The Deconcentration of Minority Students Attending Bad Schools: The Role of Housing Affordability within School Attendance Zones Containing Good Schools

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Abstract

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One of the major concerns with public education in the U.S. is that black and Hispanic students are concentrated in low performing schools where most of the students come from poor families. Underlying this concern is evidence showing that minorities perform better on standardized exams if they attend non-poor schools. One strategy to deconcentrate minorities within poor or low performing schools is to open up affordable housing opportunities within better school attendance zones (SAZs). In this paper I examine the efficacy of this approach using data on Florida elementary schools. I find that shifts in the proportion of a school district's affordable units in favor of better SAZs decrease the concentration of both black and Hispanic students in bad schools. However, different types of affordable units matter depending on the race of students and the definition of what constitutes a good school.

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1. Introduction

One of the major concerns with public education in the U.S. is that black and Hispanic students are concentrated in low performing schools where most of the students come from poor families. Orfield et al. (2012) report that in the early 2000s black and Hispanic students attended schools where somewhat more than 50 percent of their classmates received a free lunch because of low family income. What they find more disturbing is that less than ten years later this percentage had grown to over 66 percent. Underlying their concern is extensive research showing that students attain greater academic achievement if they attend schools where a majority of the students come from middle and high income families.[1] The fact that minority students are underrepresented in these schools helps explain the large achievement gaps between them and their white counterparts.[2] The importance of closing this gap cannot be overstated. In fact, two prominent experts on the issue, Christopher Jencks and Meredith Phillips, have argued in their book *The Black–White Test Score Gap* that closing the gap would probably do more to promote racial equality in the U.S. than any other strategy now under serious discussion. Not surprisingly, it follows that there is considerable interest in policies that would result in more minority students attending higher performing schools. Not only would the academic performance of those who move to better schools improve but this would also put competitive pressure on poor schools that wish to remain open to offer a better education to their students.

The most popular deconcentration policy option is school choice, which has been extensively studied by social scientists. Unfortunately, results on whether choice is an effective desegregation policy have been mixed. However, this is not all that surprising, since school choice is not one thing but

[1] Kahlenberg (2012) reviews the literature relating socioeconomic integration to student performance and concludes the evidence shows overwhelmingly a strong positive relationship. He also cites a review of 59 studies by Mickelson and Bottia (2010) that reached the same conclusion.

[2] The National Assessment of Educational Progress reports the percentage of each racial group's test scores that are at or above the proficiency level for math and reading. For fourth graders in math the percentages for whites, blacks and Hispanics are 51 percent, 19 percent, and 26 percent, respectively. In reading the percentages are 46 percent, 18 percent, and 21 percent. The percentages for eighth graders show similar racial differences.

many different things, the efficacy of which will depend on the specifics of the program and the context within which it is implemented (Schwartz and Stiefel, 2014).

The second most popular deconcentration policy option is to open up affordable housing opportunities for minority families within high performing/high income school attendance zones (SAZs).[3] This option is based on the belief that minorities are trapped in poor schools because their families cannot afford the housing found within non-poor SAZs (Rothwell, 2012). Proponents of this option point out that improving housing affordability within non-poor SAZs would improve not only the school environment of minority students but also their neighborhood environment, which considerable research has shown has its own positive impact on the child's development (Ellen and Turner, 1997). There are, however, a number of reasons why more affordable units within non-poor SAZs may not guarantee the deconcentration of minorities within poor schools. First, minority families may be disinterested in these units. Concerns other than improving their child's school environment may dominate their locational choice, such as access to public transit, job opportunities, or social services. Second, the parents or guardians of minority children may be concerned that their child would be uncomfortable in what would be in most cases a majority white school. Third, even if minorities are willing to locate within a non-poor SAZ, they may be excluded from these SAZs by discrimination on the part of housing suppliers.[4] In comparison to school choice, there is little, if any, empirical evidence on

[3] My data clearly demonstrate that the vast majority of high quality schools are white and that these white schools are relatively high income schools. As I describe in detail in section 3, I divide my sample of 1, 484 elementary schools into low, average, and high performing schools based on scores achieved on a standardized mathematical exam. The data show that in 2010 high quality schools are overwhelmingly white and high income. 75.8 percent of the high quality schools have a white plurality, while only 2.4 percent have a black plurality. For those schools with a black plurality, on average, 86.7 percent of the students received a free lunch. For schools with a white plurality the average free lunch percentage is 51.6. I follow many previous studies by using the receipt of a free lunch as an indicator of whether the child's family is poor.

[4] The U.S. Department of Housing and Urban Development's fair housing audits continue to show that black and Hispanic applicants are discriminated against within local housing markets (Turner et al., 2013). While this evidence provides a gauge of the overall level of discrimination within metropolitan areas, there is reason to believe that discrimination within non-poor SAZs may be higher than average. William Fischel's Homevoter Hypothesis (1985, 2001) maintains that homeowners will go to great lengths to protect their property value. He shows that homeowners are aware of the positive effect that a good school can have on their home's value. If they

the effectiveness of housing affordability as a deconcentration strategy. There is a simple reason for this. To study a possible causal factor empirically there must be variation in the factor that is related to the outcome of interest. Within higher income SAZs, anti-density zoning (and NIMBYism) have done a pretty successful job of eliminating affordable housing (Rothwell, 2012).

In this paper I exploit the recent volatility in Florida's local housing markets to investigate the housing affordability option as a strategy for deconcentrating black and Hispanic elementary school students within poor, low performing schools. Florida's unprecedented boom/bust housing cycles have varied in their timing and intensity across its school districts, which in Florida are county-wide. Most importantly for the purpose of this study, as documented below, the proportion of a district's affordable units found in better SAZs plummeted during the booms but rose after the crashes. In essence, Florida provides a natural experiment for investigating what might happen to school integration if more affordable housing was available within SAZs containing higher quality schools.

My empirical methodology involves relating increases in the proportion of a school district's affordable housing units located in SAZs containing better schools to the proportion of a district's black and Hispanic students attending poor schools. The key question to be addressed is whether the families of minority students move to better school zones when the opportunity presents itself. While an answer in the affirmative may seem obvious, as noted above there are factors that may prevent this from happening. Moreover, as I review below, there is evidence from previous studies that throws into question the willingness of poor families, who are predominantly minorities, to take advantage of opportunities that seemingly would better their lives.

Better schools are defined based on three separate criteria — a low percentage of students receiving a free lunch, a high percentage of students passing a standardized exam, and the school receiving a high letter grade from the Florida Department of Education. Because affordable housing

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believe that minority students may tarnish the school's reputation, they may be particularly virulent in keeping minority families from moving into their SAZ.

units are broken down into eight different types, I can not only test whether affordability has an impact on the proportion of a district's black and Hispanic students who attend bad schools , but I can also provide some evidence on which units matter most and I can do this separately for each racial group. For example, does an increase in affordable mobile home rentals within non-poor SAZs have the same or a different impact on the deconcentration of minorities attending bad schools than an increase in affordable single-family rentals? Identification of estimated effects comes from the use of a 15-year panel data set at the school district level employing alternative estimators, including linear fixed effects, pooled fractional probit, and two-stage least squares models.

2. Literature review

I could not find any prior research providing direct empirical evidence on the relationship between improved housing affordability within better SAZs and the deconcentration of minority students within poor schools. As noted above, this may be the result of such improvement being rarely observed given the strength of NIMBYism and anti-density zoning typically found within the better SAZs. There are, however, a number of studies that provide some suggestive evidence on the role that land use regulation might play in maintaining the concentration of minority students within poor schools. The results from these studies are reviewed below.

Rothwell (2012) estimates the difference in housing costs between the SAZs of low and high performing schools for individual metropolitan areas.[5] He finds that homes zoned for high performing schools cost 2.4 times as much as housing in the low performing SAZs and that this difference can be attributed to exclusionary land use regulations such as density controls. These results lead Rothwell (2012) to conclude that the elimination of exclusionary zoning would substantially lower the cost of housing in high performing SAZs, allowing poor children to attend better schools. He acknowledges,

[5] In this study, school performance was measured using test score data from Great Schools, and the housing cost measures were a weighted average of rental and owner monthly expenditures derived from the American Community Survey.

however, that homeowners' incentives for retaining anti-density zoning are strong and therefore the elimination of exclusionary zoning is unlikely to occur anytime in the near future. Rothwell then goes on to offer a number of second best alternatives, giving particular attention to expanding the portability of housing vouchers. Noteworthy from the perspective of my study is that he implicitly assumes that the presence of more affordable units within the SAZs containing high quality schools would increase the number of minority students attending such schools, but he does not provide any evidence in support of this assumption.

Studies by Rothwell and Massey (2010) and Lens and Monkkonen (2016) are highly similar, with the authors of the latter study describing their work as an extension of the former study. Both papers use cross sectional data for metropolitan areas to study the relationship between measures of residential income segregation and land use regulations. These papers are relevant to my study because residential segregation generally results in school segregation (Frankenberg, 2013), as most districts still assign students to their neighborhood school, despite the growth in school choice. Rothwell and Massey (2010) rely upon Pendall et al.'s (2006) survey of local land use regulations, while Lens and Monkkonen (2016) base their analysis on the Wharton Residential Land Use Regulatory Index, along with its eleven sub-indices that describe different dimensions of the regulatory environment (Gyourko et al., 2008). Both studies find a strong relationship between land use regulations that limit density and residential income segregation. There are two primary differences between these studies. First, while Rothwell and Massey (2010) address the possible endogeneity of anti-density zoning by estimating two-stage least squares models, Lens and Monkkonen (2016) make no such effort. The second difference is that while Rothwell and Massey (2010) study the relationship between land use regulations and segregation using standard segregation measures, the analysis in Lens and Monkkonen (2016) utilizes measures that register the separate segregation of poor, middle income, and affluent households. The analysis of these alternative segregation measures led Lens and Monkkonen (2016) to conclude that

regulations that limit density are associated with the segregation of the wealthy and middle income, but not the poor.

Another relevant literature consists of two studies whose results suggest that the housing affordability option may not have a meaningful effect on the deconcentration of minority students attending poor schools. Moving to Opportunity (MTO) was a large federally funded demonstration project conducted in five large MSAs over the years 1994–1998 (Sanbonmatsu et al., 2011). The purpose of the project was to determine the impact that improved neighborhood quality has on the welfare of indigent households. A vast majority of the participating families were headed by African-American or Hispanic single mothers. Random assignment was used to assign eligible households to one of three groups — the experimental group, the Section 8 group, and the control group. The experimental group was offered a housing voucher that could only be used in a low-poverty neighborhood. The Section 8 group was offered a voucher that could be used anywhere within the MSA. Members of the control group were not offered vouchers but received standard housing public assistance, such as a public housing apartment. Two findings are especially relevant to the current study. First, surprisingly, compliance rates were low for both the experimental (47.4 percent) and the Section 8 (61.6 percent) groups. The decision not to comply indicates a failure to take a "move to opportunity." The focus of my study is not on vouchers but rather on opportunities for minority children to attend a better school generated by changes in the distribution of affordable housing types across SAZs. Nevertheless, the MTO results suggest that minority families with children in poor schools may fail to move to SAZs with better schools when housing becomes more affordable.

The second MTO finding relevant to my study is that among the compliers members of neither the experimental nor the Section 8 group were found to target better school zones in making their relocation decision. This could stem from participants' poor knowledge of the locations of better schools or from other location factors, such as proximity to jobs or public transportation, carrying more

weight. Regardless, this finding, like the finding of low compliance rates, suggests that I may not find much empirical support for the affordability option as a deconcentration strategy.

A second study by Horn et al. (2014) addresses the question of their paper's title, "Do Housing Choice Voucher holders live near good schools?" They note that the hope is that low income families receiving vouchers, the majority of whom are minorities, will use the vouchers to locate in neighborhoods with higher performing schools, leading to improved educational outcomes for their children and potentially a pathway out of poverty. Their results, unfortunately, indicate this hope is far from being realized. Using confidential data on the residential locations of over one million voucher recipients and test score data to measure the quality of schools, Horn and her colleagues find that, on average, the schools nearest to voucher holders have higher proficiency rates than those near public housing residents, but lower proficiency rates than those near low Income households overall. These findings are surprising but consistent with those obtained from the MTO project. They leave it to future research to investigate why voucher recipients do not take the opportunity to move their children to a better school.

