will make the case that the incorporation of school reform through program and curriculum design and property improvements is necessary to a comprehensive strategy for urban renewal.
**Research Hypothesis**

Income allows parents to exercise choice in school enrollment through relocation. The results of contemporary urban renewal projects deviate from traditional concentric zone theory in that higher income results in an increased ability to live near the central business district (CBD). In areas with school choice options, families living in or near the CBD can obtain access to high-quality schools despite the caliber of those within the local catchment area. When demographics of the areas surrounding the central business district shift to include more households with higher incomes, enrollment at schools assigned to these areas will decline over time.

**Data and Methods**

This paper uses data from the National Center for Education Statistics (NCES) and the US Census on schools and families in Atlanta, GA, Chicago, IL and Washington, DC. Data from the American Community Surveys (2005-2006) were used to create a 2-year panel dataset documenting school enrollment during the period 2005-2007. A first-difference estimation model will be used to examine the relationship between indicators for urban renewal (income, housing, family makeup and poverty reduction) and school enrollment over this two-year period.
Public Elementary/Secondary School Universe Survey

This study utilizes the Public Elementary/Secondary School Universe Survey of the Common Core of Data (CCD) collected by the National Center for Education Statistics (NCES). NCES is the federal entity responsible for the collection, analysis and dissemination of data obtained from State and Local Education Agencies (SEAs) across the United States including the District of Columbia, Puerto Rico, and Tribal Communities. These data are collected annually for the purpose of providing substantive information to policy makers within the Department of Education and across other federal agencies.

The Public Elementary/Secondary School Universe Survey (PESSUS) dataset contains descriptive and detailed statistics on each of the public schools in the US. Each year, SEAs submit data annually that reports on each school’s enrollment by grade, gender, race and ethnicity. Data are currently available for each year during the period 1986-2007. Since 1986, NCES has enhanced the reporting ability of the PESSUS by expanding the data collection to include enrollment by race, ethnicity and gender for all grades available. Prior to the 1998-99 academic year the survey produced summary-level enrollment data by grade with separate summary data by race. Since that time there have been few changes to how data are reported within the survey.

The 2006-07 PESSUS includes data for 103,595 schools across 59 reporting agencies. For the purposes of this analysis, the PESSUS data was refined to include
enrollment data for the Atlanta, GA, Chicago, IL and Washington, DC producing a dataset of 1,015 schools for the 2005-06 and 2006-07 academic years. Data for each year were merged to create a balanced, long form panel dataset sorted by school identifier (NCESSCH) and year (YEAR). In some cases school data were not available in one of the two periods of survey data obtained. To remedy this, descriptive data (ID, name, address) were retained from the year with available data. Values for enrollment, however, were coded as “0” to note that there was no enrollment due to school closure or consolidation.

**American Community Survey**

This analysis of trends in public school enrollment requires additional economic and population data for the cities included in the study. These data were obtained from analysis of Public Use Microdata Sample (PUMS) files obtained from the US Census Bureau. PUMS files include data from the annual American Community Survey (ACS) conducted by the US Census Bureau for all communities within the US. This survey contains data on a random sample of households to allow for annual estimations of population demographics related to gender, race and ethnicity, education level and status, income and housing outside of the decennial census. While the ACS has been conducted since 1996, data are not available for all communities until the 2005 survey. The survey was designed with the goal of
demonstrating the potential to obtain relevant data for all communities and was restricted to areas with a population greater than 65,000.

Prior to 2005, geographic areas covered by the survey were greatly restricted and did not use the Public Use Microdata Areas (PUMAs) identified for the 2000 Census. These areas were not incorporated into the survey design until the 2005 ACS. As a result, this analysis uses the 2005 and 2006 ACS data files to obtain average housing characteristics for specific PUMAs associated with Atlanta Public Schools (APS), District of Columbia Public Schools (DCPS), and Chicago School District (CSD) during the reporting period immediately prior to the years for which public school enrollment levels will be examined.

These PUMA-level housing characteristics were incorporated into the NCES dataset for each school record. For example, a school within DCPS that is located within Northwest DC (PUMA 11101) will be associated with the housing data for PUMA 11101 as will all other schools located within the same PUMA. While there is a one-to-one relationship for schools and enrollment data, there is a one-to-many relationship for housing data to schools.

