Homeownership and Child Welfare in Unstable Times

*Insights from the Fragile Families Study*

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Master’s Thesis
Quantitative Methods in the Social Sciences
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**Introduction**

Encouraging homeownership is a major public policy goal of the United States government, supported with upwards of a $175 billion a year in federal subsidies (Ventry, 2010). For almost a century, this massive policy investment has been predicated on grand claims of community and family benefits afforded by homeownership and the consensus among policy makers that encouraging homeownership stimulates the economy (Carliner, 1998; Green & White, 1997). The housing bubble of the 1990s and the early 2000s and the subsequent global financial crisis that began in the US mortgage market has called into question the economic arguments for encouraging homeownership. The damage to communities across the United States wrought by this housing-related global financial crisis should also call into question the social justifications for encouraging homeownership.

This paper aims to reassess the social justifications for the government policy of homeownership subsidy, specifically in regards to low-income and minority households. Past research has demonstrated a positive relationship between homeownership, child welfare and educational attainment. Unfortunately, much of the past research was conducted before the housing bubble of the 1990s and early 2000s, a housing bubble that saw record rates of homeownership among low-income and minority households. Homeownership rates among low-income households (bottom income quartile) grew by 6 percentage points between 1995
and 2005, fundamentally altering the underlying demographic and socioeconomic characteristics of homeownership in the US (JCHS, 2010). This paper adds to the existing literature by examining the relationship between homeownership and child educational achievement among low-income and minority households during a period of massive growth in homeownership among these groups. Focusing on a sample of predominantly low-income and minority households should also help to control for some of the many confounders that impact the relationship between homeownership and child outcomes (Boyle, 2002).

**Literature Review**

**The mechanics of homeownership subsidy**

The federal government subsidizes homeownership in three distinct ways; the first and most apparent is the mortgage interest tax deduction; the second is though their involvement in mortgage insurance and the secondary mortgage market; finally, the government is involved in subsidizing homeownership through legislation like the Community Reinvestment Act (CRA) and through the activities of the Department of Housing and Urban Development (HUD) (Carliner, 1998). This combination of tax breaks, market manipulation, regulation and direct wealth transfers constitutes a complex and costly social program that impacts households across the income spectrum.

The mortgage interest tax deduction (MITD) is the most familiar and most significant federal subsidy of homeownership, costing the federal government in
excess of $100 billion annually in lost tax revenues (Coulson, 2002). Through this policy, the federal government allows homeowners to deduct their interest payments on up to $1 million in debt used to purchase their primary residence. The MITD has played a major role in shaping the US housing market over the years by helping to fund everything from post World War II suburbanization, to the increasingly large size of homes in the US (a.k.a. McMansions), to the perpetuation of neighborhood segregation on class and racial lines (Dwyer, 2007; K. T. Jackson, 1985). Even though the MITD is the largest and most direct of the federal subsidies for homeownership, it is by no means a social program aimed at the poor (Ventry, 2010). The financial benefit of the mortgage-interest tax deduction accrues disproportionately to those in the highest tax brackets because most lower income households don’t itemize their federal tax deductions and are therefore unable to take advantage of the of the MITD (Lowenstein, 2006). Despite the massive cost and the fact that much of the benefit goes to the wealthiest Americans, the MITD remains one of the most popular and politically sacred social programs in the United States (Howard, 1997).

The federal government also subsidizes homeownership through its involvement in the mortgage insurance and secondary mortgage market. A series of agencies and government sponsored entities (GSEs)¹ such as the Federal Housing Administration (FHA), the Federal National Mortgage Association (Fannie Mae), and Federal Home Loan Mortgage Corporation (Freddie Mac) work together to support homebuyers. Their collective activity increases the number of eligible buyers by

¹ Fannie Mae and Freddie Mac were originally established at the behest of the US government as semi-private companies with a public mission of supporting homeownership
insuring mortgages at origination (particularly for low down payment mortgages to lower-income homebuyers) and increases the supply of credit available for new mortgages by purchasing existing mortgages in the secondary market (Carliner, 1998). As a result of heavy financial losses related to high rates of housing crisis related mortgage default, both Fannie Mae and Freddie Mac were put into federal conservatorship in 2008, giving the federal government explicit responsibility for both their operations and their combined $5.4 trillion dollar balance sheet (Sale, 2009). Whereas previously the federal government had only indirect influence over the activities of Fannie Mae and Freddie Mac, the conservatorship puts the federal government in direct control of these two critical home mortgage credit providers.

Finally, the federal government is currently involved in expanding homeownership through the various activities of HUD and legislation like the Community Reinvestment Act (CRA) that compels banks to reinvest into the communities in which they do business. HUD supports the housing market through the activities of its direct subsidiaries, the FHA and Ginnie Mae. As discussed previously, FHA insures mortgages at origination, increasing the number of eligible mortgage buyers. Like Fannie Mae and Freddie Mac, Ginnie Mae facilitates the purchase of mortgages in the secondary market to increase the supply of credit available to low and moderate-income homebuyers (Mae, 2012). HUD also actively promotes the growth of homeownership though spending programs like HOME that provide funding to increase homeownership among low-income families (HUD, 2012).
The CRA is federal legislation that compels banks that do business in low and moderate-income neighborhoods to also make loans in those same neighborhoods. The legislation was passed in the late 1970s to address discrimination in bank lending among regulated banking institutions and has subsequently increased access to credit in the targeted low and moderate-income neighborhoods (Kevin & Lorraine, 2009). Both the CRA and HUD have been implicated in the housing bubble, if not outright blamed for creating the entire crisis (Patric & Kevin, 2012). Wherever blame for the crisis actually lies, there is no doubt that both HUD and the CRA helped increase the rate of homeownership among low and moderate-income households during the real estate bubble of 1990s and early 2000s.