3. Data

3.1. Data construction

The initial step in the construction of my database involved assigning residential properties to SAZs. To do this, I first geocoded the addresses of the residential properties in Florida reported in the DataQuick property tax assessment database. Next, I obtained digital 2013-vintage SAZ maps from the National Center for Education Statistics (NCES) for 58 of Florida's 67 school districts and 2011-vintage SAZ maps for three additional districts from the vendor Maponics.[6] The geographic coordinates for each of the addresses in the DataQuick file were then used to identify the school that a student at that address is assigned to attend in every grade between kindergarten and 12th grade. Because the grade

[6] The districts excluded from the NCES and Maponics digital boundary files are mostly small, rural counties.

coverages of schools are not standardized across or even within school districts, I had to construct an operational definition of an "elementary school." To that end, I defined the elementary school serving a housing unit as the school that a child at that location would be assigned to attend in third grade. Schools that were not classified as elementary schools using this definition were then removed from the data.

To characterize how the housing stock within the elementary school SAZs evolved over time, I linked the residential properties to the standardized property tax rolls that each county must submit each year to the Florida Department of Revenue (FDOR).[7] These tax roll data contain a wealth of information on real property characteristics, including the type of property (e.g., single-family, condominium, or mobile home), the year in which the property was constructed, and the property's estimated market value as of January 1st of the tax roll submission year. Importantly for my study, the tax roll data also contain fields that indicate whether or not a property was granted a property tax homestead exemption. This exemption is available to "a person who, on January 1, has the legal title or beneficial title in equity to real property in (Florida) and who in good faith makes the property his or her permanent residence or the permanent residence of another or others legally or naturally dependent upon him or her" (Section 196.031, Florida Statutes). I used the presence of a homestead exemption to classify a property as owner-occupied, and housing units without a homestead exemption are classified as renter-occupied. Because the exemption provides significant tax savings, owner-occupants have strong financial incentives to file for the exemption, and I am thus confident that owner-occupied units will generally be correctly classified based on homestead status. Properties that are not covered by a homestead exemption are primarily either rental units or second homes. The fraction of single-family homes that are second homes is expected to be small because in Florida most vacation homes are

[7] Tax roll data for recent years are available online at: http://dor.myflorida.com/dor/property/resources/data.html. FDOR collects these rolls to monitor the performance of the county tax assessors.

condominiums. For condominiums I cannot rule out the possibility that a substantial number of the properties I labeled as rentals may in fact be second homes not available for rent.

After classifying the housing units as owner-occupied and renter-occupied, I then used the property's estimated market value from FDOR to classify the housing units as affordable and unaffordable. Specifically, I first calculated rent-to-price ratios using the Public Use Microdata Sample (PUMS) for the American Community Survey by regressing the rent reported for single-family rentals on variables describing the size and quality of the home. Separate regressions were estimated for 11 market areas in Florida, and the parameters from these regressions were used to construct an imputed rent measure for the owner-occupied single-family homes in the PUMS data.[8] The imputed rent measures were then divided by the owner's estimate of market value to obtain a unit-specific rent-to-price ratio. These ratios were averaged over all of the sampled properties in a market area to obtain the area's rent-to-price ratio.

With the rent-to-price ratios in hand, I constructed imputed rent measures for every housing unit in the FDOR data between 1998 and 2013 by multiplying the rent-to-price ratio by the property's estimated market value. A property is designated as "affordable" in a given year if this imputed rent is equal to or lower than the fair market rent (FMR) for two-bedroom housing units reported by the Department of Housing and Urban Development (HUD), and housing units with imputed rents above the two-bedroom FMR are classified as "unaffordable." For each SAZ in my data, I constructed a count of each of the following housing types by affordability status: single-family homes, condominiums, mobile homes, and multifamily units.[9]

Lastly, I obtained information on public housing and subsidized rental housing units from the University of Florida's Shimberg Center; I refer to such housing units as "assisted housing units"

[8] The 11 market areas represent subregions of the state (for example, northeast, central, and southwest) and roughly correspond to Florida's Regional Planning Areas (http://www.flregionalcouncils.org/directory/).
[9] I exclude retirement homes and institutional housing, such as school dormitories and correctional facilities, from my analysis. I also exclude bank-owned properties, because such properties are not legally habitable.

hereafter. For each residential property containing assisted housing units funded by HUD, the U.S. Department of Agriculture, the Florida Housing Finance Authority, and local housing finance authorities, the Shimberg data report the year that the structure was built, the address of the structure, the number of units that are subject to rent and/or income restrictions, the primary population served by the housing development (e.g., the elderly, families), and the date on which the housing units enter into and exit from assisted housing status. The addresses in the Shimberg data were used to assign all assisted housing units to elementary schools using the geocoding procedure described above. After this assignment, I utilized the fields reporting the number of assisted housing units in a property and the dates on which such units entered and exited assisted status to generate annual SAZ-level counts of the assisted housing stock. Because there is little reason to believe public housing programs targeted towards housing the elderly and disabled will affect school populations, my assisted housing counts only included those units that were designated for families.

Because I am primarily interested in how the changes in the housing stock affect racial segregation in traditional neighborhood school systems, I removed from the data school districts that have significant open enrollment policies that break the relationship between a student's residential location and where he or she attends school. Lastly, because intra-district school segregation is only meaningfully defined when a district has multiple schools, I dropped the small rural school districts that contain only one elementary school.[10] After imposing these restrictions, I was left with 38 school districts containing 1,484 elementary schools. In Florida school district and county boundaries are coterminous. Because Florida has a large population (18,801,310 people according to the 2010 Census) and land area (65,755 square miles) with only 67 counties, school districts are also large in population

[10] Five districts had some form of open enrollment and were dropped from my panel. The vast majority of the dropped districts are rural counties containing a single elementary school. Florida has many rural counties that are agrarian in nature with a small population, 40,000 on average in 2013.

and area. The 38 school districts/counties included in my data are found throughout the state.[11] Each of the 1,484 elementary schools was linked to the NCES Common Core of Data. The Common Core files contain a number of variables that characterize the student population of all reporting schools. Most importantly for this study, included among these variables are counts of the number of students in a given school who are black, Hispanic, and white and a separate count of those eligible to participate in the Free Lunch Program under the School Lunch Act. Eligibility for free or reduced-price meals is determined by household size and income or through categorical eligibility, which serves as a proxy for income data.[12]

As noted above, a district's schools are categorized into school quality groupings using three different methods — by the percentage of students at the school receiving a free lunch, by the percentage of students passing a standardized mathematics exam, and by the letter grade assigned to the school by the Florida Department of Education. Each of these methods is described in turn below, which is followed by a justification for using multiple measures rather than a single measure of school quality.

To divide schools into income groups, I proxied a family's income level by whether its child receives a free lunch. The use of the receipt of a free lunch to gauge a student's family income has limitations (Schwartz, 2010), but it is commonly done because nothing better is available. The construction of the income groups involved three steps. First, I constructed for each year the percentage of the district's and school's students receiving a free lunch. If the school's percentage is greater (smaller) than the district median percentage, it is classified as a low (high) income school for that year. To avoid simultaneity problems in estimating my models, I needed a school income classification method that keeps an individual school within the same income group over the years

[11] The counties are found within all 10 of Florida's regional planning areas, which cover the entire state. Of the 38 counties, all but 5 are located within one of Florida's 16 metropolitan areas.

[12] The U.S. Secretary of Agriculture sets the income eligibility levels annually. Children in households with incomes at or below 130 percent of the federal poverty guidelines are eligible for free meals (Hoffman, 2012, p. 2).

covered by my panel. I found that there was considerable persistence in the annual categorizations. Schools categorized as high (low) income in one year tended to be high (low) income in the other years. Hence, the second step of the process involved classifying a school as globally low income (high income) if for all years it was classified as low income (high income). The remaining schools are those whose percentages of free lunch students tended to be at or close to the district median percentage year in and year out. As a result, in some years these schools are classified as low income and in other years as high income. I classified these schools as globally middle income schools. Finally, using schools' global classifications I aggregated them into low, middle, and high income groups.[13]

The test score data come from the Florida Department of Education. Pass rates on a mathematics proficiency exam, known as the Florida Comprehensive Assessment Test (FCAT), are reported for each school and year of my panel. A step-by-step process was followed in grouping schools based on academic performance. First, I averaged pass rates over the years of my panel at the school and district levels. If the school's average pass rate is within 5 percentage points of the district average, it is categorized as an average performing school. If its average pass rate is more than 5 points above (below) the district average, it is categorized as a high (low) performing school. This resulted in roughly an equal number of low, average, and high performing schools.

Finally, schools were grouped based on the letter grade assigned to the school each year by the Florida Department of Education. While the letter grade includes as one component the pass rate on the aforementioned FCAT mathematics proficiency exam, it also includes additional components. These include pass rates on the FCAT reading exam and the Florida Writes! exam, with greater weights attached to the performance on these exams by economically disadvantaged and minority students. Also part of the letter grade formula are year-to-year gains on the reading exam and some accounting for suspensions and absenteeism. Hence, in comparison to using just the FCAT math exam, the letter

[13] There are 1,484 total schools: 456 low income schools, 472 middle income schools, and 556 high income schools.

grade is a more comprehensive measure of school performance. However, it has its limitations. Most importantly, Figlio and Lucas (2004) find that the grades have a large stochastic component, resulting in individual school grades bouncing about from year to year. This problem is mitigated here by averaging school grades over the years covered by my panel. The steps followed to group schools into performance categories based on their letter grades are similar to those followed in obtaining performance categories based on the FCAT math exam. First, each letter grade is assigned a number, ranging from 5 for an "A" to 1 for an "F." The numbers are averaged over the panel at the school and district levels. If the average for the school is within 0.3 of the average for the district, it is labeled an average performing school. If the school's average is above (below) this middle range, it is a high (low) performing school. This results in roughly equal numbers of schools falling within each of the three performance categories.

Using three different methods to develop a school quality typology may seem redundant and therefore unnecessary because there should be a high correlation across groupings based on the three alternative criteria. For example, schools located in high income SAZs are likely to be high performing schools, based on either of the two methods for identifying such schools. While this is generally the case, there are schools located in high income SAZs that are not high performing (this is true for about 5 percent of the total number of high income schools). Also, as mentioned above, a child's free lunch status is an imperfect measure of family income. This would argue against a sole reliance on this measure. Finally, it is not clear what type of school would best serve the minority student in the long run — a high income or a high performing school. While peer group effects may be stronger in a high income school, teachers may be better in a high performing school. These reasons, along with my findings varying somewhat across the three alternative school groupings, justify using multiple measures rather than a single measure of school quality.

3.2. Summary statistics

For each of the three income groups, Table 1 reports the average proportions of black, Hispanic, and white elementary school students attending each type of school for selected years of my panel — the first (1998) and last year (2013) and two intermediate years (2005 and 2010). The year 2005 is near the peak of the housing boom for most local markets and by 2010 all markets had experienced their crash in housing values. The relative concentration of minorities in low income schools is seen in the top panel of the table. In 1998, on average, 0.436 of a district's blacks attended low income schools. In contrast, only 0.182 of whites attended these schools. Hence, black concentration in low income schools was 2.40 times greater than that of whites. Over the course of my panel, the proportions of both blacks and whites attending low income schools declined, but the relative concentration of blacks in these schools actually increased to 2.43.

Hispanics are also concentrated in low income schools, but less so than blacks. In 1998, the ratio of the average proportion of Hispanics to that of whites is 1.81, in comparison to the 2.40 for blacks. By 2013, the ratio had declined to 1.65. Hence, while there is a small upswing in the relative concentration of blacks in low income schools over my panel, the reverse holds true for Hispanics.

Tables 2 and 3 show the proportions of each racial group attending low, average, and high performing schools. In the case of school quality measured by test scores (Table 2), the black and Hispanic concentration ratios in the low performing schools in 1998 equal 2.30 and 1.60, respectively. In 2013, these ratios equaled 2.60 and 1.76. Hence, the concentration of both racial groups in the worst schools is shown to be increasing over time. This conclusion is reinforced by the proportions reported in Table 3, where school quality is being measured by letter grades. Here the black concentration ratio increased from 2.60 to 2.92, while the Hispanic concentration ratio increased from 1.63 to 1.79.

In summary, the numbers in Tables 1–3 are consistent with those reported by Orfield et al. (2012), and reinforce their conclusion that the concentration of minority students in "bad" schools is a

serious problem that is getting worse over time. The focus of my paper is on whether these trends can be reversed by providing more affordable housing within better SAZs.