Examining the relationship of indicators of urban renewal to public school enrollment levels requires a time-series dataset. In lieu of examining the relationship between indicators of urban renewal and school enrollment for each city, the data for all three cities are combined into one dataset to provide estimates on the overall
relationship between urban renewal and school enrollment. Descriptive statistics were obtained for each PUMA found in the NCES data for each of the datasets for 2005 and 2006. These values were added to the panel data set created with NCES PESSUS data by year and location. This final dataset will be used to conduct a first-difference estimation to determine the relationship between urban renewal during the period 2005-2006 and subsequent enrollment rates in 2006 and 2007.
First-Difference Estimation Model

The data obtained from the NCES PESSUS and ACS PUMS files are used to estimate the following model using a first-difference equation:

**Figure 2: First-Difference Estimation Model for Change in School Enrollment**

\[
\begin{align*}
\text{member}_{i2} &= (\beta_0 + \delta_0) + \beta_1 \text{finc}_{i2} + \beta_2 \text{mrgp}_{i2} + \beta_3 \text{ybl}_{i2} + \beta_4 \text{mwkids}_{i2} + \beta_5 \text{dink}_{i2} + \beta_6 \text{sink}_{i2} + \\
&\quad + \beta_7 \text{under6}_{i2} + u_{i2} \\
\text{member}_{i1} &= \beta_0 + \beta_1 \text{finc}_{i1} + \beta_2 \text{mrgp}_{i1} + \beta_3 \text{ybl}_{i1} + \beta_4 \text{mwkids}_{i1} + \beta_5 \text{dink}_{i1} + \beta_6 \text{sink}_{i1} + \\
&\quad + \beta_7 \text{under6}_{i1} + u_{i1} \\
\text{(member}_{i2} - \text{member}_{i1}) &= \delta_0 + \beta_1 (\text{finc}_{i2} - \text{finc}_{i1}) + \beta_2 (\text{mrgp}_{i2} - \text{mrgp}_{i1}) + \beta_3 (\text{ybl}_{i2} - \text{ybl}_{i1}) + \\
&\quad + \beta_4 (\text{mwkids}_{i2} - \text{mwkids}_{i1}) + \beta_5 (\text{dink}_{i2} - \text{dink}_{i1}) + \beta_6 (\text{sink}_{i2} - \text{sink}_{i1}) + \beta_7 (\text{under6}_{i2} - \text{under6}_{i1}) + \\
&\quad + (u_{i2} - u_{i1}) \\
\Delta \text{member} &= \Delta \beta_0 + \beta_1 \Delta \text{finc} + \Delta \text{mrgp} + \beta_3 \Delta \text{ybl} + \beta_4 \Delta \text{mwkids} + \beta_5 \Delta \text{dink} + \beta_6 \Delta \text{sink} + \\
&\quad + \beta_7 \Delta \text{under6}
\end{align*}
\]

A first-difference estimation model allows for the analysis of time-series panel data by removing the error associated with each \(x_{it}\) resulting in strict exogeneity of each of the explanatory variables. As a result, the estimators obtained through this model will be unbiased. The panel dataset created with the NCES PESSUS and ACS Data contains information on the same schools over a two-year period. In this dataset there are changes in school enrollment as well as the factors associated with gentrification over the same period. While the factors associated with gentrification (income, housing and family demographics) vary by PUMA and the enrollment varies by school, this variation satisfies the requirements to conduct first-difference analysis on the two-period panel data nonetheless.
Dependent Variable

This analysis estimates the relationship between changes in income, family type and building construction/renovation as indicators of urban renewal to changes in public school enrollment over a two-year period. The dependent variable of study, \textit{member}, is a continuous ratio variable obtained from the NCES PESSUS dataset that measures the number of students in a given school during an academic year.

\textbf{Table 1: Public School Enrollment by City}

<table>
<thead>
<tr>
<th>Location</th>
<th>2006</th>
<th>2007</th>
<th>+/-</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Washington, DC \textsuperscript{a}</td>
<td>76,727</td>
<td>72,674</td>
<td>\textbf{(4,053)}</td>
<td>-5%</td>
</tr>
<tr>
<td>Atlanta, GA \textsuperscript{b}</td>
<td>50,770</td>
<td>50,631</td>
<td>\textbf{(139)}</td>
<td>0%</td>
</tr>
<tr>
<td>Chicago, IL \textsuperscript{c}</td>
<td>420,982</td>
<td>414,342</td>
<td>\textbf{(6,640)}</td>
<td>-2%</td>
</tr>
<tr>
<td>All Cities</td>
<td>548,479</td>
<td>537,647</td>
<td>\textbf{(10,832)}</td>
<td>-2%</td>
</tr>
</tbody>
</table>

Notes: \(N = 972\). Average enrollment across all cities was 564 in 2006 and 553 in 2007.
\textsuperscript{a} \(n = 235\)
\textsuperscript{b} \(n = 101\)
\textsuperscript{c} \(n = 636\)

As shown in Table 1, the mean school enrollment across all schools decreases from 564 students in 2006 to 553 students in 2007 (\textit{min} = 0; \textit{max} = 5,944). A two-group mean comparison \textit{t-test} was performed to demonstrate that the differences in school enrollment from 2006 to 2007 is not statistically different from zero at the 5% level (\(t = 0.4914\)).
Independent Variables

Previous studies have shown that indicators for urban renewal include changes in income, types of housing, property values and population demographics. The model above uses these indicators as obtained from ACS housing data to estimate changes in public school enrollment.