**The housing bubble**

While debate continues to rage over its true origins, high default rates in subprime mortgages and the subsequent bursting of the US housing market price bubble during the first decade of the twenty-second century were the proximate cause of the current global financial crisis. Subprime mortgages are home loans made to borrowers with poor credit (typically low-income and minority households) and have higher interest rates than standard or prime mortgages. The housing market price bubble of the late 1990s and the early to mid 2000s was big, with massive home price increases both an input to and outcome of the massive increase in subprime mortgage lending (Brueckner, Calem, & Nakamura, 2012). The growth in subprime mortgage lending made homeownership possible for millions of low-income and minority households, households previously resigned to renting.
The growth in homeownership rates among lower-income Americans over the last 20 years was propelled by both changes in government policies and lending practices in the mortgage industry (Tyuse & Birkenmaier, 2006). The HUD program Home Ownership for People Everywhere (HOPE), began under the first president Bush and the National Homeownership Strategy initiated by the Clinton administration helped contribute to this growth (Immergluck, 1998). Also contributing to the growth in homeownership among lower-income and minority Americans was the increased exposure to subprime mortgages at Fannie Mae and Freddie Mac, which went from almost nothing in 2000 to nearly twenty-five percent of their portfolios in 2007 (Wiseman, 2010).

At the same time that government policies were helping to expand homeownership to lower-income and minority Americans, developments in the private mortgage market were also contributing to the growth in low-income homeownership. Non-bank mortgage finance companies and complex securitization schemes increased the competition among lenders and lowered the costs of borrowing for consumers. These developments funneled increasing amounts of capital into both the prime and subprime mortgage markets, an opportunity augmented by historically low interest rates (Henderson & Hummel, 2009).

For most of these subprime borrowers the promise of homeownership proved illusory. Millions of homeowners were forced to default on their home loans after the peak of the housing price bubble in 2006 when access to credit evaporated and the terms of their loans became financially unsustainable (JCHS, 2010). Low-income and minority borrows were disproportionately the holders of these subprime
mortgages, and these communities have disproportionately bared the brunt of the negative impact of the crisis in the housing market (Rugh & Massey, 2010). These communities not only faced financial trauma, they also have faced the subsequent emotional trauma that attends the loss of what was for many their biggest investment (Ross & Squires, 2011). The widespread dislocation and emotional trauma caused by the turmoil in the low-income and minority housing market corresponds with the period of time under study and will likely influence the impact of homeownership on childhood educational achievement in this analysis.

**Neighborhood and educational achievement**

The financial damage and emotional trauma of the housing crisis was centered in low-income and minority communities, so this analysis first assess the relationship between homeownership on child educational achievement at the neighborhood level. Past research has established a positive relationship between community socioeconomic status (SES) and child academic achievement. A meta analysis of studies dealing with the neighborhood effects on children and youth found that higher-SES neighborhoods, defined by a composite variable that included neighborhood household income, educational attainment and percentage of professional and managerial workers, had a positive effect on school readiness and achievement outcomes including IQ, verbal ability and reading recognition scores (T. Leventhal & Brooks-Gunn, 2000). Leventhal and Brooks-Gunn posit that a lack of community institutions to monitor and foster children in low SES neighborhoods could be contributing to the lower levels of student achievement in these neighborhoods (2000). Leventhal and Brooks-Gunn based their conclusions in part
on established models of the relationship between neighborhood resources and child welfare (Jencks, 1990). The neighborhood effect holds for both children and adolescents, but evidence suggests that neighborhood has an even greater impact among adolescents (Brooks-Gunn, Duncan, Klebanov, & Sealand, 1993; T. Leventhal & Brooks-Gunn, 2000). Analysis of a recent HUD program provides additional support for the relationship between neighborhood effect and child educational achievement. The HUD program Moving to Opportunity for Fair Housing Demonstrations placed families in neighborhoods with different economic composition, and placement in higher SES neighborhoods had positive impacts on the academic achievement score of adolescent males. (Tama Leventhal & Brooks-Gunn, 2004)

**The relationship between homeownership, neighborhood and community**

Both neighborhood resources and community tenure are directly related to homeownership status. To start with, homeowners and renters tend to live in different types of neighborhoods, with the majority of homeowners occupying single-family homes in suburban communities and the majority of renters living in multi-family buildings in urban communities (Rossi & Weber, 1996). Homeowners are also more likely to be wealthier than renters, and thus live in more socioeconomically advantaged neighborhoods (Rossi & Weber, 1996). In addition to living in different types of neighborhoods with different socioeconomic characteristics, homeowners and renters also invest different levels of social capital in their communities. An analysis of the U.S. General Social Survey and the German Socio-Economic Panel showed that homeowners have higher levels of civic
engagement compared to renters, with greater membership in nonprofessional organizations and greater involvement in local politics (DiPasquale & Glaeser, 1999). Similar to the positive effect of residential stability on educational achievement, DiPasquale and Glaeser found that the majority of the effect of homeownership on civic engagement was related to the fact the homeowners tend to live longer in their communities than renters (1999).

The impacts of homeownership on educational achievement

Much of the previous research into the relationship between homeownership and educational achievement was conducted among the general population before the housing bubble and price declines of the 1990s and 2000s. That being said, reviewing this literature helps to define the social benefits that have underpinned government intervention and spending in the mortgage market. Overall, this past research has established a positive relationship between homeownership and improvements in the educational outcomes among the children of homeowners. While these studies also found that parent demographics, residential stability, and neighborhood context influence the educational improvements, an independent relationship between homeownership and improved child educational outcomes has been consistent across studies.

An analysis of the Panel Study of Income Dynamics (PSID), a longitudinal dataset that followed five thousand American families between 1968 and 1992, found that children of homeowners were significantly more likely to achieve a higher level of education than the children of renters (Boehm & Schlottmann, 1999). The effect of homeownership endured despite controlling for other factors known to
influence educational attainment of children including parent’s education and income, and the race and gender of the child. Boehm and Schlottmann posit that the use of home equity to support the education of children, particularly in higher education, accounts for the higher levels of lifetime educational attainment among the children of homeowners given that parents are the biggest source of financial support for their children’s education (1999).