My data are ideal for this purpose because there have been major shifts in school districts' proportions of affordable housing units located within the better SAZs. Table 4 reports the average proportion of each type of affordable housing found in low, middle, and high income SAZs, while Table 5 reports the proportions for low, average, and high performing SAZs.[14]

To illustrate the variability in my data, consider the swings in the proportion of affordable single-family rentals found in high income SAZs over the course of my panel (third row in Table 4). In 1998 the proportion is 0.230, which declines to 0.203 in 2005, then rises to 0.246 in 2010, falling back to 0.233 in 2013. This pattern, of course, follows Florida's boom/bust/recover cycle in housing prices. The swings (in direction) observed for single-family rentals are also observed for owner-occupied single-family homes and condominiums, as well as for apartments. For both rental and owner-occupied mobile homes, the proportion in the high income SAZs monotonically increases over the panel, again demonstrating the variability in the data. The swings in the proportions for high performing SAZs reported in Table 5 are even more consistent with those found for single-family rentals in Table 4. For all affordable housing types, except mobile homes, the pattern is for the proportion in the high performing SAZs to decline up until the crash and then rise precipitately after the crash.[15]

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[14] Tables 4 and 5 also report the proportions of non-affordable units located in each school group. Table 5 uses the performance on the math exam to gauge school quality. Using the letter grade resulted in highly similar results.

[15] These changes in the proportions of affordable units located in the better SAZs could come from demolitions, new construction, or changes in the status of existing units from owner to rental tenure or from unaffordable to affordable. A close inspection of the data revealed that the intertemporal movements in the proportions were driven by the latter two factors and not by demolitions or new construction. Results from regressions also support this conclusion. I ran two regressions. In the first I regressed the number of affordable single-family rental units within the SAZ on year and school fixed effects. I obtained an *r*-square of .06. Next, I added the current and lagged number of single-family foreclosures to the model as explanatory variables. The *r*-square rose to .23. These results show that increases in the number of single-family rentals within a SAZ are largely driven by changes in the number of foreclosures, which result in homes being converted from owner-occupied units into rentals. See Ihlanfeldt and Mayock (2014) for more on the foreclosure data that I added to my panel to run the above regressions.

4. Empirical methodology

4.1. Estimated models

My empirical models estimate how increases in a school district's proportions of affordable housing types located in groups of SAZs defined by income (middle and high) or school quality (average and high performing) affect the proportion of minority elementary students (black and Hispanic) attending low income (low performing) schools.[16] Models are estimated using three alternative estimators — pooled fractional probit (PFP), linear fixed effects (LFE), and two-stage least squares (2SLS). The PFP and LFE models are expressed below. Before expressing these models, I first introduce some simplifying notation.

Let i = school district

t = year

L = {middle income group, high income group}

J = {affordable, owner-occupied, single-family units;
unaffordable, owner-occupied, single-family units;
affordable, rental, single-family units;
unaffordable, rental, single-family units}

P = {affordable, owner-occupied, condominium units;
unaffordable, owner-occupied, condominium units;
affordable, rental, condominium units;
unaffordable, rental, condominium units}

D = {affordable, owner-occupied, mobile homes;
unaffordable, owner-occupied, mobile homes;
affordable, rental, mobile homes;
unaffordable, rental, mobile homes}

E = {affordable, apartment units;

[16] To be clear, I am only observing possible movements of minorities between SAZs within the same school district. Minorities in a bad SAZ in one district may move to a good SAZ in another district in response to an increase in affordable housing within the latter district. This could bias my results if these cross-district movements are significant in magnitude and are correlated with my within-district variables. However, school districts in Florida are county-wide and counties are large measured by both population and land area. Therefore, possible cross-district movements in response to changes in housing affordability are unlikely to have an important effect on my results.

unaffordable, apartment units}.

Next, define the following cross products:

$Q = L \times J$

$F = L \times P$

$B = L \times D$

$G = L \times E$.

For an arbitrary variable Y_i, define the intertemporal mean as

$$\bar{Y} = \frac{I}{T}\sum_{t}^{T} Y_{it} .$$

Finally, define the variables that enter the model as follows:

S = proportion of district's single-family housing

C = proportion of district's condominium units

M = proportion of district's mobile homes

A = proportion of district's apartments

H = proportion of district's assisted housing units.

Then the PFP model can be expressed as

$$E(X_{it}|Z_{it}) = \varphi\left(\theta_t + \sum_{q\in Q} B_q S_{qit} + \sum_{f\in F} B_f C_{fit} + \sum_{b\in B} B_b M_{bit} + \sum_{g\in G} B_g A_{git} + \sum_{l\in L} B_l H_{lit} + \sum_{q\in Q} \alpha_q \bar{S}_{qit} + \sum_{f\in F} \alpha_f \bar{C}_{fit} + \sum_{b\in B} \alpha_b \bar{M}_{bit} + \sum_{g\in G} \alpha_g \bar{A}_{git} + \sum_{l\in L} \alpha_l \bar{H}_{lit} + \varepsilon_{it}\right), \quad (1)$$

where φ = standard normal cumulative density function, θ_t = year fixed effects and ε_{it} = the idiosyncratic error term.

To illustrate, the first component of $\sum_{q\in Q} B_q S_{qit}$ registers the impact of an increase in the proportion of the district's affordable, owner-occupied, single-family homes located in the middle

income group of SAZs on the concentration of black students attending low income schools. Notice that school district fixed effects do not enter (1). Instead, unobservable heterogeneity across districts is captured by the temporal means of the explanatory variables over the panel (Papke and Wooldridge, 2008). Also note that the housing types include both affordable and unaffordable units. The latter are included as control variables whose omission may have biased the estimated effects of the affordable housing types.

The LFE model can be expressed as

$$P_{it} = \theta_t + \lambda_o + \sum_{q \in Q} B_q S_{qit} + \sum_{f \in F} B_f C_{fit} + \sum_{b \in B} B_b M_{bit} + \sum_{g \in G} B_g A_{git} + \sum_{l \in L} B_l H_{lit} + \varepsilon_{it}\,, \tag{2}$$

where *P* = the proportion of district *i*'s black (Hispanic) students attending low income schools, and θ_t and λ_o = year and school district effects, respectively. Equations (1) and (2) are estimated separately for blacks and Hispanics. In additional models, the income groups are replaced by the school performance groups.

4.2. Identification of effects

To obtain consistent estimates, equations (1) and (2) assume that the proportions of the district's housing types falling within the middle income (average performing) and high income (high performing) school groups are strictly exogenous. The satisfaction of strict exogeneity requires contemporaneous exogeneity and the absence of feedback effects. Feedback effects occur if current values of the dependent variable (the proportion of minority students attending low income or poor performing schools) affect future values of the explanatory variables. For example, unobservable shocks could affect the demand for affordable housing by minority families within SAZs causing changes in the supplies of these units. Independent of changes in demand, unobservables could also affect the supply of affordable housing within SAZs.[17] For these reasons, feedback effects may exist and strict

[17] On the demand side, feedback effects may result from the job accessibility of minority families improving as the result of extensions to public transportation networks or new firm locations, which may increase minority income

exogeneity would be violated, resulting in inconsistent estimates. The solution to this problem is to instrument the affordable housing proportions in the better SAZs with strictly exogenous variables.[18]

Papke and Wooldridge (2008) note that the LFE estimator may yield inconsistent estimates due to the incidental parameters problem. To circumvent this problem they develop and propose the PFP estimator. However, they show that the severity of the incidental parameters problem declines as the length of the panel (*t*) increases relative to the number of observations (*n*). By their standards, *t* (15 years) is large relative to *n* (38 districts) in my panel, which suggests that the LFE and PFP estimators should yield similar results. As a check on this, the estimated average partial effects produced by each model are compared and, as reported below, are indeed found to be similar. Hence, if strict exogeneity is satisfied, the LFE estimates should yield reliable results. If strict exogeneity is violated, the endogeneity must be dealt with. Wooldridge (2010, p. 618) notes that correcting for an explanatory variable that is not strictly exogenous is quite difficult in nonlinear models, such as the PFP model. Despite this difficulty, along with Papke (2008) he develops a multistep, rather involved, methodology for instrumenting an endogenous explanatory variable using the PFP estimator. They find that the simple two-stage least squares linear model with fixed effects (2SLS) yields almost identical results to the PFP estimator with endogenous variables. They therefore conclude that in many nonlinear contexts the 2SLS model does a good job of estimating average partial effects. I therefore test each estimated model for strict exogeneity. Where I reject the null hypothesis of exogeneity, I emphasize the results obtained using the 2SLS estimator. However, the results obtained using all three estimators are reported to assess the robustness of my findings. My instrumental variables are based on base year

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and thereby improve their residential mobility. In response, investors may purchase more REOs located in better SAZs and rent these units out, creating more affordable housing for minority families. On the supply side, feedback effects may occur if more subsidized housing is built within bad SAZs. This may reduce the demand for housing by minorities within good SAZs, causing lower prices and an increase in the number of affordable units. While I control for HUD sponsored subsidized housing, I have no data on local housing subsidy programs.

[18] In comparison to affordable housing units, I could not come up with plausible explanations for why unaffordable housing units would produce feedback effects. Thus, while bias from unobservables is always a possibility, to avoid having to instrument all of my housing types, unaffordable units are assumed exogenous.

values of the endogenous variables (i.e., the affordable housing types). In most applications the base year would be the first year of the panel. However, this may not guarantee the exogeneity of the instruments. Fortunately, I am able to measure base year values for 1997 and 1995, one and three years before my panel begins in 1998. To obtain an instrumental value for each endogenous variable for each year of my panel, I interact the base year value for each of the endogenous affordable housing type proportions with a set of dummy variables equaling one for the year of observation and otherwise equaling zero.[19] This allows for 1) the impact of the base year value to be different in each period and 2) the strength of the correlation between the instrument and the endogenous variable to fall throughout the course of the panel. The key assumption underlying my identification strategy is that after accounting for the proportions of affordable housing located in the better SAZs, the proportions of these units from the base year do not have an additional partial effect on the proportion of minority students attending low income (low performing) schools in the current year. [20]

It is important to draw a distinction between my base value instruments and the use of a lagged endogenous variable as an instrument whose value is changing throughout the panel. As is well known, the use of a lagged endogenous variable as an instrument is problematic if unobservables are correlated with the dependent variable along with current and past values of the endogenous variable (Angrist and Krueger, 2001). In my case I am taking care of time-constant unobservables by using fixed effects. Time-varying unobservables are only a problem if my base year value of the endogenous variable has a lasting effect on the dependent variable (so that it should appear as an additional explanatory variable on the right-hand side). It is very unlikely that my base year variables, especially those going back three years

[19] So, for example, to instrument the proportion of the district's affordable single-family rental units located within high income SAZs I use the base year value of this proportion and interact it with a dummy variable equaling one for the year of observation and zero otherwise.

[20] Goldsmith-Pinkham, et al. (2017, p.19-20) argue that my instrumental variables are "Bartik-like". They define a Bartik-like instrument as one where the researcher exploits the inner product structure of the endogenous variable to construct an instrument. They argue the classical Bartik (1991) instrument is equivalent to a whole family of related instruments, including both the growth rate instrument that researchers are very familiar with and the base year value interacted with time effects instrument that I employ.

before the beginning of the panel, would have a nonzero partial effect. Support for this assessment is provided by Akaike's information criterion (AIC) which yielded larger negative AIC values for models not containing lagged effects.

The determination of strict exogeneity merits comment. Wooldridge (2002, p. 285) proposes a test that involves adding the leading values of suspected endogenous explanatory variables to equation (2). The null hypothesis of strict exogeneity is rejected if the leading variables are jointly significant. A limitation of the test is that it has low power for testing contemporaneous exogeneity. As noted above, strict exogeneity requires both an absence of feedback effects and contemporaneous exogeneity. To test for contemporaneous exogeneity I employ Wooldridge's (1995) robust score test, which is analogous to a Hausman test, but unlike the latter test does not assume that the error term is i.i.d.

5. Results

Tables 6–8 and Tables 9–11 report detailed results for black and Hispanic students, respectively.[21] The first, second, and third tables for each race are the results for income groups, the school performance groups, where performance is measured by test scores, and the alternative school performance groups, where performance is measured by the letter grades. The LFE, PFP, and 2SLS results are each given in a separate column. The columns titled 2SLS-A and 2SLS-B report the results obtained with the 1997 and 1995 base year instrumental variables, respectively. For each housing type four numbers are reported – the estimated coefficient, the estimated standard error clustered at the district level (in box brackets), the change in the dependent variable (proportion of blacks (Hispanics) attending low income (low performing) schools) resulting from a five percent increase in the explanatory variable (e.g., the proportion of affordable single-family rentals found within the high income group) (in curly brackets), and the percentage change in the dependent variable from the five percent increase in

[21] In the interest of brevity, the results tables only include the estimated effects of the affordable housing types. As expected, the unaffordable housing types are largely statistically insignificant.

the explanatory variable, where the bases for calculating the percentage changes are the sample means of the variables (in angle brackets).[22]

The estimated coefficients obtained from the LFE and 2SLS models are average partial effects (APEs). The estimated coefficients for the PFP model are not APEs, but they are easily calculated and appear in parentheses next to the estimated coefficient.[23]

Due to the large number of results, a summary table (Table 12) indicates where an increase in the proportion of an affordable housing type is found to decrease the proportion of the minority group attending low income (low performing) schools. These results are from the 2SLS-A models. The 2SLS-B model results are highly similar to the 2SLS-A models, which lends support to my identification strategy. Only statistically significant effects are reported.