Fincp is a continuous ratio variable with values measured in US dollars ($) to represent family income during the past 12 months (min = $31,469; max = $243,559). The mean fincp is obtained for the records in each PUMA and applied to the associated public school record in the panel dataset. Since urban renewal is characterized by marked increases in income and subsequent decreases in the area poverty level, fincp was included in the model to estimate the impact of changes in income on public school enrollment.

Hupac is a nominal variable used to categorize the presence of children within a household. Records are assigned a value of “1”, “2” or “3” if the household contains children under age 6, age 6-17 or between birth and age 17 respectively. Households without children are assigned a value of “4”. The variables under6, hupac2, hupac3 and hupac4 represent the percentage of families assigned to that category based on the values obtained in the frequency distributions for hupac (i.e., under6 is the percentage of families with children under age 6 and therefore recorded with a value of “1” for the variable hupac). Hupac5 is a variable created in Stata which is the sum of under6,
and hupac3 to show the total percentage of families with children up to age 17.

*Fes* is a nominal variable used to categorize respondents based on family type and employment status. Records may be assigned a value of “1” through “8” based on the householder type, marital or relationship status and employment of one or both householders. Married-couple families are assigned a value of “1” through “4” with variations determined by the employment status of the husband and wife. Other variations in household type are assigned a value of “5” through “8.” Like married-couple family categories, the assigned value is determined by the presence or absence of an additional householder and his/her employment status. Frequency distributions were obtained to create the variables *fesdi, feslf* and *fessi*. *Fesdi* reflects the percentage of married-couple households with at least one member in the workforce; this value is the percentage of families recorded with a value of “1”, “2”, or “3” for the variable *fes*. *Feslf* is the percentage of families participating in the labor force. There is no distinction between married-couple families and others within this variable. This value is the sum of the frequencies (%) for records having an *fes* variable value of “1”, “2”, “3”, “5” or “7”. *Fessi* is the percentage of families with only one source of income. This variable is the percentage of families recorded with a value of “5” or “7” for the variable *fes*. 
Married, dual income families experience a level of social mobility not afforded to single-parent or single-income families; they are better able to exercise choices in education through participation in open enrollment, private or charter school programs. However, the impact of an increase in dual-income households on school enrollment levels is further affected by the presence of children in these households. An increase in school aged children over time is likely to contribute to an increase in school enrollment over time; however, an increase in households without children is likely to contribute to a decrease in public school enrollment over time. To estimate this relationship, the variables sink, dink and mwkids were created to demonstrate a range of family types. Sink is a variable reflecting the percentage of single-income families (one-or two householders) without children. This variable was created in Stata by interacting hupac4 and fessi. Likewise, dink is a variable created to estimate the percentage of dual-income families (married and non) without children. This variable was also created in Stata by interacting hupac4 and fesdi. Additionally, it is important to estimate the relationship of families with children on public school enrollment. The variable mwokids was created in Stata by interacting fesdi and hupac5. While it is understood that nuclear families (husband, wife and child) are not the only type of families in which two householders may care for a child, those families were excluded from this model. Similarly, only families with two-incomes are included in the model to further measure the influence of urban renewal on school
enrollment. This variable will not only measure the impact of an increase in families with children, but also the impact of a certain type of family – one where both parents are contributing to the workforce and would likely require increased access to the public goods targeted for urban renewal.

Ybl is also a nominal variable with values of “1” through “9” to indicate when the housing structure was built. As it is represented in the panel dataset, ybl is the percentage of homes built in the year 2000 or later. This percentage value was obtained by adding the frequency distributions for records holding a value of “1” and “2” for homes built 2005 or later and during the period 2000-2004 respectively. As indicated by the goals of New Urbanism and HOPE VI legislation, areas undergoing urban renewal are largely characterized by substantial new construction and or building improvements. This variable was included in the model to allow for the examination of the relationship of an increase in percentage of new homes built in an area to school enrollment. An increase in new homes would likely result in the increase in families and children in a given area thereby increasing the district enrollment levels. Existing research on school choice and housing often examines relationships between enrollment and property values. In keeping with this methodology the variables ybl and mrgp were included in the model to demonstrate both an increase in the availability of housing resulting from new construction as well as an increase in the purchase price of existing homes for sale.
By combining these variables in a first-difference estimation model, this study seeks to show that an increase in the factors associated with urban renewal (income, housing and poverty reduction) will be associated with a decline in public school enrollment over time. This analysis does not estimate a model for urban renewal or gentrification. Rather, it uses existing research to establish urban renewal as a given state for each of the cities included in the model. It is important, however, to demonstrate whether the changes in income, building construction and family structure vary significantly from 2006 to 2007. Average family income, $f_{incp}$, rose to $76,092 from $71,717 per year across all cities; an increase that is statistically significant at the 5% level ($t = -2.5963$). A city-level analysis, however, reveals that the changes in income within each city were only statistically significant for records in Chicago, IL ($t = -2.2183$).