Another study that also looked at the PSID, as well as the Public Use Microsample of the 1980 Census of Population (PUMS) and the High School and Beyond (HSB) dataset found that children of homeowners were less likely to drop out of school and less likely to have a teenage pregnancy, relationships strongest among lower-income households (Green & White, 1997). Even when controlling for neighborhood context and housing tenure, Green & White found that the children of homeowners were significantly more likely to graduate from high school than the children of renters (1997). A subsequent investigation into the PSID data found that residential stability, or how long a household stays in a given residence, was a major component of this relationship between homeownership and educational attainment, although homeownership was still correlated with higher school attainment even after accounting of residential stability (Aaronson, 2000).

A more recent study looked at both the Ontario Child Health Study (OCHS) and the National Longitudinal Study of Children and Youth (NLSCY) and demonstrated a higher emotional and behavioral wellbeing among the children of homeowners aged 4 to 16 years old. Although socioeconomic factors related to homeownership (e.g., race, income) accounted for much of the relationship with
child behavior, homeownership remained an important factor (Boyle, 2002). Boyle also found that children of homeowners had higher scores for receptive vocabulary\(^2\) than the children of renters (2002). Of particular interest to this analysis, Boyle found the positive impact of homeownership on child emotional and behavioral wellbeing was consistent for families with incomes above the poverty line and families with incomes below the poverty line (2002).

**Low-income and minority homeownership and educational achievement**

The literature considered thus far has demonstrated the positive impact of homeownership on child educational achievement for households across the income spectrum. It has also demonstrated the link between homeownership status and neighborhood quality, and the influence of neighborhood quality on educational outcomes. The related effects of homeownership and community SES on educational outcomes give reason to believe that low-income households may have a different experience than households higher in the income spectrum. The following sections describe the different experiences that these low-income households have with homeownership compared to wealthier households.

In general, homeownership has its perils, but low-income homeowners face a unique set of potential problems. Research into longitudinal data collected as part of a program evaluation of Neighborhood Reinvestment Corporation’s Homeownership Pilot Program suggests that many low-income homeowners end up living in lower quality neighborhoods (higher rates of poverty, crime and other

\(^2\) Receptive vocabulary is defined as the set of words that a person can understand when heard or read
social problems) than the ones they moved from as renters, while low-income renters more easily improve their neighborhood quality by moving to better neighborhoods over time. (Van Zandt & Rohe, 2006). In other words, to find affordable housing, low-income homebuyers are trading neighborhood quality for homeownership. Low-income homebuyers do appear to live in neighborhoods that are improving, but they are improving more slowly than the neighborhoods occupied by continuing renters (Van Zandt & Rohe, 2006). Given the connection between neighborhood SES and child education outcomes established by Leventhal and Brooks-Gunn, it’s conceivable that the lower quality neighborhoods of low-income and minority homeowners could negatively impact the relationship between homeownership on educational achievement among these groups (2000).

Looking again at the PSID, researchers found that homeownership improves outcomes for the children of all homeowners, but the effect of homeownership on children’s outcomes is less pronounced in poor and residentially unstable neighborhoods. (Harkness & Newman, 2002). Harkness and Newman also found that although low-income homeowners trade neighborhood quality for homeownership, there is some evidence that the positive effects of homeownership are stronger than the negative effects of worse neighborhoods (2002). This finding suggests that although neighborhood remains important, homeownership can counteract the negative effects of low-quality neighborhoods found by Leventhal and Brooks-Gunn (2000,2004).

It’s unclear whether the children of low-income homeowners, particularly those that pioneer gentrification in poor and crime-ridden neighborhoods, actually
benefit from these improving neighborhoods because they grow up before they can reap the rewards of their parent’s investment (Harkness & Newman, 2002). A survey of research on the impact of neighborhoods on children found that neighborhoods appeared to have the most impact on adolescents, purportedly because they spend more time out in the community with their peers than younger children do (Ellen & Turner, 1997). Across several studies, Ellen and Turner found that neighborhood did impact adolescent educational attainment but it was unclear which particular aspects of neighborhood matter and which types of adolescent were most impacted (1997).

The racial and socioeconomic residential segregation that was once official policy (e.g., redlining\(^3\)), and that was first addressed in the civil rights legislation of the 1960s, continues to be reinforced by trends in neighborhood choice among low-income and minority homebuyers. Neighborhoods of homebuyers remain segregated by income level, with lower-income households and minorities buying in low-income and minority neighborhoods (Immergluck, 1998; Stuart & Harvard Civil Rights Project, 2000). So although more lower-income and minority households have become homeowners, it has not resulted in increased integration of neighborhoods. The pursuit of homeownership has helped to perpetuate the class and racial segregation of lower-income and minority households.

\(^3\) A policy where banks refuse to grant mortgages in certain neighborhoods, primarily minority areas.
Research Question and Hypothesis

This paper is concerned with better understanding the impact that homeownership has on the educational achievement of the children of low-income and minority homeowners. Given the government policy of encouraging homeownership in the name of its positive social impacts, it’s critical that we understand the impact of this policy on those members of society most in need of assistance. This paper will test the following hypothesis:

The positive impact of homeownership on the educational attainment of the children of homeowners is less pronounced in low-income households.

Materials & Methods

This section defines the sample population and reviews the relationship between the main independent variable, homeownership status, and the other covariates. This section will also discuss the dependent variable and establish its relationship to homeownership status. Finally, this section describes the development of the statistical models used in this analysis.

Study population

This paper analyzes data from the Fragile Families and Child Wellbeing Study (FF). The FF follows a cohort of nearly 5,000 children born in 20 large U.S. cities.

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4 The author thanks the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) through grants R01HD36916, R01HD39135, and R01HD40421, as well as a consortium of private foundations for their support of the Fragile Families and Child Wellbeing Study.
between 1998 and 2000. As the name suggests, this study was designed to assess the life experience of “fragile families,” defined as unmarried parents and their children. Subsequently, roughly three-quarters of the study population were born to unmarried parents. The subjects of the FF are also predominantly non-white (69.2%) and low-income, with the majority (64%) of parents using Medicaid or some other form of government assistance to pay for the medical fees associated with childbirth (CRCW, 2012).