A broad overview of the estimated APEs reveals that they are similar across the three estimators, where one or more of the effects are statistically significant. For example, an increase in the proportion of multifamily apartments found within high income SAZs has a strong negative effect on the proportion of black students attending low income schools, regardless of estimator. The APEs are −0.060, −0.073, and −0.063 according to the LFE, PFP and 2SLS models, and all effects are highly

[22] A five percent increase was chosen assuming that such an annual increase in affordable housing within a better SAZ would not be an unreasonable policy target. Moreover, the proportions in high income SAZs of a number of the affordable housing types (single-family rentals, owner-occupied single-family homes, mobile home rentals, and owner-occupied mobile homes) showed roughly a five percent annual increase from before the crash (2005) to after the crash (2010). Hence, for these units we can judge the impact that the crash had on the proportions of minority students attending bad schools.

[23] The estimation of average partial effects from the PFP model is straightforward. For instance, in equation (1), if z_{kit} is an arbitrary element of Z_{it}, and the parameter associated with z_{kit} is denoted Γ_k, then differentiating equation (1) with respect to z_{kit} gives us the following partial effect for observation *i* in period *t*

$$\frac{\partial E(S_{it}|Z_{it})}{\partial z_{kit}} = \Gamma_k \Phi(Z_{it}) ,$$

where ϕ ( ) denotes the standard normal probability density function. Papke and Wooldridge (2008) show that the average partial effect (APE_k) of z_{kit} on X_{it} can be consistently estimated by simply averaging over all observations of the above equation. That is,

$$APE_k = \frac{\Gamma_k}{NT} \sum_{t=1}^{T} \sum_{i=1}^{N} \Phi(Z_{it}).$$

statistically significant. Other examples of the similarity of estimated effects across estimators run throughout the tables, although differences in the effects can also be found.

In the absence of any prior knowledge on which of the affordable housing types might be endogenous within a particular model, I treated all of them as endogenous in each of the models in conducting my strict exogeneity tests. This resulted in 14 endogenous and 16 exogenous variables (not counting the fixed effects) for each model.[24] Based on Wooldridge's score tests from the LFE models I could not reject contemporaneous exogeneity for two of the models – the model explaining the proportion of Hispanic students attending low income schools and the model explaining the proportion of Hispanics attending low performing schools, where performance is measured using the letter grades. Adding the leading values of the affordable housing types to the LFE models tests for the presence of feedback effects. For all models, the leading values are found to be statistically significant at the 5 percent level, indicating the existence of feedback effects. Hence, my focus will be on the results obtained with the 2SLS models.[25]

From the results summary presented in Table 12, it is clear that there is strong support for the hypothesis that improving housing affordability within better SAZs decreases the school district's proportions of black and Hispanic elementary school students attending low income (low performing) schools. Without exception, one or more of the housing types is found to have a statistically significant effect in the 2SLS models. Moreover, these effects are far from trivial in magnitude. Here are a few

[24] The 16 exogenous variables are the unaffordable housing types and assisted housing, broken down into 8 variables registering the proportion of each type found within high income (high performing) and middle income (average performing) SAZs.

[25] First-stage diagnostics for the 2SLS models are strong in all cases, although, as expected, they are weaker when using 1995 rather than 1997 as the base year. Regardless of the measure of school quality or the base year, Shea's partial *R*-square, which measures the strength of the correlation between the endogenous variable and its instrument, is in all cases respectable, with the lowest value equaling 0.27. Across the board, *F*-statistics are all statistically significant at the 1 percent level. For the income school quality measure the average *F*-statistics are 11.21 and 20.98 using as the base year 1995 and 1997, respectively. For the math exam measure of quality these numbers are 10.14 and 16.78. The numbers equal 10.35 and 151.71 using the letter grade to measure school quality.

examples. Increasing the proportion of single-family rentals in SAZs containing high performing schools, as measured by test scores, by five percent reduces the proportion of black students attending low performing schools by two percent. Increasing the proportion of owner-occupied mobile homes in SAZs containing average performing schools, as measured by test scores, by five percent reduces the proportion of Hispanic students attending low performing schools by two percent. Unsurprisingly, an increase in the proportion of apartments located within better SAZs is found to have significant effects. This is true for five of the six estimated models. Here again the magnitude of the effects is remarkable. For example, in the models estimated for blacks and Hispanics, a five percent increase in the proportion of apartments located in high income SAZs reduces the proportion of students attending low income schools by one percent.

What might be surprising is that mobile homes have significant effects, but only for black students. In Florida, mobile homes are an important part of the housing stock. On average, across the 38 districts of my panel they are 14 percent of the single-family plus condominium plus mobile home total. This is higher than the percentage for condominiums (13 percent), a type of housing that is strongly associated with the state of Florida. Single-family homes represent 72 percent of the total. In the model estimated for blacks using the school income groups an increase in the proportion of owner-occupied mobile homes located in high income SAZs is found to reduce the proportion of the group attending a low income school by two percent. In the model estimated for blacks using the school performance groups based on the FCAT math exam an increase in the proportion of mobile home rentals in the average performing group of SAZs is found to reduce the proportion of the group attending a low performing school by one percent.

The housing types that reduce the concentration of blacks and Hispanics in low income or low preforming schools, as measured by the letter grade, are quite similar. However, this is not true for the groups defined by the FCAT math exam. From Table 12 it can be seen that there are four housing types

that matter to blacks and five housing types that matter to Hispanics and none are the same between the two racial groups. There are also differences in the housing types that matter within racial groups across the three groupings of schools. The only housing type that is consistently found to reduce the concentration of minorities in bad schools are apartments in the high income or high performing groups of SAZs. Frequently, however, it is an increase in the proportion of single-family or mobile homes found in the better SAZs and not apartments that have the greater impact on reducing minority concentration in the bad schools. For example, in the case of black students attending low income schools, in comparison to an increase in the proportion of apartments within high income SAZs, an increase in the proportion of mobile homes within these SAZs has an impact on deconcentration that is almost twice as large. An example for Hispanics is that an increase in the proportion of single-family rentals in average performing schools, as measured by the FCAT math exam, has an impact on the deconcentration of these students in low performing schools that is 1.6 times as large as the impact from increasing the proportion of apartments. These results suggest that families with young children prefer the extra living space provided by detached units.

The important takeaways from Table 12 are two in number. First, improving housing affordability in SAZs containing better schools, as measured by income or school performance, lowers the concentration of minority students attending bad schools by nontrivial amounts. Second, the specific types of affordable housing that matter most to this deconcentration vary across racial and school groups. These differences may reflect a variety of factors, including racial differences in family incomes, preferences for different types of schools, and constraints associated with attending these schools. Sorting out the relative importance of these factors may be an important issue for future research, but without question this will be a daunting task, given the difficulty of measuring both preferences and constraints.

As a final exercise, I calculated the percentage reduction in the proportions of minority students attending low income schools from the changes that occurred in the proportions of all the affordable housing types found within high income SAZs between 2005 (before the crash) and 2010 (after the crash). As seen in Table 4 the proportions of all eight of the affordable housing types found within the high income SAZs increased over this period. So the question addressed is, what was the total effect on minority concentration within low income schools from the aggregate increase in housing affordability resulting from the housing market crash? Across the 38 school districts the average reduction in the proportion of the district's black students attending low income schools equaled 6.92 percent. But for over a third of the districts the reduction was greater than 10 percent. For Hispanic students the average reduction was 3.53 percent, with 13 percent of the districts having a reduction of greater than 10 percent. These predicted changes, especially for blacks, provide further evidence that improvements in housing affordability within better SAZs can have an important effect on deconcentrating minority students attending bad schools.

6. Conclusions

The school performance of minority students is well below that of white students. Minority students are also far more concentrated in low income/poor performing schools. These two facts are interconnected. The concentration of minority students in bad schools contributes to their underperformance on standardized exams. From a policy perspective the need to integrate public schools is beyond dispute. Sadly, the history of desegregation policy in the U.S. is long and shows that policies tried in the past have had limited success. Today, school segregation remains unacceptably high and by some measures is worsening over time.[26]

[26] There are at least three different measures of school segregation. Dissimilarity indices measure racial balance across schools within the district. If black students are distributed evenly across all elementary schools, the dissimilarity index takes a value of zero and there is no segregation. At the opposite extreme, the index assumes a value of unity when black and white students are completely segregated into separate schools. Exposure indices

Today, there is new hope that the adoption of school choice programs will integrate schools. Unfortunately, the most popular programs focus on charter schools and the best evidence available shows that they have little effect on school integration (Zimmer et al., 2009). An alternative to school choice as a deconcentration policy is to improve housing affordability within those school attendance zones within a school district that contain higher income/higher performing schools. Presumably because of data constraints, little empirical evidence exists on the efficacy of this approach. In this paper I have exploited Florida's recent turbulent housing markets to relate changes in a district's affordable housing units located in better SAZs to the deconcentration of minority students in bad schools. The results are based on a unique panel data set at the school district level which allowed unobservable heterogeneity across districts and endogeneity within districts to be addressed.

The results show that an increase in the proportion of a district's affordable housing units located in higher income/higher performing SAZs reduces the concentration of black and Hispanic students in low income/low performing schools. The estimated effects are nontrivial in magnitude and are robust across three alternative estimators. These findings belie the results obtained from the MTO project and Ellen et al. (2016) suggesting that housing voucher recipients, the majority of whom are minorities, do not take the opportunity to improve their child's school environment when the opportunity presents itself.

From a policy perspective my results suggest that improving housing affordability within better SAZs will have a positive impact on school integration. However, they also show that the program should be tailored to each racial group and to the type of school the district is most interested in integrating. The housing types that matter the most to a successful integration vary depending on these factors.

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measure potential contact or the possibility of interaction between whites and blacks. Isolation indices measure the extent to which blacks (whites) are exposed only to other blacks (whites) and not to any other racial group. Recent evidence on exposure and isolation indices suggests that segregation is worsening over time. In contrast, evidence on dissimilarity indices suggests that segregation is staying about the same (Orfield et al., 2012; Clotfelter et al., 2005).

The question is, how can public policy create more affordable housing units within better SAZs in light of the tight government budgets that currently prevail? The approach most frequently recommended is inclusionary zoning. Operationally, developers of housing projects within better SAZs could be required to set aside a percentage of their units at below market prices. These homes could then be purchased by local housing authorities that would then rent the units to poor families at an affordable price.[27]

However, even if inclusionary zoning can be made financially feasible, the possible opposition of residents within better SAZs to affordable housing would have to be overcome. NIMBYism is the reality and local governments have offered little resistance. However, my previous work with Gregory Burge (2006) suggests there may be a way to counteract some of the opposition to affordable, higher density housing within better SAZs. We have found that the imposition of impact fees by suburban jurisdictions increases the quantity of multifamily housing receiving project approval. More of this otherwise undesirable type of housing gets built because the impact fee revenue helps to offset the negative externalities emitted by the housing, including the fiscal deficit that it allegedly creates. Another approach to countering the NIMBYism would be to move land use control, limited to the purpose of opening up affordable housing opportunities to minority families in better SAZs, from local governments to the states or federal government. Given the national importance attached to improving the academic achievement of minority children, it may be time to make this change.

While my results provide important new evidence on the relationship between housing affordability and school integration, the limitations of my analysis leave ample room for additional

[27] The results of a study by Schwartz (2010) suggest that inclusionary zoning may be more than an effective policy for desegregating public schools. Her analysis focuses on Montgomery County, Maryland, where zoning policy allows the public housing authority to purchase one-third of the inclusionary zoning homes within each subdivision to operate as federally subsidized public housing. Families are randomly assigned to apartments which prevents families' self-selection into neighborhoods and elementary schools of their choice. She compares the test scores of children assigned to low poverty and higher poverty schools and finds that after a period of time the former children achieve higher scores on both mathematics and reading exams.

research. One limitation is that the results show only the short-run or first order effects of increases in a district's proportions of affordable housing units located within good SAZs on the concentration of minorities attending bad schools. There may be second order effects that have an important role to play in formulating housing policies. For example, as the proportion of blacks or Hispanics increases within the good SAZs in response to improved housing affordability there may be white flight to private schools, charter schools, or to schools located within other districts.[28] Hence, there may be no long-run improvement in school integration. Another long-run consequence could be that the loss of enrollment of minorities attending bad schools could propel these schools to perform better, resulting in minorities choosing to stay and not move. On the other hand, these schools may cease to exist as minority population declines within the area. Many more secondary effects could be listed that serve as opportunities for future research. Another limitation of my analysis is that due to data limitations I was forced to assume symmetry in the effects of increases and decreases in housing affordability on minority deconcentration within bad schools. It may be the case that, in comparison to an increase in the district's affordable housing located in the good SAZs, a reduction in affordability may have a different impact. With richer data than those employed here, asymmetric effects could be investigated. Finally, the use of individual student data would enable a plethora of interesting extensions to the current project. For example, how does the distance between the residential locations of minority families and good schools affect their probability of moving to a good SAZ?[29] Most importantly, after a move from a

[28] A large number of studies have found that school choice results in more segregated schools. Choice allows white families to avoid sending their children to a neighborhood school that has a high proportion of minority students. For a review of this literature see Straus and Lemieux (2016). The school choice results suggest that white families may flee from good schools in white areas as more affordable housing in the SAZ allows minorities to attend the school. However, there is a difference between whites avoiding an integrated neighborhood school versus exiting from a good school in a white area as minorities increase their enrollment. Hence, it is important for future research to focus on the latter question.