Housing construction and renovation is also used here as an indicator of urban renewal as exhibited in the variable $y_{bl}$. The percentage of homes constructed in the year 2000 and later rose from 4.1% in 2006 to 5.5% (+ 1.4 percentage points) in 2007 across all cities ($t = -6.3335$). City-level analysis shows an increase in new home construction in all cities. Atlanta, GA showed the greatest jump in new construction with an increase of 4.6 percentage points in 2007. All increases at the city-level are statistically significant at the 1% level (DC: $t = -5.01$; GA: $t = -5.38$; IL: $t = -4.188$).
In addition to the more tangible measures of urban renewal, *hupac* is included in the model to estimate the relationship of family composition to school enrollment. Naturally, an increase in families with school-aged children would contribute to an increase in school enrollment levels. However, as indicated by previous research, parental decisions regarding education differ depending on the student’s position along the educational continuum. Parents are more willing to sacrifice school quality at the elementary level than at the high school level when admission to colleges and universities is impacted by the student’s access to academically rigorous courses and suitable extracurricular activities. As a result, *t*-tests were conducted on each of the variables *under6, hupac2, hupac3* and *hupac4* to determine whether changes in family type, as determined by the presence of children, vary significantly between 2006 and 2007. The number of families without children (*hupac4*) increased by 2 percentage points to 71% in 2007 across all cities (*t* = -2.9732). There was an increase in each city by at least 1 percentage point; however the change was not statistically significant for records in Chicago, IL. With this increase in families without children, a decrease in public school enrollment would be expected when including *hupac4* or its derivatives in the estimated model. Conversely, the number of families with children (birth to age 17) decreased by 2 percentage points to 29% in 2007 across all cities. Interestingly, further *t*-tests show that while there is an overall decrease in families with children, the percentage of families with children under age 6 remained constant.
at 7% across all cities and holds true for all cities in the dataset. The largest decreases, with statistical significance, are noted in families where school aged children are present (hupac2, hupac3).

This preliminary analysis of the indicators of urban renewal gives validity to the decision to consider each of the cities as renewal cities. Though the comparisons are not made over a significant span of time, the presence of statistically significant variation in key indicators of renewal suggests that further research examining a broader panel of data may be supported.
RESULTS

In this study, a first-difference method was used to estimate three iterations of the model presented in Figure 2. The first model estimates the impact of indicators for urban renewal (income, new construction, mortgage and family type) on public school enrollment in Atlanta, GA, Chicago, IL and Washington, DC. This model incorporates mortgage payments as an additional indicator of urban renewal to estimate public school enrollment levels alongside other factors related to the interplay of income, family type and community characteristics. The second and third models are restricted by type to estimate the relationship between the ages of children in the household and other stated indicators of renewal to school enrollment in charter and traditional public schools respectively. The results of these models are shown in Table 2.
Table 2: First-Difference Model for Change in Public School Enrollment

<table>
<thead>
<tr>
<th>Independent variable (change in)</th>
<th>(i)</th>
<th>(ii)</th>
<th>(iii)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Family income</td>
<td>-0.035</td>
<td>0.051</td>
<td>-0.008</td>
</tr>
<tr>
<td></td>
<td>(0.038)</td>
<td>(0.340)</td>
<td>(0.036)</td>
</tr>
<tr>
<td>2. Mortgage payment</td>
<td>-0.045</td>
<td>-0.731**</td>
<td>-0.051</td>
</tr>
<tr>
<td></td>
<td>(0.035)</td>
<td>(0.342)</td>
<td>(0.033)</td>
</tr>
<tr>
<td>3. Homes built 2000 and later</td>
<td>0.067*</td>
<td>0.033</td>
<td>0.063*</td>
</tr>
<tr>
<td></td>
<td>(0.038)</td>
<td>(0.397)</td>
<td>(0.035)</td>
</tr>
<tr>
<td>4. Married householder, with children</td>
<td>0.056</td>
<td>0.101</td>
<td>0.062</td>
</tr>
<tr>
<td></td>
<td>(0.044)</td>
<td>(0.402)</td>
<td>(0.040)</td>
</tr>
<tr>
<td>5. Married householder, no children</td>
<td>0.010</td>
<td>-0.662*</td>
<td>0.018</td>
</tr>
<tr>
<td></td>
<td>(0.036)</td>
<td>(0.391)</td>
<td>(0.033)</td>
</tr>
<tr>
<td>6. Single householder, no children</td>
<td>-0.024</td>
<td>0.082</td>
<td>-0.163</td>
</tr>
<tr>
<td></td>
<td>(0.037)</td>
<td>(0.254)</td>
<td>(0.035)</td>
</tr>
<tr>
<td>7. Children under age 6</td>
<td>-0.016</td>
<td>0.674*</td>
<td>-0.026</td>
</tr>
<tr>
<td></td>
<td>(0.041)</td>
<td>(0.354)</td>
<td>(0.038)</td>
</tr>
<tr>
<td>8. constant</td>
<td>0.000</td>
<td>0.742</td>
<td>-0.050</td>
</tr>
<tr>
<td></td>
<td>(0.032)</td>
<td>(0.232)</td>
<td>(0.030)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Charter Schools</th>
<th>Yes</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional Public Schools</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>n</td>
<td>972</td>
<td>92</td>
<td>880</td>
</tr>
<tr>
<td>R²</td>
<td>0.008</td>
<td>0.090</td>
<td>0.012</td>
</tr>
<tr>
<td>F</td>
<td>1.13</td>
<td>1.19</td>
<td>1.53</td>
</tr>
<tr>
<td>p-value</td>
<td>0.34</td>
<td>0.32</td>
<td>0.15</td>
</tr>
</tbody>
</table>