The FF was chosen for several reasons. First, it covers the late 1990s and early 2000s, a period of massive growth in low-income and minority homeownership. Second, it contains extensive information on parent demographics and homeownership status. Third, the FF has longitudinal data on child education outcomes. Finally, the FF provides a large sample of low-income and minority populations.

The FF baseline data was collected through in-hospital interviews with mothers and in-hospital or telephone interviews with fathers. In addition to information on homeownership status, these baseline interviews provide data on parental demographics and family relationships. This analysis also makes use of data on marriage, co-habitation, residential stability, and homeownership status collected by telephone from the mother at year 1, year 3, year 5 and year 9. This analysis also makes use of scores from the third edition of the Peabody Picture Vocabulary Test (PPVT-III) conducted during an in-home assessment in year 9 of the study. Finally, this analysis will also use FF data collected from a mailed teacher survey from year nine of the study that included information about the child’s
academic development and social skills as well as school characteristics and parental involvement.

Sample Selection

The majority of mothers and fathers in the FF don’t live together which complicates the assignment of the main independent variable (homeownership status) and the demographic covariates that will be used in this analysis. For example, if a father owns a home, and the mother does not, or vice versa, it’s unclear how to judge the impacts of homeownership status on the child. The same problem exists with demographic characteristics like household income. If both parents don’t live together, it’s unclear how to incorporate the impacts of household income in the analysis.

In order to simplify the analysis and ensure consistent comparison between homeowners and renters, the sample was restricted to those children that lived with their mothers at least fifty percent of the time over the course of the study. These children could also be living with their fathers, but they at least lived with their mothers. Of the 2,195 cases for which there is both parent baseline data, year nine educational data and year nine teacher survey data, 2,018 (92%) lived with their mother for four of the five study periods. Although the restriction that

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5 Whether or not the child would live (baseline) or lived with the mother was assessed at all five waves of the study. The year nine data on whether the child lives with the mother covers both year nine and the previous four years since the year five wave of the study. Although this is technically coterminous with the dependent variable, because it also provides the status of the previous four years it has been included in the calculation of the variable that measures time spent living with the mother.

6 Thirty-five percent (761 cases) of the sample used for this analysis were either missing data (693 cases) or had reported that the child was not living with the mother (68 cases) during only one of
children that live with their mothers removes 8% of the potential cases, the majority of the excluded cases live with caregivers for whom no available homeownership data exists. This restriction also means that the majority of the data for this analysis comes from the maternal surveys, excluding potential data from the parallel paternal surveys.

**Independent variables**

As discussed previously, the main independent variable is homeownership status (Table 1). The data for this variable comes from questions in the baseline and subsequent follow-up surveys that ask whether the mother lived in a house that was owned or rented. For this analysis, the homeownership variable (tlmomown) is constructed as a continuous variable representing the total number of years a given case has been exposed to an owned home. Of the 2,018 mother-child pairs considered in this analysis, 47% lived in a home that was owned during at least one of the follow-up periods while the remaining 53% lived exclusively in rented homes. This 47% rate of homeownership is considerably less than the overall US rate of 66.2% in the year 2000 and also below the homeownership rate of 51% among households with income below the median income in the year 2000 (EPI, 2011; U.S. Census Bureau, 2011). Of the moms that lived in an owned home, the average (median) length of time they lived in an owned home over the course of the study follow-up was two years.

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7 Is the home/apartment were you currently reside owned/rented?
In addition to the homeownership status, a number of demographic variables are included in the analysis. The relationship between race and academic achievement has been well documented so this analysis will control for mother’s race as a factor in itself and has a proxy for the race of the child (Lay & Wakstein, 1985). This analysis will also control for gender of the child given the ongoing debate around gender and academic achievement (Epstein, Elwood, Hey, & Maw, 1998). This analysis will include mother’s education at year nine in order to control for the influence of parent education on child academic achievement (Davis-Kean, 2005). Finally, this analysis will control for age of the mother at baseline given the known negative consequences on families of young childbearing (Card & Wise, 1978).

This analysis also includes measures of family resources, family structure, maternal mental health, and residential stability in order to help control for the unique characteristics of “fragile families” that are known to influence child wellbeing (Waldfogel, Craigie, & Brooks-Gunn, 2010). Given the established relationship between family financial resources and academic achievement, this analysis will control for an average of household income over the 9-year follow-up period (Sirin, 2005). This analysis will also include marriage status (ever married to father yes/no) of the parents in order to control for the established relationship between academic achievement and parental marriage status (McLanahan & Sandefur, 1994). Although marriage status is not the only measure of the impact of parental relationship health on child wellbeing, previous research into the FF database has found that married parents have less conflict and better relationship quality than
non-married or single parents (McLanahan & Beck, 2010). This analysis will also include a variable that indicates whether the child lived with father at any point during the study follow-up period in order to control for the influence of father-child involvement and child development (D. Jackson, O’Brien, & East, 2006). A relationship between maternal mental health and child wellbeing has been established in the literature, so this analysis will also control for whether or not the mother was ever classified as depressed on the World Health Organization Composite International Diagnostic Interview (CIDI) during the course of the nine year follow-up (Friedlander, Weiss, & Traylor, 1986). Finally, this analysis will also control for residential stability, defined as whether or not the mother of the child moved during the course of the 9-year study follow-up. Given the high amount of residential instability among both homeowners and renters in the sample, residential stability is an important confounder independent of homeownership status. Additionally, “fragile families” are both interpersonally unstable and unstable in where they live, and findings from previous literature highlight the relationship of residential stability to the positive effect of homeownership (Aaronson, 2000).