[29] Some suggestive evidence on the importance of distance is provided by Ellen et al. (2016). As noted above, in earlier work Ellen and her colleagues documented the fact that voucher recipients do not live near good schools (Horn et al., 2014). In Ellen et al. (2016) they seek to discover why this is true. Using the same confidential database on the locations of over a million voucher recipients, they find that families with vouchers are more likely to move toward a better school in the year before their oldest child meets the eligibility cutoff for kindergarten.

bad to a good SAZ does the student's school performance improve and how long does it take in the good school for an improvement to occur?[30]

The magnitude of the effect is larger in metropolitan areas with a relatively high share of affordable rental units located near high performing schools and in neighborhoods in close proximity to higher performing schools.

[30] As noted above, Schwartz (2010) provides evidence on this issue, using an attractive identification strategy.

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Table 1
Mean Proportion of Each Racial Group
Attending Low, Middle, and High Income Elementary Schools
Where Income Group is Defined By the Percentage of Students Receiving a Free Lunch

	1998	2005	2010	2013
Low Income Schools				
Blacks	0.436	0.403	0.392	0.384
	(0.254) [1]	(0.239)	(0.226)	(0.226)
Hispanics	0.330	0.292	0.271	0.261
	(0.214)	(0.191)	(0.159)	(0.156)
Whites	0.182	0.164	0.158	0.158
	(0.096)	(0.115)	(0.116)	(0.116)
Middle Income Schools				
Blacks	0.378	0.387	0.371	0.368
	(0.260)	(0.250)	(0.236)	(0.236)
Hispanics	0.428	0.402	0.384	0.379
	(0.255)	(0.247)	(0.220)	(0.220)
Whites	0.412	0.372	0.351	0.343
	(0.205)	(0.213)	(0.207)	(0.206)
High Income Schools				
Blacks	0.186	0.210	0.237	0.239
	(0.150)	(0.139)	(0.142)	(0.149)
Hispanics	0.242	0.306	0.345	0.349
	(0.148)	(0.180)	(0.168)	(0.170)
Whites	0.405	0.464	0.491	0.487
	(0.160)	(0.196)	(0.189)	(0.187)

[1] Standard deviations in parentheses.

Table 2
Mean Proportion of Each Racial Group
Attending Low, Average, and High Performing Elementary Schools
Where Quality is Measured By Mathematics Test Scores

	1998	2005	2010	2013
Low Performing Schools				
Blacks	0.477	0.461	0.435	0.431
	(0.221) [1]	(0.209)	(0.200)	(0.202)
Hispanics	0.333	0.305	0.282	0.290
	(0.210)	(0.189)	(0.152)	(0.154)
Whites	0.208	0.181	0.163	0.165
	(0.084)	(0.115)	(0.094)	(0.091)
Average Performing Schools				
Blacks	0.373	0.362	0.367	0.373
	(0.257)	(0.232)	(0.236)	(0.240)
Hispanics	0.413	0.416	0.400	0.386
	(0.274)	(0.244)	(0.232)	(0.226)
Whites	0.421	0.400	0.389	0.387
	(0.238)	(0.230)	(0.232)	(0.233)
High Performing Schools				
Blacks	0.150	0.177	0.197	0.196
	(0.118)	(0.112)	(0.112)	(0.112)
Hispanics	0.253	0.279	0.318	0.324
	(0.225)	(0.193)	(0.194)	(0.203)
Whites	0.370	0.419	0.448	0.447
	(0.207)	(0.211)	(0.223)	(0.226)

[1] Standard deviations in parentheses.

Table 3
Mean Proportion of Each Racial Group
Attending Low, Average, and High Performing Elementary Schools
Where Quality is Measured by Letter Grade Assigned By the Florida Department of Education

	1998	2005	2010	2013
Low Performing Schools				
Blacks	0.370	0.352	0.340	0.327
	(0.231) [1]	(0.227)	(0.220)	(0.220)
Hispanics	0.232	0.215	0.198	0.200
	(0.200)	(0.176)	(0.156)	(0.154)
Whites	0.142	0.124	0.111	0.112
	(0.084)	(0.118)	(0.104)	(0.101)
Average Performing Schools				
Blacks	0.507	0.492	0.490	0.492
	(0.291)	(0.278)	(0.274)	(0.271)
Hispanics	0.544	0.516	0.511	0.496
	(0.303)	(0.270)	(0.272)	(0.266)
Whites	0.551	0.508	0.496	0.485
	(0.281)	(0.281)	(0.285)	(0.288)
High Performing Schools				
Blacks	0.123	0.156	0.170	0.171
	(0.107)	(0.108)	(0.108)	(0.109)
Hispanics	0.224	0.268	0.291	0.293
	(0.241)	(0.208)	(0.214)	(0.218)
Whites	0.307	0.368	0.393	0.391
	(0.243)	(0.247)	(0.262)	(0.262)

[1] Standard deviations in parentheses.

Table 4
Mean Proportion of Each Housing Type
Falling Within Low, Middle, and High Income School Attendance Zones
Where Income Group is Defined By Percentage of Students Receiving a Free Lunch

	1998	2005	2010	2013
Single-Family Affordable Rental				
Low Income Schools	0.326	0.354	0.325	0.331
	(0.192) [1]	(0.218)	(0.198)	(0.204)
Middle Income Schools	0.419	0.417	0.403	0.401
	(0.239)	(0.250)	(0.238)	(0.237)
High Income Schools	0.230	0.203	0.246	0.233
	(0.149)	(0.138)	(0.124)	(0.128)
Single-Family Unaffordable Rental				
Low Income Schools	0.156	0.178	0.161	0.168
	(0.185)	(0.201)	(0.207)	(0.209)
Middle Income Schools	0.358	0.376	0.337	0.334
	(0.252)	(0.251)	(0.243)	(0.243)
High Income Schools	0.460	0.420	0.476	0.460
	(0.247)	(0.228)	(0.246)	(0.240)
Single-Family Affordable Owner				
Low Income Schools	0.284	0.334	0.282	0.283
	(0.169)	(0.205)	(0.171)	(0.180)
Middle Income Schools	0.432	0.427	0.408	0.409
	(0.232)	(0.243)	(0.229)	(0.229)
High Income Schools	0.258	0.214	0.284	0.272
	(0.139)	(0.132)	(0.137)	(0.139)
Single-Family Unaffordable Owner				
Low Income Schools	0.144	0.161	0.142	0.148
	(0.171)	(0.184)	(0.186)	(0.191)
Middle Income Schools	0.339	0.357	0.320	0.318
	(0.228)	(0.234)	(0.224)	(0.222)
High Income Schools	0.491	0.456	0.513	0.495
	(0.229)	(0.221)	(0.239)	(0.230)
Mobile Home Affordable Rental				
Low Income Schools	0.270	0.268	0.253	0.243
	(0.187)	(0.191)	(0.184)	(0.183)
Middle Income Schools	0.465	0.459	0.439	0.433
	(0.259)	(0.260)	(0.267)	(0.264)
High Income Schools	0.239	0.247	0.282	0.287
	(0.169)	(0.158)	(0.189)	(0.202)
Mobile Home Unaffordable Rental				
Low Income Schools	0.219	0.219	0.218	0.236
	(0.220)	(0.220)	(0.218)	(0.209)
Middle Income Schools	0.434	0.434	0.398	0.371
	(0.290)	(0.290)	(0.276)	(0.272)
High Income Schools	0.320	0.320	0.357	0.358
	(0.250)	(0.250)	(0.261)	(0.252)

Mobile Home Affordable Owner				
Low Income Schools	0.237	0.244	0.227	0.224
	(0.172)	(0.192)	(0.194)	(0.191)
Middle Income Schools	0.469	0.458	0.450	0.443
	(0.270)	(0.280)	(0.287)	(0.282)
High Income Schools	0.268	0.272	0.298	0.298
	(0.205)	(0.196)	(0.224)	(0.229)
Mobile Home Unaffordable Owner				
Low Income Schools	0.160	0.177	0.177	0.205
	(0.185)	(0.156)	(0.172)	(0.204)
Middle Income Schools	0.448	0.461	0.437	0.414
	(0.324)	(0.292)	(0.288)	(0.284)
High Income Schools	0.315	0.335	0.360	0.348
	(0.281)	(0.268)	(0.272)	(0.263)
Condominium Affordable Rental				
Low Income Schools	0.273	0.283	0.278	0.273
	(0.273)	(0.283)	(0.267)	(0.269)
Middle Income Schools	0.369	0.349	0.347	0.328
	(0.272)	(0.273)	(0.252)	(0.253)
High Income Schools	0.280	0.290	0.297	0.296
	(0.235)	(0.254)	(0.233)	(0.246)
Condominium Unaffordable Rental				
Low Income Schools	0.192	0.180	0.199	0.192
	(0.314)	(0.265)	(0.296)	(0.290)
Middle Income Schools	0.299	0.300	0.333	0.337
	(0.328)	(0.291)	(0.339)	(0.318)
High Income Schools	0.380	0.417	0.365	0.361
	(0.362)	(0.327)	(0.324)	(0.319)
Condominium Affordable Owner				
Low Income Schools	0.256	0.279	0.250	0.244
	(0.263)	(0.285)	(0.265)	(0.258)
Middle Income Schools	0.368	0.340	0.334	0.316
	(0.282)	(0.284)	(0.256)	(0.254)
High Income Schools	0.299	0.277	0.339	0.333
	(0.248)	(0.259)	(0.263)	(0.258)
Condominium Unaffordable Owner				
Low Income Schools	0.136	0.151	0.193	0.190
	(0.262)	(0.227)	(0.296)	(0.283)
Middle Income Schools	0.270	0.303	0.318	0.297
	(0.317)	(0.312)	(0.327)	(0.303)
High Income Schools	0.389	0.418	0.387	0.381
	(0.358)	(0.335)	(0.327)	(0.313)
Multifamily Affordable				
Low Income Schools	0.308	0.320	0.330	0.327
	(0.212)	(0.229)	(0.207)	(0.211)
Middle Income Schools	0.392	0.399	0.385	0.388
	(0.258)	(0.249)	(0.224)	(0.233)
High Income Schools	0.274	0.256	0.259	0.250

	(0.217)	(0.163)	(0.154)	(0.151)
Multifamily Unaffordable				
Low Income Schools	0.218	0.204	0.195	0.236
	(0.277)	(0.264)	(0.216)	(0.279)
Middle Income Schools	0.321	0.340	0.399	0.350
	(0.311)	(0.328)	(0.317)	(0.304)
High Income Schools	0.281	0.378	0.381	0.359
	(0.280)	(0.320)	(0.279)	(0.263)
Assisted Housing				
Low Income Schools	0.432	0.389	0.400	0.397
	(0.323)	(0.285)	(0.275)	(0.274)
Middle Income Schools	0.352	0.379	0.354	0.352
	(0.324)	(0.296)	(0.273)	(0.274)
High Income Schools	0.190	0.206	0.221	0.216
	(0.253)	(0.215)	(0.218)	(0.216)

[1] Standard deviations in parentheses.