** significance at 5% level
* significance at 10% level

Note: Standard errors in parentheses.

          American Community Survey (US Census Bureau 2005, 2006)
The most significant relationship among all variables in all models is between the percentage change in mortgage payments and public school enrollment shown in model II ($t = -2.14; P|t| = 0.04$). Each model presented reveals that there is a significant relationship between the percentage of homes built since 2000 ($ybl$) and mortgage amount ($mrgp$) and public school enrollment with $mrgp$ being significant at the 5% level in model II. While income is not significant in either model, mortgage price can serve as a proxy for income in that a higher mortgage would require more income to meet the obligation. While the direction of the relationship does not vary across models, the degree of that relationship and its significance is strengthened by the restriction of the model to only charter schools as in model II or only traditional public schools as in model III. Mortgage payments have the largest and most significant relationship in model II by limiting the data to include only charter schools. For every one percentage point increase in mortgage payments, enrollment is estimated to decrease by 0.73 percentage points among charter schools. However, it is the relationship of other family types and the age of the student to school enrollment that, when combined with the changes in mortgage payments and other indicators of renewal, can mean a loss of students participating in the public school system.

As noted previously, variables related to property value were excluded from the base model I. However, $mrgp$ was added into the models to investigate what conclusions, if any, may be drawn about the relationship between $ybl$ and $mrgp$ in
estimating school enrollment. Regardless of school type (charter or traditional public), an increase in mortgage payments is associated with a decrease in school enrollment. Although mortgage payments are only significant in model II, the direction of the relationship remains the same. Despite this, each model reveals that income alone as an indicator of urban renewal is not sufficient to estimate increases or decreases in public school enrollment. However, the impact of income is demonstrated through the associations of dual-income families and higher mortgages with school enrollment. While a family’s income may increase over time if it is not accompanied by other social changes such as marriage and home ownership, the effect on school enrollment is minimal.

Restricting the model to charter and traditional public schools can complicate interpretation of the relationship between dual-income families with children and public school enrollment particularly in the presence of private school options. Based on the results in models II and III it can be concluded that an increase in mortgage payments, and likely income as well, will be associated with a decrease in school enrollment. The decrease in enrollment in charter schools is 0.73 percentage points while it is only 0.05 percentage points in traditional public schools. This finding suggests that charter schools are affected more by renewal than their traditional public school counterparts. It does not follow the assumptions established in previous research indicating a preference of higher income families for charter or private
schools. It is suggested that future research also include data on private schools in addition to public and charter schools if additional conclusions should be drawn regarding where high-income families are actually sending their students to school.

Model II also reveals a significant relationship between the age of children in the household and enrollment. It estimates that for every one percentage point increase in households with children under age 6 as measured by $\text{under6}$, public school enrollment levels will increase by 0.67 percentage points in charter schools. $\text{Under6}$ is not significant in estimating the change in enrollment in traditional public schools, but the degree and direction of the change are worth noting. In public schools, for example, a one percentage point increase in households with children under age 6 contributes to a decrease in public school enrollment by 0.02 percentage points. This finding signals that there is a greater preference for charter schools among families with children under age 6. This suggests that it is important to consider the age of the child in the household when estimating the relationship of families with children on school enrollment. The relationship of $\text{under6}$ to enrollment is significant at the 10% level ($P|t| = 0.06$) and its inclusion in the model provides tools for drawing broader qualitative inferences on the relationship between urban renewal and public school enrollment.

Intuitively, the percentage of married-couple households without children is expected to have a negative association with school enrollment – fewer children in an
area will lead the fewer children in school. What is interesting about this variable in
the model, however, is that the coefficient estimate is negative and significant in model
II and positive in models I and III indicating that for every one percentage point
increase in married-couple households without children, enrollment decreases by 0.66
percentage points in charter schools, increases by 0.02 percentage points in traditional
public schools and increases by 0.01 percentage points overall. Consistent with
previous research, this indicates that married-couple households would prefer charter
schools to traditional public schools. This is also evident in the size of the association
between married couples with children where enrollment is estimated to increase by
0.10 percentage points in charters and 0.06 percentage points in traditional public
schools.