Controlling for these demographic, family structure and family resource covariates is particularly important in this analysis because homeownership should be viewed as the result of the successful navigation of the home buying and home maintaining process, a process that ultimately depends on the characteristics of the parents, not just the fact that they own a home (Boyle, 2002). As seen in Table 1, there is more than a two-year difference between the mean age at baseline of mothers that live in owned homes (26.3) and mothers that live in rented homes
(24.1). Compared to mothers that live in rented homes, mothers that live in owned homes are more likely to be white (42.8% versus 23.4%), and are more likely to have at least some college education at baseline (67.8 % versus 51.8%).

Also seen in Table 1, mothers that live in owned homes are more likely to have a higher median income at baseline ($39,300 versus $21,300) and are more likely to have been married to the child’s father during the course of the nine-year follow-up (56.1% versus 31.9%). Mothers that live in owned homes are also more likely to have spent time living with the father of the child during the course of the nine-year follow-up (68.0%) than mothers that live in rented homes (56.0%). There is not much difference between homeowners and renters when it comes to maternal mental health. Mothers that live in owned homes (29.2%) are only slightly less likely to have been classified as depressed during the study follow-up compared to mothers that live in rented homes (33.5%). Finally, the overwhelming majority of both mothers that live in owned homes (81.6%) and mothers that live in rented homes (90.0%) moved during the nine-year study follow-up. Mothers moved a median of two times during the course of the nine-year follow-up, for an average of one move every four and one-half years. Not surprisingly, mothers that lived in an owned home (42.3%) are less likely to have moved more than the median number of moves in the study compared to mothers that live in rented homes (54.3%). The extent of the housing instability in the sample is great, and will likely impact any potential homeownership effect.

Understanding that homeowners and renters often live in different types of communities with different school quality, this analysis will include a general school
misbehavior variable to help control for differences in the quality of school environment across cases (Rossi & Weber, 1996). This variable comes from the year-nine teacher survey and represents teachers that agree or strongly agree that misbehavior in the school interferes with their ability to teach. At age nine (the most recent wave of the study), children of mother’s that live in rented homes have slightly less misbehavior in their schools (18.0%) than the children of mother’s that live in rented homes (25.4%). Finally, this analysis also includes a variable designed to control for parent involvement in their child’s schooling that also come from the year-nine teacher survey. Past research has demonstrated a relationship between parent involvement in school and child academic performance, and including this variable should help to capture attitudinal components of parent’s influence on educational attainment not accounted for in the demographic covariates (Fan, 2001). Parent’s that live in owned homes (77.6%) are more likely to share the goals of their child’s school a lot or a great deal at age nine compared to parent’s that live in rented homes (63.4%).

---

8 Q: The level of child misbehavior (for example, noise, horseplay, or fighting in the halls or cafeteria) in this school interferes with my teaching
9 Q: How much do you feel the child’s parents/guardians have the same goals for their child that the school does?
### Table 1: Variable correlations and baseline sample characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Owned home (n=955)</th>
<th>Rented home (n=1,063)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homeownership status</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Age, mean (std dev)</td>
<td>26.3 (6.2)</td>
<td>24.1 (5.7)</td>
</tr>
<tr>
<td>Race, %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>42.8</td>
<td>23.4</td>
</tr>
<tr>
<td>Black</td>
<td>40.8</td>
<td>60.0</td>
</tr>
<tr>
<td>Other</td>
<td>16.4</td>
<td>16.6</td>
</tr>
<tr>
<td>Mother’s education (at least some college), %</td>
<td>67.8</td>
<td>51.8</td>
</tr>
<tr>
<td>HH Income, median $K (IQR)*</td>
<td>39.3 (22.5-67.6)</td>
<td>21.3 (13.8 – 32.9)</td>
</tr>
<tr>
<td>Ever married to father, %</td>
<td>56.1</td>
<td>31.9</td>
</tr>
<tr>
<td>Ever live with father, %</td>
<td>68.0</td>
<td>56.0</td>
</tr>
<tr>
<td>Mother ever depresses, %</td>
<td>29.2</td>
<td>33.5</td>
</tr>
<tr>
<td>Ever moved during study period, %</td>
<td>81.6</td>
<td>90.0</td>
</tr>
<tr>
<td>Moved more than median, %</td>
<td>42.3</td>
<td>54.3</td>
</tr>
<tr>
<td>Misbehavior in school, %</td>
<td>18.0</td>
<td>25.4</td>
</tr>
<tr>
<td>Parents involvement a lot or a great deal, %</td>
<td>77.6</td>
<td>63.4</td>
</tr>
<tr>
<td>ppvty9, mean (std dev)</td>
<td>97.5 (15.5)</td>
<td>90.6 (13.9)</td>
</tr>
</tbody>
</table>

*(IQR) Inter-Quartile Range

---

**Dependent variable: Educational performance**

The dependent variable for this analysis will be child academic achievement, as measured by the PPVT-III. The PPVT-III tests receptive vocabulary, and when previous iterations are included, it has been around for over half a century (Dunn & Dunn, 1997). Numerous studies have found the PPVT-III to be a valid measure of
verbal ability among children of various racial and socioeconomic backgrounds (Keith, Bell, & Campbell, 2001; Washington & Craig, 1999). The PPVT-III data in this analysis (ppvty9) comes from the year-nine in-home assessment of the child, and represents the standardized score (m=100) from the PPVT-III.

The correlations between ppvty9 and the independent variables (Table 1) conform to expectations regarding the relationship between parental demographics and the educational achievement of their children. For mothers, household income (r=0.42, p<0.001), white race (r=0.30, p<0.001), having at least some college education (r=0.28, p<0.001), having ever been married to the child’s father (r=0.27, p<0.001), and parent involvement in school (r=0.17, p<0.001) all have sizable, positive correlations with child educational achievement. Black race (r=-0.25, p<0.001) of mothers has a sizable, negative correlation with child educational achievement. The main independent variable, homeownership status of the mother (r=0.26, p<0.001), has a relatively large and highly significant, positive correlation with child educational achievement.