Table 5
Mean Proportion of Each Housing Type
Falling Within Low, Average, and High Performing School Attendance Zones
Where Performance is Measured By Math Test Scores

	1998	2005	2010	2013
Single-Family Affordable Rental				
Low Performing School	0.380	0.417	0.381	0.389
	(0.162) [1]	(0.191)	(0.160)	(0.170)
Average Performing School	0.398	0.394	0.393	0.394
	(0.232)	(0.222)	(0.205)	(0.206)
High Performing School	0.221	0.188	0.226	0.217
	(0.122)	(0.104)	(0.095)	(0.100)
Single-Family Unaffordable Rental				
Low Performing School	0.177	0.209	0.186	0.188
	(0.157)	(0.185)	(0.196)	(0.193)
Average Performing School	0.356	0.373	0.359	0.360
	(0.254)	(0.246)	(0.250)	(0.255)
High Performing School	0.467	0.418	0.454	0.451
	(0.268)	(0.219)	(0.237)	(0.233)
Single-Family Affordable Owner				
Low Performing School	0.344	0.396	0.333	0.337
	(0.140)	(0.183)	(0.148)	(0.158)
Average Performing School	0.420	0.410	0.413	0.417
	(0.227)	(0.217)	(0.204)	(0.206)
High Performing School	0.236	0.194	0.254	0.246
	(0.124)	(0.100)	(0.103)	(0.106)
Single-Family Unaffordable Owner				
Low Performing School	0.178	0.191	0.168	0.172
	(0.165)	(0.171)	(0.175)	(0.177)
Average Performing School	0.359	0.383	0.353	0.356
	(0.239)	(0.236)	(0.236)	(0.236)
High Performing School	0.462	0.427	0.479	0.472
	(0.249)	(0.219)	(0.236)	(0.229)
Mobile Home Affordable Rental				
Low Performing School	0.319	0.318	0.293	0.291
	(0.198)	(0.202)	(0.201)	(0.204)
Average Performing School	0.460	0.457	0.464	0.463
	(0.264)	(0.268)	(0.273)	(0.279)
High Performing School	0.221	0.224	0.242	0.246
	(0.188)	(0.169)	(0.190)	(0.195)
Mobile Home Unaffordable Rental				
Low Performing School	0.263	0.253	0.204	0.217
	(0.203)	(0.215)	(0.208)	(0.198)
Average Performing School	0.473	0.468	0.489	0.460
	(0.289)	(0.299)	(0.294)	(0.299)
High Performing School	0.237	0.279	0.307	0.323
	(0.238)	(0.245)	(0.262)	(0.258)

Mobile Home Affordable Owner				
Low Performing School	0.285	0.291	0.264	0.250
	(0.195)	(0.203)	(0.198)	(0.198)
Average Performing School	0.480	0.467	0.487	0.489
	(0.271)	(0.276)	(0.278)	(0.283)
High Performing School	0.234	0.242	0.249	0.261
	(0.212)	(0.202)	(0.198)	(0.210)
Mobile Home Unaffordable Owner				
Low Performing School	0.472	0.219	0.209	0.219
	(0.196)	(0.187)	(0.178)	(0.196)
Average Performing School	0.520	0.498	0.474	0.472
	(0.316)	(0.323)	(0.323)	(0.318)
High Performing School	0.254	0.283	0.317	0.309
	(0.256)	(0.257)	(0.286)	(0.276)
Condominium Affordable Rental				
Low Performing School	0.282	0.312	0.295	0.293
	(0.235)	(0.249)	(0.257)	(0.255)
Average Performing School	0.382	0.367	0.376	0.370
	(0.262)	(0.271)	(0.274)	(0.272)
High Performing School	0.283	0.268	0.276	0.284
	(0.238)	(0.223)	(0.238)	(0.247)
Condominium Unaffordable Rental				
Low Performing School	0.174	0.185	0.186	0.176
	(0.228)	(0.231)	(0.244)	(0.235)
Average Performing School	0.303	0.310	0.342	0.357
	(0.344)	(0.311)	(0.350)	(0.343)
High Performing School	0.417	0.425	0.393	0.388
	(0.384)	(0.339)	(0.328)	(0.323)
Condominium Affordable Owner				
Low Performing School	0.295	0.311	0.282	0.273
	(0.257)	(0.259)	(0.258)	(0.251)
Average Performing School	0.340	0.346	0.325	0.335
	(0.271)	(0.262)	(0.260)	(0.261)
High Performing School	0.312	0.264	0.339	0.339
	(0.272)	(0.241)	(0.270)	(0.261)
Condominium Unaffordable Owner				
Low Performing School	0.118	0.142	0.174	0.171
	(0.221)	(0.180)	(0.236)	(0.231)
Average Performing School	0.255	0.303	0.312	0.283
	(0.344)	(0.325)	(0.328)	(0.302)
High Performing School	0.442	0.450	0.435	0.440
	(0.395)	(0.358)	(0.340)	(0.340)
Multifamily Affordable				
Low Performing School	0.375	0.396	0.395	0.395
	(0.191)	(0.208)	(0.190)	(0.191)
Average Performing School	0.381	0.384	0.385	0.388
	(0.239)	(0.236)	(0.226)	(0.223)
High Performing School	0.243	0.220	0.220	0.217

	(0.200)	(0.144)	(0.121)	(0.116)
Multifamily Unaffordable				
Low Performing School	0.217	0.216	0.219	0.221
	(0.251)	(0.253)	(0.202)	(0.207)
Average Performing School	0.341	0.331	0.343	0.366
	(0.342)	(0.329)	(0.286)	(0.293)
High Performing School	0.284	0.400	0.438	0.386
	(0.294)	(0.332)	(0.299)	(0.259)
Assisted Housing				
Low Performing School	0.522	0.487	0.479	0.479
	(0.283)	(0.274)	(0.271)	(0.271)
Average Performing School	0.333	0.351	0.357	0.358
	(0.304)	(0.299)	(0.303)	(0.304)
High Performing School	0.145	0.162	0.163	0.163
	(0.185)	(0.175)	(0.175)	(0.176)

[1] Standard deviations in parentheses.

Table 6
Estimated Effects of Increases in the Proportions of Affordable Housing Types
Located in High and Middle Income School Attendance Zones on the
Proportion of Black Elementary School Students Attending Low Income Schools

	Fixed Effects	Probit	2SLS-A	2SLS-B
High Income Schools				
Single-Family Rental	−0.279	−1.092 (−0.336)**	−0.374	–0.395
	[0.199]	[0.549]	[0.233]	[0.246]
	{−0.003}	{−0.004}	{–0.004}	{–0.004}
	<−0.784>	<−0.942>	<–1.050>	<–1.110>
Single-Family Owner	−0.006	0.001 (0.000)	–0.041	0.024
	[0.143]	[0.454]	[0.221]	[0.202]
	{−0.000}	{0.000}	{–0.001}	{0.000}
	<−0.020>	<0.001>	<–0.128>	<0.076>
Mobile Home Rental	−0.093	−0.440 (−0.135)	0.035	–0.004
	[0.072]	[0.270]	[0.107]	[0.100]
	{−0.001}	{−0.002}	{0.000}	{–0.000}
	<−0.310>	<−0.450>	<0.116>	<–0.014>
Mobile Home Owner	−0.126	−0.181 (−0.056)	–0.528**	–0.473*
	[0.137]	[0.351]	[0.227]	[0.279]
	{−0.002}	{−0.001}	{–0.008}	{–0.007}
	<−0.451>	<−0.199>	<–1.885>	<–1.689>
Condominium Rental	0.074	0.212 (0.065)	–0.074	–0.025
	[0.068]	[0.245]	[0.125]	[0.132]
	{0.001}	{0.001}	{–0.001}	{–0.000}
	<0.273>	<0.241>	<–0.274>	<–0.094>
Condominium Owner	−0.044	−0.075 (−0.023)	0.126	0.138
	[0.074]	[0.216]	[0.084]	[0.089]
	{−0.001}	{−0.000}	{0.002}	{0.002}
	<−0.174>	<−0.091>	<0.495>	<0.547>
Multifamily	−0.361***	1.419 (−0.436)***	–0.305**	–0.251*
	[0.109]	[0.273]	[0.143]	[0.129]
	{−0.005}	{−0.006}	{–0.004}	{–0.003}
	<−1.189>	<−1.437>	<–1.005>	<–0.827>
Assisted Housing	−0.153**	−0.491 (−0.151)*	–0.099	–0.150
	[0.074]	[0.283]	[0.086]	[0.078]
	{−0.002}	{−0.002}	{–0.001}	{–0.002}
	<−0.403>	<−0.397>	<–0.261>	<–0.395>
Middle Income Schools				
Single-Family Rental	−0.379*	−1.567 (−0.482)**	–0.475	–0.634*
	[0.208]	[0.687]	[0.323]	[0.336]
	{−0.008}	{−0.010}	{–0.010}	{–0.013}
	<−2.012>	<−2.555>	<–2.522>	<3.362>
Single-Family Owner	0.108	0.150 (0.046)	–0.159	0.155
	[0.200]	[0.585]	[0.302]	[0.301]
	{0.002}	{0.001}	{–0.003}	{0.003}
	<0.589>	<0.251>	<–0.864>	<0.843>

Mobile Home Rental	0.059	0.078 (0.024)	–0.079	–0.004
	[0.096]	[0.266]	[0.182]	[0.100]
	{0.001}	{0.000}	{–0.002}	{–0.004}
	<0.341>	<0.138>	<–0.460>	<–0.890>
Mobile Home Owner	0.056	0.453 (0.139)	0.030	0.102
	[0.139]	[0.310]	[0.264]	[0.295]
	{0.001}	{0.003}	{0.001}	{0.002}
	<0.326>	<0.814>	<0.178>	<0.595>
Condominium Rental	0.134**	0.346 (0.106)	0.074	0.045
	[0.064]	[0.245]	[0.125]	[0.100]
	{0.002}	{0.002}	{0.001}	{0.001}
	<0.604>	<0.474>	<0.357>	<0.202>
Condominium Owner	−0.021	−0.079 (−0.024)	–0.022	–0.011
	[0.027]	[0.081]	[0.043]	[0.046]
	{−0.001}	{−0.001}	{–0.000}	{–0.000}
	<−0.092>	<−0.108>	<–0.099>	<–0.050>
Multifamily	−0.304**	1.105 (−0.340)***	–0.221	–0.139
	[0.115]	[0.405]	[0.167]	[0.190]
	{−0.006}	{−0.007}	{–0.004}	{–0.003}
	<−1.529>	<−1.710>	<–1.104>	<–0.701>
Assisted Housing	−0.164**	−0.573 (−0.176)*	–0.135*	–0.163*
	[0.069]	[0.351]	[0.081]	[0.085]
	{−0.003}	{−0.003}	{–0.002}	{–0.003}
	<−0.766>	<−0.821>	<–0.629>	<–0.761>

Notes: The number in parentheses is the average partial effect.
The number in box brackets is the clustered standard error.
The number in curly brackets is the change in the proportion of black students attending low income schools from a 5% increase in the variable.
The number in angle brackets is the percentage change in the proportion of black students attending low income schools from a 5% increase in the variable.
*, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 7
Estimated Effects of Increases in the Proportions of Affordable Housing Types
Located in High and Average Performing School Attendance Zones on the
Proportion of Black Elementary School Students Attending Low Performing Schools
Where Performance is Measured by Mathematics Test Score

	Fixed Effects	Probit	2SLS-A	2SLS-B
High Performing Schools				
Single-Family Rental	–0.627**	–1.962 (–0.665)***	–0.972***	–0.901***
	[0.242]	[0.713]	[0.271]	[0.282]
	{–0.006}	{–0.006}	{–0.010}	{–0.009}
	<–1.425>	<–1.511>	<–2.208>	<–2.047>
Single-Family Owner	0.278	0.801 (0.271)	0.669**	0.601**
	[0.155]	[0.424]	[0.265]	[0.277]
	{0.003}	{0.003}	{0.007}	{0.007}
	<0.676>	<0.659>	<1.625>	<1.459>
Mobile Home Rental	–0.324**	–0.999 (–0.338)**	0.332	–0.432*
	[0.139]	[0.425]	[0.243]	[0.242]
	{–0.004}	{–0.004}	{–0.004}	{–0.005}
	<–0.818>	<–0.856>	<–0.840>	<–1.093>
Mobile Home Owner	–0.053	–0.077 (–0.026)	–0.278	–0.192
	[0.104]	[0.261]	[0.209]	[0.202]
	{–0.001}	{–0.001}	{–0.003}	{–0.002}
	<–0.142>	<–0.070>	<–0.741>	<–0.513>
Condominium Rental	0.112	0.557 (0.189)**	–0.011	0.023
	[0.079]	[0.267]	[0.093]	[0.090]
	{0.001}	{0.003}	{–0.000}	{0.000}
	<0.343>	<0.579>	<–0.034>	<0.071>
Condominium Owner	–0.059*	–0.113 (–0.038)	–0.012	–0.017
	[0.030]	[0.171]	[0.033]	[0.035]
	{–0.001}	{–0.001}	{–0.000}	{–0.000}
	<–0.202>	<–0.132>	<–0.040>	<–0.059>
Multifamily	–0.102	–0.408 (–0.138)*	–0.754	–0.277
	[0.095]	[0.240]	[0.197]	[0.179]
	{–0.001}	{–0.001}	{–0.003}	{–0.003}
	<–0.249>	<–0.338>	<–0.623>	<–0.680>
Assisted Housing	–0.261***	–0.649 (–0.220)**	–0.226**	–0.209*
	[0.091]	[0.271]	[0.101]	[0.104]
	{–0.002}	{–0.002}	{–0.002}	{–0.002}
	<–0.459>	<–0.386>	<–0.397>	<–0.367>
Average Performing Schools				
Single-Family Rental	–0.324**	–0.393 (–0.133)	–0.284	–0.301
	[0.139]	[0.476]	[0.275]	[0.284]
	{–0.004}	{–0.003}	{–0.006}	{–0.006}
	<–0.913>	<–0.578>	<–1.231>	<–1.306>
Single-Family Owner	–0.016	–0.845 (–0.286)	–0.027	–0.069
	[0.077]	[0.712]	[0.328]	[0.330]
	{–0.003}	{–0.006}	{–0.001}	{–0.001}