Despite the fluctuations in the significance levels of key variables, model III is
the best equation to estimate the relationship between urban renewal and public school
enrollment \(F = 1.53; \ P|\_| = 0.15\). The combination of important social behaviors in
addition to income provides a more holistic look at urban renewal in the absence of
intensive population and community studies. Considering a one percentage point
increase in income, mortgage payments, homes built since 2000, dual-income families
(with and without children), single-income families without children and households
with children under age 6, the estimated change in school enrollment is -0.17
percentage points among traditional public schools compared to a 0.27 percentage
point increase among charter schools and a decrease by 0.05 percentage points across all schools.

This finding prompts additional inquiry into how this model influences estimates of public school enrollment by school level. Previous research has suggested that while parents are willing to reside in an area with poor schools, the decision to do so is based in part on the age of the student and their current grade level. Parents with high-school age children are less likely than parents of elementary age students to reside in areas where access to high-quality schools is minimal. In urban areas, particularly those undergoing transformation through renewal programs, parents with school-age children will utilize available options to exercise choice when area schools do not meet high-quality standards. Based on previous research and the findings in Model III, it would be expected that an increase in families with elementary age children will contribute to a greater decline in public school enrollment patterns particularly for area middle and high schools.

NCES data contain a variable level to denote the grade level of the school record. This value is determined based on the combination of the school’s low and highest grade offered. Records are assigned a value between “0” and “3” which is determined based on the combination of the school’s low and high grades offered. Elementary/Middle schools are assigned a value of “1”. Middle schools are assigned a value of “2” and middle/high schools are assigned a value of “3.” Although it was not
included in the original model(s), this information was retained from the original NCES PESSUS data in the panel dataset. The availability of this variable allows for the additional analysis of enrollment levels by school level using a first-difference estimation equation.

The results of this model are shown in Table 3. Unlike previous models that did not examine changes in school enrollment by school level, only one of the coefficient estimates is statistically significant. There are substantially fewer middle and high schools included in the dataset and this is expected. Middle and high schools tend to be much larger in size and enrollment than elementary schools. Since the data are restricted across an already restricted dataset (by City), the standard errors are large and contribute to low $t$-values. The model does, however, continue to tell the story that school enrollment is influenced by urban renewal, particularly by the types of families that the new communities attract. Given the overlap in grades used to define the level assignment, the models were estimated combining the values of “1” and “2” for the middle school and “2” and “3” for high school for the level variable. Only the variable for income, $\textit{fincp}$, in the third model for high schools is statistically significant at the 5% level ($P|t| = 0.031$). This finding supports the previous research that parents will make concessions for school quality when children are younger, but will choose to either a) live in areas with higher quality schools or b) continue to reside in the urban area, but send students to private schools when the student reaches middle/high school.
age. As evidenced by the model presented in Table 3, either action will contribute to an overall decline in enrollment, particularly in middle and high schools. Considering a one percentage point increase in each of the variables the estimated change in school enrollment in is +0.16 percentage points in elementary schools, +0.32 in middle schools and -0.16 in high schools.
Table 3: First-Difference Model for Change in Public School Enrollment by School Level

<table>
<thead>
<tr>
<th>Independent variable (change in)</th>
<th>Elementary level = 1</th>
<th>Middle level = 1, 2</th>
<th>High level = 2, 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Family income</td>
<td>0.014</td>
<td>-0.035</td>
<td>-0.233**</td>
</tr>
<tr>
<td></td>
<td>(0.031)</td>
<td>(0.038)</td>
<td>(0.107)</td>
</tr>
<tr>
<td>2. Mortgage payment</td>
<td>-0.007</td>
<td>-0.013</td>
<td>0.090</td>
</tr>
<tr>
<td></td>
<td>(0.028)</td>
<td>0.035</td>
<td>(0.103)</td>
</tr>
<tr>
<td>3. Homes built 2000 and later</td>
<td>0.036</td>
<td>0.378</td>
<td>0.066</td>
</tr>
<tr>
<td></td>
<td>(0.030)</td>
<td>(0.037)</td>
<td>(0.104)</td>
</tr>
<tr>
<td>4. Married householder, with</td>
<td>0.037</td>
<td>0.042</td>
<td>0.120</td>
</tr>
<tr>
<td>children</td>
<td>(0.034)</td>
<td>(0.042)</td>
<td>(0.124)</td>
</tr>
<tr>
<td>5. Married householder, no children</td>
<td>0.016</td>
<td>-0.007</td>
<td>-0.011</td>
</tr>
<tr>
<td></td>
<td>(0.028)</td>
<td>(0.035)</td>
<td>(0.114)</td>
</tr>
<tr>
<td>6. Single householder, no children</td>
<td>0.014</td>
<td>-0.023</td>
<td>-0.094</td>
</tr>
<tr>
<td></td>
<td>(0.030)</td>
<td>(0.037)</td>
<td>(0.102)</td>
</tr>
<tr>
<td>7. Children under age 6</td>
<td>0.020</td>
<td>-0.004</td>
<td>-0.142</td>
</tr>
<tr>
<td></td>
<td>(0.032)</td>
<td>(0.040)</td>
<td>(0.122)</td>
</tr>
<tr>
<td>8. constant</td>
<td>0.035</td>
<td>-0.016</td>
<td>0.046</td>
</tr>
<tr>
<td></td>
<td>(0.026)</td>
<td>(0.032)</td>
<td>(0.091)</td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>R²</th>
<th>F</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>676</td>
<td>0.01</td>
<td>0.85</td>
<td>0.55</td>
</tr>
<tr>
<td></td>
<td>748</td>
<td>0.00</td>
<td>0.50</td>
<td>0.84</td>
</tr>
<tr>
<td></td>
<td>208</td>
<td>0.04</td>
<td>1.12</td>
<td>0.35</td>
</tr>
</tbody>
</table>