In isolation, the majority of the variables have strong relationships with the dependent variable, ppvty9. The statistical analysis in the next section of the paper will look at how the interrelationships between these variables impact their relationship with the dependent variable of child educational achievement.

**Statistical analysis**

While the original sample for this study was large at 4,898 cases, both missing data and the restrictions applied as a condition of this analysis have significantly reduced the sample size for the final analysis. The two main sources of
missing data are case attrition over the course of the nine-year follow-up and incomplete for missing responses from the year-nine teacher survey. Almost 1,498 cases were missing from the year-nine wave, or 31% of the original sample. Data from the teacher survey was missing on 2,644 cases, or 54% of the original sample. The number of cases remaining in this analysis (Table 2), including the restriction to cases that live with their mothers was 2,018, or 41% of the original sample. Despite losing over half the sample, the cases that remain in the study are largely similar in demographic makeup to the missing cases. There is no significant difference between the remaining cases and the missing cases on mother’s age, and the significant differences in mother’s race and education are no more than six percentage points large. Mother’s household income is also largely similar between the remaining and missing cases. Finally, the remaining cases and the missing cases have largely similar average scores on the dependent variable, PPVT-III score. Given the stability of the sample parameters between the missing and remaining cases, cases with missing data will be excluded from this analysis.
TABLE 2: Missing sample description

<table>
<thead>
<tr>
<th>Variable</th>
<th>Included (n=2,018)</th>
<th>Excluded (n=2,703)</th>
<th>TTest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mom age at baseline, mean (std dev)</td>
<td>25.1 (6.0)</td>
<td>25.3 (6.0)</td>
<td></td>
</tr>
<tr>
<td>Race, %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>32.6</td>
<td>29.5</td>
<td>*</td>
</tr>
<tr>
<td>Black</td>
<td>50.9</td>
<td>48.8</td>
<td>***</td>
</tr>
<tr>
<td>Other</td>
<td>16.5</td>
<td>21.6</td>
<td></td>
</tr>
<tr>
<td>Mother’s education at baseline (at least some college), %</td>
<td>38.6</td>
<td>32.8</td>
<td>***</td>
</tr>
<tr>
<td>Mother’s HH income at baseline, median $K (IQR)</td>
<td>22,500 (12,500 – 42,500)</td>
<td>22,500 (9,028 – 42,500)</td>
<td>**</td>
</tr>
<tr>
<td>ppty9, mean (std dev)</td>
<td>93.9 (15.1)</td>
<td>91.0 (14.6)</td>
<td>***</td>
</tr>
</tbody>
</table>

The interquartile range (IQC) represents the 25th and 75th percentiles

*** p <.001, ** p<.01, * p<.05

Analytic Approach

This paper uses an ordinary least squares regression (OLS) model for the analysis of the achievement composite variable. OLS models operate by minimizing the distance between the observed values and the values predicted by the model, thus providing the linear “best fit” approximation of the parameters. The suitability of OLS models depend on several assumptions (see Appendix A) about the underlying data, most importantly that dependent and independent variables have a linear relationship that can be represented by a straight line (Chatterjee, 2006).

Using OLS will allow this analysis to explore the relationship between the dependent variable, (child academic achievement) and the main independent variable (homeownership status) while controlling for the many variables that work to influence their relationship.
Results

The correlation (r=0.26, p<0.001) between mother’s homeownership status (tlmomown) and educational achievement (ppvty9) established that a relationship exists between the dependent and the main independent variable. The following section further explores this relationship while controlling in stages for demographic, residential stability and educational environment covariates. The covariates are added in stages by type, allowing for a progressively deeper understanding of the interconnections that underlie the relationship between mother’s homeownership status and child academic achievement.

Initial model

This initial model (Table 3) uses a simple linear regression to examine the relationship between the main independent variable (tlmomown) and the dependent variable (ppvty9) without any covariates. In the initial model, homeownership exposure has a significant (p<0.001) and sizable impact on child academic achievement. Each additional year of exposure to living in an owned home increases the standardized PPVT-III score of the child at age nine by 3.1 points. It’s important to note that the model fit (adjusted R² = 0.07) on this initial model is poor, indicating that homeownership exposure by itself does not do a good job of explaining changes in child academic achievement.
Table 3: Regression model comparison

<table>
<thead>
<tr>
<th></th>
<th>Initial model (SLR) (n=2,018)</th>
<th>Demographic model (n=1,978)</th>
<th>Fragile families model (n=1,978)</th>
<th>Educational environment model (n=1,978)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ppty9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>tlmomown</td>
<td>3.1</td>
<td>0.000</td>
<td>0.5</td>
<td>0.052</td>
</tr>
<tr>
<td>momagey0</td>
<td>0.1</td>
<td>0.031</td>
<td>0.1</td>
<td>0.040</td>
</tr>
<tr>
<td>blackmom</td>
<td>-6.1</td>
<td>0.000</td>
<td>-5.9</td>
<td>0.000</td>
</tr>
<tr>
<td>othermom</td>
<td>-4.9</td>
<td>0.000</td>
<td>-4.6</td>
<td>0.000</td>
</tr>
<tr>
<td>momatlscol</td>
<td>4.5</td>
<td>0.000</td>
<td>4.4</td>
<td>0.000</td>
</tr>
<tr>
<td>logmomhhinc</td>
<td>5.5</td>
<td>0.000</td>
<td>5.5</td>
<td>0.000</td>
</tr>
<tr>
<td>girl</td>
<td>-0.04</td>
<td>0.889</td>
<td></td>
<td></td>
</tr>
<tr>
<td>himove</td>
<td></td>
<td></td>
<td>1.3</td>
<td>0.042</td>
</tr>
<tr>
<td>tlmarrriage</td>
<td></td>
<td></td>
<td>0.3</td>
<td>0.002</td>
</tr>
<tr>
<td>everlivewdad</td>
<td></td>
<td></td>
<td>-2.0</td>
<td>0.005</td>
</tr>
<tr>
<td>momeverdep</td>
<td></td>
<td></td>
<td>0.1</td>
<td>0.849</td>
</tr>
<tr>
<td>schmisbehav</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>involvealot</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted R2</td>
<td>0.07</td>
<td></td>
<td>0.24</td>
<td></td>
</tr>
</tbody>
</table>