	<–0.641>	<–1.304>	<–0.125>	<–0.313>
Mobile Home Rental	–0.206***	–0.607 (–0.206)***	–0.169*	–0.157*
	[0.060]	[0.186]	[0.088]	[0.081]
	{–0.005}	{–0.004}	{–0.004}	{–0.004}
	<–1.053>	<–1.054>	<–0.866>	<–0.806>
Mobile Home Owner	–0.016	–0.067 (–0.023)	–0.186	–0.147
	[0.077]	[0.200]	[0.140]	[0.133]
	{–0.001}	{–0.001}	{–0.004}	{–0.004}
	<–0.086>	<–0.120>	<–0.987>	<–0.776>
Condominium Rental	–0.055	0.043 (0.014)	–0.120	–0.106
	[0.058]	[0.205]	[0.106]	[0.107]
	{–0.001}	{0.000}	{–0.002}	{–0.002}
	<–0.223>	<0.059>	<–0.484>	<–0.428>
Condominium Owner	0.106	0.289 (0.098)*	0.148	0.163*
	[0.059]	[0.165]	[0.098]	[0.096]
	{0.002}	{0.002}	{0.002}	{0.003}
	<0.391>	<0.361>	<0.546>	<0.602>
Multifamily	–0.236**	–0.905 (–0.307)**	–0.038	–0.045
	[0.110]	[0.410]	[0.216]	[0.196]
	{–0.004}	{–0.006}	{–0.001}	{–0.001}
	<–0.998>	<–1.299>	<–0.160>	<–0.191>
Assisted Housing	–0.200**	–0.476 (–0.161)	–0.259***	–0.241*
	[0.098]	[0.298]	[0.089]	[0.089]
	{–0.004}	{–0.003}	{–0.004}	{–0.004}
	<–0.772>	<–0.624>	<–1.003>	<–0.934>

Notes: The number in parentheses is the average partial effect.
The number in box brackets is the clustered standard error.
The number in curly brackets is the change in the proportion of black students attending low performing schools from a 5% increase in the variable.
The number in angle brackets is the percentage change in the proportion of black students attending low performing schools from a 5% increase in the variable.
*, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 8
Estimated Effects of Increases in the Proportions of Affordable Housing Types
Located in High and Average Performing School Attendance Zones on the
Proportion of Black Elementary School Students Attending Low Performing Schools
Where Performance is Measured by School Grade

	Fixed Effects	Probit	2SLS-A	2SLS-B
High Performing Schools				
Single-Family Rental	–0.133	–0.698 (–0.207)	–0.362	–0.440
	[0.231]	[0.670]	[0.345]	[0.374]
	{–0.001}	{–0.002}	{–0.003}	{–0.004}
	<–0.333>	<–0.517>	<–0.905>	<–1.101>
Single-Family Owner	–0.193	–0.458 (–0.135)	–0.039	0.114
	[0.183]	[0.523]	[0.250]	[0.282]
	{–0.002}	{–0.001}	{–0.000}	{0.001}
	<–0.522>	<–0.367>	<–0.105>	<0.308>
Mobile Home Rental	–0.112	–0.401 (–0.119)	–0.010	0.006
	[0.088]	[0.254]	[0.108]	[0.103]
	{–0.001}	{–0.001}	{–0.000}	{0.000}
	<–0.339>	<–0.358>	<–0.030>	<0.019>
Mobile Home Owner	–0.135	–0.237 (–0.070)	–0.323	–0.450**
	[0.110]	[0.254]	[0.203]	[0.192]
	{–0.001}	{–0.001}	{–0.004}	{–0.005}
	<–0.450>	<–0.233>	<–1.074>	<–1.496>
Condominium Rental	0.159	0.453 (0.134)	0.139	–0.047
	[0.099]	[0.264]	[0.142]	[0.145]
	{0.002}	{0.002}	{0.002}	{–0.001}
	<0.588>	<0.495>	<0.514>	<–0.173>
Condominium Owner	–0.051	–0.071 (–0.021)	–0.043	–0.035
	[0.039]	[0.357]	[0.044]	[0.058]
	{–0.001}	{–0.000}	{–0.001}	{–0.001}
	<–0.210>	<–0.086>	<–0.177>	<–0.142>
Multifamily	–0.231**	–0.930 (–0.275)***	–0.284**	–0.220*
	[0.089]	[0.225]	[0.123]	[0.116]
	{–0.002}	{–0.003}	{–0.003}	{–0.002}
	<–0.660>	<–0.787>	<–0.814>	<–0.628>
Assisted Housing	–0.138	–0.207 (–0.061)	–0.149	–0.054
	[0.092]	[0.237]	[0.093]	[0.088]
	{–0.001}	{–0.000}	{–0.001}	{–0.000}
	<–0.275>	<–0.121>	<–0.297>	<–0.108>
Average Performing Schools				
Single-Family Rental	0.410	1.610 (0.476)**	0.901*	0.360
	[0.281]	[0.733]	[0.461]	[0.360]
	{0.011}	{0.012}	{0.023}	{0.009}
	<3.065>	<3.559>	<6.735>	<2.693>
Single-Family Owner	–0.657**	–2.0665	–0.742*	–0.560*
	[0.276]	(–0.611)***	[0.391]	[0.329]
	{–0.018}	[0.757]	{–0.020}	{–0.015}

	<–5.064	{–0.016} <–4.713>	<–5.718>	<–4.320>
Mobile Home Rental	–0.141	–0.563 (–0.149)	–0.210	0.035
	[0.160]	[0.421]	[0.173]	[0.247]
	{–0.004}	{–0.004}	{–0.006}	{0.001}
	<–1.073>	<–1.136>	<–1.605>	<0.272>
Mobile Home Owner	0.002	–0.003 (–0.001)	–0.074	–0.045
	[0.094]	[0.259]	[0.135]	[0.128]
	{0.000}	{–0.000}	{–0.002}	{–0.001}
	<0.016>	<–0.008>	<–0.575>	<–0.346>
Condominium Rental	0.130	0.340 (0.100)	0.083	–0.013
	[0.113]	[0.326]	[0.154]	[0.174]
	{0.003}	{0.002}	{0.002}	{–0.000}
	<0.917>	<0.711>	<0.589>	<–0.094>
Condominium Owner	0.079	0.252 (0.075)	0.099	0.031
	[0.075]	[0.324]	[0.091]	[0.117]
	{0.002}	{0.002}	{0.002}	{0.001}
	<0.532>	<0.501>	<0.666>	<0.207>
Multifamily	–0.236	–0.890 (–0.263)*	–0.334**	–0.387***
	[0.157]	[0.466]	[0.161]	[0.141]
	{–0.006}	{–0.007}	{–0.009}	{–0.010}
	<–1.804>	<–2.009>	<–2.548>	<–2.995>
Assisted Housing	–0.071	0.047 (0.014)	–0.054	0.046
	[0.110]	[0.281]	[0.114]	[0.110]
	{–0.002}	{0.000}	{–0.001}	{0.001}
	<–0.520>	<0.102>	<–0.394>	<0.338>

Notes: The number in parentheses is the average partial effect.
The number in box brackets is the clustered standard error.
The number in curly brackets is the change in the proportion of black students attending low performing schools from a 5% increase in the variable.
The number in angle brackets is the percentage change in the proportion of black students attending low performing schools from a 5% increase in the variable.
*, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 9
Estimated Effects of Increases in the Proportions of Affordable Housing Types
Located in High and Middle Income School Attendance Zones on the
Proportion of Hispanic Elementary School Students Attending Low Income Schools

	Fixed Effects	Probit	2SLS-A	2SLS-B
High Income Schools				
Single-Family Rental	0.034	−0.103 (−0.030)	−0.092	−0.255
	[0.177]	[0.566]	[0.318]	[0.284]
	{0.000}	{−0.000}	{−0.001}	{−0.003}
	<0.132>	<−0.117>	<−0.355>	<−0.987>
Single-Family Owner	−0.132	−0.369 (−0.108)	−0.116	−0.054
	[0.150]	[0.473]	[0.265]	[0.251]
	{−0.002}	{−0.001}	{−0.001}	{−0.001}
	<−0.564>	<−0.462>	<−0.495>	<−0.230>
Mobile Home Rental	−0.091	−0.425 (−0.125)	−0.074	−0.095
	[0.074]	[0.315]	[0.102]	[0.107]
	{−0.001}	{−0.002}	{−0.001}	{−0.001}
	<−0.420>	<−0.573>	<−0.341>	<−0.437>
Mobile Home Owner	0.014	0.248 (0.073)	0.083	0.159
	[0.122]	[0.358]	[0.241]	[0.224]
	{0.000}	{0.001}	{0.001}	{0.002}
	<0.068>	<0.358>	<0.407>	<0.782>
Condominium Rental	0.059	0.154 (0.045)	−0.062	−0.001
	[0.079]	[0.270]	[0.110]	[0.105]
	{0.001}	{0.001}	{−0.003}	{−0.000}
	<0.302>	<0.230>	<−0.316>	<−0.005>
Condominium Owner	−0.009	0.045 (0.013)	0.075	0.062
	[0.056]	[0.172]	[0.073]	[0.064]
	{−0.000}	{0.001}	{0.001}	{0.001}
	<−0.048>	<0.072>	<0.409>	<0.339>
Multifamily	−0.288***	−0.093 (−0.291)***	−0.212**	−0.237**
	[0.067]	[0.235]	[0.089]	[0.093]
	{−0.004}	{−0.004}	{−0.003}	{−0.003}
	<−1.308>	<−1.321>	<−0.963>	<−1.076>
Assisted Housing	−0.100	−0.271 (−0.079)	−0.083	−0.100
	[0.105]	[0.358]	[0.101]	[0.112]
	{−0.001}	{−0.001}	{−0.001}	{−0.001}
	<−0.361>	<−0.289>	<−0.301>	<−0.363>
Middle Income Schools				
Single-Family Rental	−0.054	−0.778 (−0.228)	−0.184	−0.492
	[0.207]	[0.669]	[0.351]	[0.353]
	{−0.001}	{−0.005}	{−0.004}	{−0.010}
	<−0.392>	<−1.668>	<−1.347>	<−3.594>
Single-Family Owner	−0.271	−0.891 (−0.261)*	−0.081	0.172
	[0.170]	[0.524]	[0.327]	[0.282]
	{−0.006}	{−0.006}	{−0.002}	{0.004}
	<−2.029>	<−1.959>	<−0.608>	<1.287>

Mobile Home Rental	−0.113	−0.293 (−0.086)	−0.172	−0.076
	[0.112]	[0.324]	[0.220]	[0.223]
	{−0.003}	{−0.002}	{−0.004}	{−0.002}
	<−0.901>	<−0.687>	<−1.378>	<−0.611>
Mobile Home Owner	0.625	0.225 (0.066)	0.103	0.058
	[0.143]	[0.429]	[0.260]	[0.256]
	{0.001}	{0.001}	{0.002}	{0.001}
	<0.202>	<0.532>	<0.830>	<0.469>
Condominium Rental	0.132	0.416 (0.122)**	0.115	0.064
	[0.051]	[0.194]	[0.075]	[0.072]
	{0.003}	{0.002}	{0.002}	{0.001}
	<0.814>	<0.753>	<0.710>	<0.396>
Condominium Owner	−0.050*	−0.161 (−0.047)**	−0.025	−0.019
	[0.027]	[0.064]	[0.034]	[0.042]
	{−0.001}	{−0.001}	{−0.001}	{−0.000}
	<−0.309>	<−0.289>	<−0.156>	<−0.119>
Multifamily	−0.114	−0.483 (−0.261)	−0.233**	−0.155*
	[0.076]	[0.304]	[0.104]	[0.092]
	{−0.002}	{−0.003}	{−0.005}	{−0.003}
	<−0.794>	<−0.982>	<−1.620>	<−1.076>
Assisted Housing	−0.144	−0.442 (−0.130)	−0.098	−0.127
	[0.111]	[0.462]	[0.108]	[0.105]
	{−0.003}	{−0.002}	{−0.002}	{−0.002}
	<−0.923>	<−0.833>	<−0.629>	<−0.817>