** significance at 5% level

American Community Survey (US Census Bureau 2005, 2006)

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LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

This study relies on previous research and legislation to support a critical baseline assumption that Atlanta, GA, Chicago, IL and Washington, DC are cities that have undergone significant urban renewal in the past decade that has resulted in key changes in income, housing availability and household demographics for each. The estimates of changes in public school enrollment are made using data that takes urban renewal as a given with t-tests demonstrating that changes in household type, income, and construction between 2006 and 2007 are statistically significant. Without a model and/or population studies that clearly identify the indicators of urban renewal and their impact the models’ abilities to estimate changes in enrollment will be strengthened by the identification of critical variables based on empirical research.

Likewise, the breadth of this study is limited by the availability of data to be used in documenting changes in indicators of renewal prior to the enrollment year. At present, this study documents changes in select population variables and school enrollment in a very restricted two-year period. In order to develop more meaningful analyses, future research should be conducted over a time span greater than two years with a study of population data for (at least) the three years immediately prior to the years in which enrollment levels are studied. With the increased capacity of the US Census Bureau to report data obtained through the ACS at the PUMA-level, the same analyses conducted here may be performed after additional years of data are obtained.
for ACS. A more rigorous analysis, however, could be conducted if researchers are able to obtain population and housing data at the census tract or block level. This level of analysis will allow researchers to identify and project changes in enrollment based on smaller areas and can therefore make estimates based on catchment areas versus school districts.

**CONCLUSION**

Despite the limitations of existing data and the models estimated here, the results provide substantial evidence to support further analysis and policy improvements to address declines in enrollment in urban school districts. The successes and failures of urban renewal have been examined since the advent of public housing in the 1930s. Proponents and critics alike have cited the effect of urban renewal on families in poverty as an area for policy mediation. Likewise, parallel conversations are occurring that call for school improvements in order to increase the number of high-quality, high-performing schools in previously poor, urban areas. Unfortunately though, the influence of urban renewal on public school enrollment is largely absent from the discussion. On the surface, public school enrollment levels do not signal immediate need for policy changes; enrollment levels are expected to rise and fall depending on population demographics. As demonstrated in this analysis,
changes in public school enrollment are not trivial when examined in the context of a city undergoing significant revitalization through urban renewal.

Urban renewal is achieved through *deliberate* public and private action designed to alter a city’s landscape, public goods and resources, and population demographics. All policy changes have implications for the communities they are designed to affect. The absence of the impact of urban renewal on public schools from assessments of the program’s effectiveness presents significant hazard. A decrease in traditional public school enrollment by 0.17 percentage points and increase in charter schools by 0.27 percentages points with only a one percentage point increase across all variables students deserves further attention from the policy community. Either scenario places a burden on schools to serve students with the resources available for the current school mix. In some cases, this level of funding or availability of resources is already strained for the existing population. An addition of students to a strained school or a decrease in students in a similarly strained school where funding is uniquely tied to enrollment levels, does a disservices to the communities in which the schools are located. Without the forethought to assess enrollment levels associated with changes in the surrounding communities, schools and school leaders may be faced with an inability to serve the school population. It should be noted that these decreases are estimated based on very modest changes in family income, mortgage payments, and the percentage of dual-income families (with and without children), single-income
families without children and new construction. Increases above 1-percentage point in either of the family type variables will lend even greater changes in school enrollment levels.

The results found in this analysis would be particularly useful to leaders of urban school districts. While the practical response to the findings presented here may not result in the loss of all students at one school, school closure resulting from consolidation is a very real and plausible outcome. In Washington, DC for example Chancellor Michelle Rhee’s decision to close some area schools was met with considerable opposition by parents and teachers alike. The decision to close the schools was the result of declining numbers in enrollment across many DCPS schools resulting in strained resources available for the students remaining in the school system. Chancellor Rhee’s approach to school closures may be unique to the District of Columbia, but the impetus for such closures can be applied to other major urban school districts. Students are leaving public schools and the cause of this movement is unknown. It is the author’s goal that the research presented here encourages the inclusion of indicators of urban renewal as predictors of changes in public school enrollment. Additional research on the subject would support policy changes that promote urban renewal that sends financial and human capital resources to improve district schools while simultaneously investing in smart development that attracts households of all types.
REFERENCES