Demographic model

The next iteration of the model (Table 3) includes demographic data on mother of the child including age at baseline (momagey0), white, black or other race of the mother (whitemom[ref], blackmom, othermom), whether the mother has a high school education or less or at least some college education (momhsoless[ref], momatlscol) and household income for the mother (logmomhhinc). Adding these demographic variables significantly improved the model fit ($R^2=0.24$). The addition of the demographic variables also reduced the coefficient on homeownership exposure by a factor of ten and rendered it just insignificant. In the model including demographic variables, each additional year of mother’s homeownership (p<0.052) increases the child PPVT-III score at age nine by only 0.5 points holding all
demographic variables in the equation constant. This drastic impact of the demographic variables makes sense given common sense and what we know from previous studies about the nature of homeownership. Owning a home is the result of a process, an outcome dependent on the characteristics and experience of the homeowner (Boyle, 2002).

Compared to having a white mother, having a black mother (p<0.001) reduces the child PPVT-III score at age nine by 6.1 points when holding all other variables in the equation constant. When compared with mothers with a high school education or less, mothers with at least some college education (p<0.001) increase the child PPVT-III score at age nine by 4.5 points, holding other variables in the equation constant. Mother’s household income also had a significant (p<0.001) impact on child education achievement, with each 10% increase in income leading to a .6 point increase in child PPVT-III score at age nine, holding the other variables in the equation constant. The finding on mother’s household income implies that children from households on the upper end of the income spectrum for this sample would have meaningfully higher PPVT-III scores than children from households on the bottom of the income spectrum. The impact of age was small but significant (p<0.031). For every additional 10 years of age a mother has at the birth of the child, the child PPVT-III score at age 9 increases by 1 point, holding the other variables in the equation constant.

Fragile families model

The fragile families model (Table 3) includes four additional variables: whether the mother moved more than the median number of moves during the
study period (himove), the total number of years that the child has been exposed to
the marriage of his or her parents (tlmarriage), whether or not the child has ever
lived with his or her father (everlivewdad), and whether the mother could have
been classified as depressed at any point during the study period (momeverdepp).
Overall, the addition of these fragile families variables had little impact on the model
fit (adjusted $R^2=0.25$) or the relationship between mother’s homeownership status
and child educational achievement (coefficient=0.5, $p<0.09$).

The impact of having moved more than the median number of moves during
the study time (himove) on child PPVT-III score at age nine was significant
($p<0.042$) but relatively small. Moving more than the median number of times
increases child score on the PPVT-III at age nine by 1.3 points, holding all other
variables in the equation constant. Despite the small impact, it’s interesting to note
that moving more than the median number of times appears to have a positive effect
on PPVT-III score of the child at age nine. This positive directionality goes counter to
what would be expected given the supposed importance of stability to child school
performance (Aaronson, 2000). The impact of the marriage variable (tlmarriage) is
significant ($p<0.002$) and potentially sizable depending on the length of exposure.
Each additional year a child is exposed to their parent’s marriage increases their
child PPVT-III score at age nine by 0.3 points, holding all other variables in the
equation constant. Having ever lived with dad ($p<0.005$) reduces the child PPVT-III
score at age nine by 2 points holding all other variables in the equation constant.
Finally, whether the mother could have been classified as depressed during the
course of the study follow-up had little effect on child PPVT-III score at age nine and was highly insignificant (coefficient=0.1, p<0.849).

**Educational environment**

The educational environment model (Table 3) includes the addition of two educational environment variables from the year-nine teacher survey: a measure of general misbehavior in the child’s school (schmisbehav) and a teacher assessment of the commitment of parents to the goals of the school (involvealot). The inclusion of these new variables had little impact on the model fit compared with the previous model (Adjusted $R^2 = 0.25$). The addition of the educational environment variables slightly reduced the impact of mother’s homeownership on child PPVT-III score at age nine (coefficient=0.4, p<0.128).

The misbehavior variable (schmisbehav) is significant (p<0.027) and has a relatively large negative impact. Children from schools were discipline problems interfere with teachers ability to teach score an average a 1.6 points lower on the PPVT-III test at age nine, holding all other variables in the equation constant. Children of parents that share the goals of the school a lot or a great deal perform 1.9 points (p<0.004) better on average than children whose parents are not as aligned with school goals, holding all other variables in the equation constant.

**Residential stability**

Given the high degree of residential instability in the sample (a median of 2 moves for each family over the course of the nine year follow-up) and the disruption in the housing market that characterized this period of history, the next and final
analysis stratifies the sample into two groups: those that moved more than the median number of moves for the sample (high residential instability) and those that moved the median or below the median number of moves for the sample (low residential instability). Covariates included in these two stratified models include homeownership status and all the significant variables from the previous models.

**Table 4: Residential stability analysis**

<table>
<thead>
<tr>
<th></th>
<th>High residential instability (n=967)</th>
<th>Low residential instability (n=1,011)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ppvty9</td>
<td>Coef. 0.1  P&gt;t 0.765</td>
<td>Coef. 0.6  P&gt;t 0.131</td>
</tr>
<tr>
<td>tlmomown</td>
<td></td>
<td></td>
</tr>
<tr>
<td>momagey0</td>
<td>0.04  0.604</td>
<td>0.2  0.026</td>
</tr>
<tr>
<td>blackmom</td>
<td>-5.9  0</td>
<td>-5.2  0</td>
</tr>
<tr>
<td>othermom</td>
<td>-4.8  0.002</td>
<td>-4.0  0.002</td>
</tr>
<tr>
<td>momatlscol</td>
<td>3.7  0</td>
<td>4.9  0</td>
</tr>
<tr>
<td>logmomhhinc</td>
<td>5.4  0</td>
<td>4.8  0</td>
</tr>
<tr>
<td>tlmarrriage</td>
<td>0.4  0.017</td>
<td>0.3  0.115</td>
</tr>
<tr>
<td>everlivewdad</td>
<td>-3.3  0.006</td>
<td>-0.8  0.454</td>
</tr>
<tr>
<td>schmisbehav</td>
<td>-2.8  0.005</td>
<td>-0.5  0.679</td>
</tr>
<tr>
<td>involvealot</td>
<td>1.9  0.032</td>
<td>1.9  0.065</td>
</tr>
</tbody>
</table>