Notes: The number in parentheses is the average partial effect.
The number in box brackets is the clustered standard error.
The number in curly brackets is the change in the proportion of Hispanic students attending low income schools from a 5% increase in the variable.
The number in angle brackets is the percentage change in the proportion of Hispanic students attending low income schools from a 5% increase in the variable.
*, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 10
Estimated Effects of Increases in the Proportions of Affordable Housing Types
Located in High and Average Performing School Attendance Zones on the
Proportion of Hispanic Elementary School Students Attending Low Performing Schools
Where Performance is Measured by Mathematics Test Score

	Fixed Effects	Probit	2SLS-A	2SLS-B
High Performing Schools				
Single-Family Rental	−0.190	−0.769 (−0.236)	−0.192	−0.201
	[0.164]	[0.510]	[0.232]	[0.237]
	{−0.002}	{−0.002}	{−0.002}	{−0.002}
	<−0.431>	<−0.799>	<−0.650>	<−0.681>
Single-Family Owner	0.100	0.266 (0.082)	0.051	0.148
	[0.136]	[0.421]	[0.227]	[0.222]
	{0.001}	{0.001}	{0.000}	{0.002}
	<0.242>	<0.296>	<0.185>	<0.536>
Mobile Home Rental	−0.102	−0.463 (−0.142)	−0.205	−0.190
	[0.108]	[0.336]	[0.190]	[0.185]
	{−0.001}	{−0.002}	{−0.002}	{−0.002}
	<−0.258>	<−0.535>	<−0.775>	<−0.719>
Mobile Home Owner	−0.232**	−0.620 (−0.190)**	−0.256	−0.342*
	[0.098]	[0.306]	[0.166]	[0.172]
	{−0.003}	{−0.002}	{−0.003}	{−0.004}
	<−0.619>	<−0.756>	<−1.018>	<−1.360>
Condominium Rental	0.150**	0.686 (0.210)***	0.072	0.075
	[0.068]	[0.241]	[0.090]	[0.094]
	{0.002}	{0.003}	{0.001}	{0.001}
	<0.459>	<0.961>	<0.331>	<0.347>
Condominium Owner	−0.086**	−0.210 (−0.064)	−0.115**	−0.101*
	[0.033]	[0.143]	[0.055]	[0.052]
	{−0.001}	{−0.001}	{−0.002}	{−0.002}
	<−0.294>	<−0.331>	<−0.591>	<−0.517>
Multifamily	−0.191**	−0.712 (−0.218)***	−0.343*	−0.388**
	[0.073]	[0.220]	[0.182]	[0.178]
	{−0.002}	{−0.002}	{−0.004}	{−0.004}
	<−0.468>	<−0.798>	<−1.255>	<−1.418>
Assisted Housing	0.292***	−0.799 (−0.245)***	0.231*	−0.207*
	[0.100]	[0.277]	[0.120]	[0.121]
	{−0.002}	{−0.002}	{−0.002}	{−0.002}
	<−0.513>	<−0.642>	<−0.606>	<−0.542>
Average Performing Schools				
Single-Family Rental	−0.360*	−0.989 (−0.303)	−0.560*	−0.378
	[0.204]	[0.626]	[0.299]	[0.292]
	{−0.007}	{−0.006}	{−0.011}	{−0.007}
	<−1.560>	<−1.961>	<−3.621>	<−2.442>
Single-Family Owner	−0.024	−0.418 (−0.128)	0.069	−0.089
	[0.209]	[0.709]	[0.294]	[0.298]
	{−0.001}	{−0.003}	{0.001}	{−0.002}

	<−0.109>	<−0.871>	<0.472>	<−0.606>
Mobile Home Rental	−0.099	−0.378 (−0.116)**	−0.063	−0.074
	[0.068]	[0.176]	[0.080]	[0.089]
	{−0.002}	{−0.003}	{−0.001}	{−0.002}
	<−0.507>	<−0.887>	<−0.481>	<−0.567>
Mobile Home Owner	−0.193*	−0.622 (−0.191)**	−0.235**	−0.243*
	[0.104]	[0.301]	[0.113]	[0.124]
	{−0.005}	{−0.005}	{−0.006}	{−0.006}
	<−1.024>	<−1.506>	<−1.863>	<−1.921>
Condominium Rental	0.016	0.258 (0.079)	−0.144*	−0.141
	[0.065]	[0.256]	[0.084]	[0.090]
	{0.000}	{0.001}	{−0.003}	{−0.003}
	<0.064>	<0.478>	<−0.870>	<−0.852>
Condominium Owner	0.005	0.037 (0.011)	0.015	0.033
	[0.059]	[0.235]	[0.097]	[0.101]
	{0.000}	{0.000}	{0.000}	{0.000}
	<0.019>	<0.063>	<0.081>	<0.183>
Multifamily	−0.254***	−1.052 (−0.322)***	−0.342**	−0.410***
	[0.080]	[0.281]	[0.147]	[0.133]
	{−0.005}	{−0.006}	{−0.006}	{−0.008}
	<−1.075>	<−2.039>	<−2.164>	<−2.597>
Assisted Housing	−0.144*	−0.377 (−0.116)*	−0.118	−0.100
	[0.084]	[0.217]	[0.102]	[0.102]
	{−0.002}	{−0.002}	{−0.002}	{−0.002}
	<−0.557>	<−0.668>	<−0.680>	<−0.580>

Notes: The number in parentheses is the average partial effect.
The number in box brackets is the clustered standard error.
The number in curly brackets is the change in the proportion of Hispanic students attending low performing schools from a 5% increase in the variable.
The number in angle brackets is the percentage change in the proportion of Hispanic students attending low performing schools from a 5% increase in the variable.
*, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 11
Estimated Effects of Increases in the Proportions of Affordable Housing Types
Located in High and Average Performing School Attendance Zones on the
Proportion of Hispanic Elementary School Students Attending Low Performing Schools
Where Performance is Measured by School Grade

	Fixed Effects	Probit	2SLS-A	2SLS-B
High Performing Schools				
Single-Family Rental	0.024	−0.053 (−0.013)	0.043	−0.095
	[0.114]	[0.384]	[0.133]	[0.168]
	{0.000}	{−0.000}	{0.000}	{−0.001}
	<0.097>	<−0.032>	<0.177>	<−0.390>
Single-Family Owner	−0.101	−0.325 (−0.079)	−0.097	0.083
	[0.095]	[0.309]	[0.115]	[0.153]
	{−0.001}	{−0.001}	{−0.001}	{0.001}
	<−0.450>	<−0.214>	<−0.430>	<0.371>
Mobile Home Rental	0.060	−0.019 (0.005)	0.083	0.134
	[0.059]	[0.214]	[0.072]	[0.083]
	{0.001}	{−0.000}	{0.001}	{0.001}
	<0.298>	<−0.014>	<0.411>	<0.662>
Mobile Home Owner	−0.205**	−0.354 (−0.086)	−0.243	−0.335**
	[0.094]	[0.337]	[0.145]	[0.168]
	{−0.002}	{−0.001}	{−0.003}	{−0.004}
	<−1.118>	<−0.287>	<−1.325>	<−1.828>
Condominium Rental	0.086	0.270 (0.066)	0.100	−0.024
	[0.070]	[0.209]	[0.120]	[0.150]
	{0.001}	{0.001}	{0.001}	{−0.000}
	<0.522>	<0.242>	<0.609>	<−0.143>
Condominium Owner	−0.026	0.070 (0.017)	−0.064	−0.016
	[0.023]	[0.195]	[0.036]	[0.030]
	{−0.000}	{0.000}	{−0.001}	{−0.000}
	<−0.173>	<0.070>	<−0.431>	<−0.112>
Multifamily	−0.377***	−1.334 (−0.325)***	−0.481***	−0.424***
	[0.077]	[0.230]	[0.101]	[0.109]
	{−0.004}	{−0.003}	{−0.005}	{−0.004}
	<−1.773>	<−0.929>	<−2.262>	<−1.994>
Assisted Housing	−0.134*	−0.459 (−0.112)	−0.075	−0.106
	[0.077]	[0.280]	[0.090]	[0.088]
	{−0.001}	{−0.001}	{−0.001}	{−0.001}
	<−0.437>	<−0.222>	<−0.243>	<−0.347>
Average Performing Schools				
Single-Family Rental	0.055	−0.180 (−0.044)	0.082	0.350
	[0.168]	[0.690]	[0.222]	[0.263]
	{0.001}	{−0.001}	{0.002}	{0.009}
	<0.681>	<−0.329>	<1.002>	<4.299>
Single-Family Owner	−0.238	−0.629 (−0.153)	−0.357*	−0.590*
	[0.182]	[0.652]	[0.206]	[0.313]
	{−0.006}	{−0.004}	{−0.010}	{−0.016}

	<−3.012>	<−1.181>	<−4.519>	<−7.465>
Mobile Home Rental	0.230	0.638 (0.155)	0.344**	0.119
	[0.140]	[0.438]	[0.158]	[0.237]
	{0.006}	{0.004}	{0.009}	{0.003}
	<2.882>	<1.185>	<4.308>	<1.496>
Mobile Home Owner	−0.170	−0.398 (−0.097)	−0.192	−0.023
	[0.109]	[0.302]	[0.154]	[0.210]
	{−0.005}	{−0.003}	{−0.005}	{−0.001}
	<−2.169>	<−0.751>	<−2.444>	<−0.299>
Condominium Rental	0.017	−0.174 (−0.042)	−0.004	−0.067
	[0.078]	[0.211]	[0.114]	[0.146]
	{0.000}	{−0.001}	{−0.000}	{−0.002}
	<0.200>	<−0.300>	<−0.045>	<−0.780>
Condominium Owner	0.027	0.181 (0.044)	0.011	−0.011
	[0.058]	[0.277]	[0.078]	[0.082]
	{0.000}	{0.001}	{0.000}	{−0.000}
	<0.299>	<0.297>	<0.117>	<−0.118>
Multifamily	−0.087	−0.157 (0.038)	−0.272*	−0.290*
	[0.126]	[0.451]	[0.160]	[0.163]
	{−0.002}	{−0.001}	{−0.006}	{−0.008}
	<−1.092>	<−0.291>	<−2.785>	<−3.628>
Assisted Housing	−0.104	−0.485 (−0.118)	−0.074	−0.043
	[0.079]	[0.314]	[0.090]	[0.090]
	{−0.003}	{−0.003}	{−0.001}	{−0.001}
	<−1.253>	<−0.865>	<−0.611>	<−0.514>

Notes: The number in parentheses is the average partial effect.
The number in box brackets is the clustered standard error.
The number in curly brackets is the change in the proportion of Hispanic students attending low performing schools from a 5% increase in the variable.
The number in angle brackets is the percentage change in the proportion of Hispanic students attending low performing schools from a 5% increase in the variable.
*, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 12
Summary of Results

Which shifts in the distributions of affordable housing types across groups of SAZs (measured by a five percent increase in the district's proportion within the group) are found to cause a percentage decrease in the district's proportion of:

- black students attending low income schools?
  1. owner-occupied mobile homes in the high income group of SAZs, 1.885% reduction
  2. apartments in high income group, 1.005% reduction
  3. apartments in middle income group, .629% reduction

- black students attending low performing schools, where performance is measured by the percentage of students passing a mathematics exam?
  1. single-family rentals in the high performing group of SAZs, 2.208% reduction
  2. assisted housing apartments in the high performing group of SAZs , .397% reduction
  3. mobile home rentals in average performing group , .866% reduction
  4. assisted housing apartments in average performing group, 1.003% reduction

- black students attending low performing schools, where performance is measured by the letter grade assigned to the school by the FLDOE?
  1. apartments in the high performing group of SAZs, .814% reduction
  2. owner-occupied single-family units in averaging performing group, 5.718% reduction
  3. apartments in average performing group, 2.548% reduction

- Hispanic students attending low income schools?
  1. apartments in the high income group of SAZs, .963% reduction
  2. apartments in middle income group, 1.620% reduction

- Hispanic students attending low performing schools, where performance is measured by the percentage of students passing a mathematics exam?
  1. owner-occupied condominiums in the high performing group of SAZs, .591% reduction
  2. apartments in high performing group, 1.255% reduction
  3. single-family rentals in average performing group, 3.621% reduction
  4. condominium rentals in average performing group, .870% reduction
  5. apartments in average performing group, 2.164% reduction

- Hispanic students attending low performing schools, where performance is measured by the letter grade assigned to the school by the FLDOE?
  1. apartments in the high performing group of SAZs, 2.262% reduction
  2. owner-occupied single-family housing in average performing group, 4.519% reduction