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<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Dataset</th>
</tr>
</thead>
<tbody>
<tr>
<td>ncessch</td>
<td>A unique 12-digit identifier for each school included within the survey. This identifier is a combination of the NCES 7-digit LEA identifier and the 5-digit NCES school identifier.</td>
<td>PESSUS</td>
</tr>
<tr>
<td>year</td>
<td>The year in which data were collected (values: 2001, 2004 and 2007).</td>
<td>PESSUS</td>
</tr>
<tr>
<td>lcity</td>
<td>The city of the school’s location. Values included in this dataset are “Atlanta”, “Chicago”, “District of Columbia”, and “Washington”.</td>
<td>PESSUS</td>
</tr>
<tr>
<td>lstate</td>
<td>The state of the school’s location. Values included in this dataset are “DC”, “GA”, and “IL”.</td>
<td>PESSUS</td>
</tr>
</tbody>
</table>
| chartr   | = “1” if Charter School  
= “2” if Not Charter School | PESSUS  |
| level    | = “1” if Primary School (PK-08)  
= “2” if Middle School (04-09)  
= “3” if High School (07-12)  
= “4” if Other | PESSUS  |
| member   | The total number of students enrolled across all grades. | PESSUS  |
| hincp    | Total household income measured in dollars ($). | ACS     |
| fincp    | Total family income measured in dollars ($). | ACS     |
| grntp    | Gross rent paid measured in dollars ($). | ACS     |
| mrgp     | Mortgage payment measured in dollars ($). | ACS     |
| fes      | Family type and employment status of heads of household.  
-1- Married Couple Family, both in labor force  
-2- Married Couple Family, husband only in labor force  
-3- Married Couple Family, wife only in labor force  
-4- Married Couple Family, neither in labor force  
-5- Other Family: Male Householder in labor force, no wife present  
-6- Other Family: Male Householder not in labor force, no wife present  
-7- Other Family: Female Householder in labor force, no husband present  
-8- Other Family: Female Householder not in labor force, no husband present | ACS     |
<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Interaction Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>feslf</td>
<td>Percentage of families participating in the labor force. This value is the sum of the frequencies obtained for fes categories 1, 2, 3, 5 and 7.</td>
<td>ACS</td>
</tr>
<tr>
<td>fesnlf</td>
<td>Percentage of families not participating in the labor force. This value is the sum of the frequencies obtained for fes categories 4, 6, and 8.</td>
<td>ACS</td>
</tr>
<tr>
<td>fesdi</td>
<td>Percentage of married-couple families in the labor force. This value is the frequency obtained for fes category 1, 2, or 3.</td>
<td>ACS</td>
</tr>
<tr>
<td>fessi</td>
<td>Percentage of single-income households in the labor force. This value is the frequency obtained for fes category 5 or 7.</td>
<td>ACS</td>
</tr>
<tr>
<td>dink</td>
<td>Percentage of married-couple households without children present. Interaction term: fesdi*hupac4</td>
<td>ACS</td>
</tr>
<tr>
<td>sink</td>
<td>Percentage of single-income households without children present. Interaction term: fessi*hupac4</td>
<td>ACS</td>
</tr>
<tr>
<td>mwkids</td>
<td>Percentage of married-couple households with children present. Interaction term: fesdi*hupac5</td>
<td>ACS</td>
</tr>
<tr>
<td>hupac</td>
<td>Presence of own children. -1- Own children under age 6. -2- Own children between ages 6 and 17. -3- Own children between birth and age 17. -4- No own children.</td>
<td>ACS</td>
</tr>
<tr>
<td>under6</td>
<td>Percentage of families with children under age 6. This value is the frequency obtained for hupac category 1.</td>
<td>ACS</td>
</tr>
<tr>
<td>hupac2</td>
<td>Percentage of families with children between the ages of 6 and 17. This value is the frequency obtained for hupac category 2.</td>
<td>ACS</td>
</tr>
<tr>
<td>hupac3</td>
<td>Percentage of families with children between the ages of 0 and 17. This value is the sum of the frequencies obtained for hupac categories 1 and 2.</td>
<td>ACS</td>
</tr>
<tr>
<td>hupac4</td>
<td>Percentage of families with no children. This value is the frequency obtained for hupac category 4.</td>
<td>ACS</td>
</tr>
<tr>
<td>hupac5</td>
<td>Percentage of families with any children. This value is the sum of frequencies obtained for hupac category 1, 2, and 3.</td>
<td>ACS</td>
</tr>
</tbody>
</table>
**ybl** Percentage of homes built within the previous 5 years. This value is the frequency obtained for *ybl* categories 1 and 2.
- 1- Homes built 2005 or later
- 2- Homes built 1999-2004
Both categories are used only in the dataset that combines 2004-2006 data to represent homes built since 1999.