Adjusted $R^2$ 0.22 0.27

The most striking impact of this stratification is the drastic reduction in the coefficient on mother’s homeownership status (Table 4) for those cases with high residential instability. For cases with high residential instability, mother’s homeownership status is highly insignificant and has a fraction of the impact (coefficient=0.1, p<0.765) as it does among those cases with low residential instability (coefficient=0.6, p<0.131). Also of interest is the impact of residential stability on the demographic covariates. Both black mother (coefficient=-5.2, p<0.001) and mothers of races other than black or white (coefficient=-4.0, p<0.003) have less of a negative impact among those with low residential instability. Mother’s
education also has a higher impact on child PPVT-III score at age nine (coefficient=4.9, p<0.001) among cases with low residential instability. Finally, all of the measures of family fragility (exposure to marriage and having ever lived with dad) and educational environment (school misbehavior and parent involvement) are insignificant and have reduced impact among those with low residential instability.

Looking at the residential stability numbers by homeownership status again (Table 5) highlights the extent of residential instability among both those that have ever lived in an owned home during the study period and those that never lived in an owned home during the study period.

Table 5: Moving and homeownership

<table>
<thead>
<tr>
<th></th>
<th>Move more than the median (n=981)</th>
<th>Move median or less (n=1,037)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ever lived in an owned home</td>
<td>404 (41.2%)</td>
<td>551 (53.1%)</td>
</tr>
<tr>
<td>Never lived in an owned home</td>
<td>577 (58.8%)</td>
<td>486 (46.9%)</td>
</tr>
</tbody>
</table>

Although mothers that have lived in owned homes are less likely to have moved more than the median number of times (41.2%) compared to mothers that never lived in an owned home (58.8%), both groups still moved a great deal during the study period. Owning a home during the study period only afforded a minor improvement in residential stability.
Discussion

From the beginning this analysis has acknowledged homeownership as the result of a complex process, determined by the confluence of numerous factors. Therefore, it comes as no surprise that when analyzing the relationship between homeownership and child educational achievement, underlying factors explain most of this relationship. Most important of these underlying factors is demographics. The combination of mother’s race, household income, and education explained the overwhelming majority of homeownership’s relationship with child educational achievement. Other factors considered in this analysis like family structure and educational environment also influenced the relationship, but their impact was minor in comparison to demographics. Child educational achievement, like homeownership, is the result of a complex process dependent on the underlying characteristics of the people involved.

Despite the overwhelming impact of demographics, there is some evidence for a small and independent relationship between homeownership status and childhood educational achievement among low-income and minority households. Given the importance of residential stability in the positive impacts of homeownership and neighborhood SES on child educational achievement, it’s surprising there is any homeownership effect at all given how much the households in the sample moved during the course of the study follow-up. The importance of residential stability to the homeownership effect can be seen dramatically in the stratified residential stability analysis. Homeownership had practically no impact on
child educational achievement among those households that moved more than two times during the course of the nine-year study follow-up. The fact that the median number of moves was 2 could also explain why the relationship between homeownership and child educational achievement was so small overall.

The nine year follow-up period of the Fragile Families study spans a tumultuous decade for the US housing market, particularly for low-income and minority households. Millions of low-income and minority families transitioned from renting to homeownership, and then back to renting again, with disastrous consequences for both personal finances and community continuity.

Homeownership was clearly not good for the financial health of many low-income households. Given the high levels of residential instability that characterizes the experience of low-income homeowners, it’s also clear these households are not getting all the potential social benefits of homeownership.

The ideal of homeownership is embedded deep in the American psyche, so deep that the greatest financial crisis since the Great Depression will likely do little to quell the desire of households to become homeowners. Given the amount of money the federal government spends on subsiding homeownership, it’s a national disgrace that millions of low-income and minority households were so badly damaged in the housing market during the last decade. Homeownership in the US today is undoubtedly the product of the welfare state, an entitlement that should at the very least be dealt out on a fair and equitable basis.
Limitations

There are several limitations to this study, most critically the difficulty in isolating the relationship between homeownership and child educational performance. The regression models in this analysis control for many of the known confounders, but there are many others that could not be controlled. The most notable missing confounders include neighborhood quality and the extent to which households changed the communities in which they lived when they moved. Data on these confounders would help to answer questions on the extent that geographical dislocation and neighborhood quality influence the relationship between homeownership and child educational achievement.

Also of concern was the extent of missing data in the final analysis. Although this analysis established that the sub-sample did not differ significantly from the original sample, any representativeness that could be assumed in the original sample was compromised by the sample exclusions required by this analysis. Future research would also do well to compare how the turmoil that impacted the prime mortgage and housing market impacted the relationship between homeownership and child education achievement. Being able to directly compare both the experiences of low-income and middle and upper-income households during the housing boom and bust would help give context to the relationship between low-income and minority homeownership and child educational achievement observed in this analysis.

This analysis is also limited by how homeownership status was measured in the FF study and the relatively young age of the children in question. First, this
analysis looks only at mothers that lived in an owned home, not necessarily a home that was owned by the mother. More precise measurement of mother’s homeownership status may have helped in isolating the impact of homeownership on child educational achievement. Also of issue is the age of the children in question. Most of the literature finds that adolescents are the most influenced by neighborhood and homeownership effects. Analyzing subsequent waves of the FF study could help to overcome this limitation.

Finally, the OLS models in this analysis depend on a series of model assumptions. Although regression diagnostics (Appendix A) don’t reveal any extreme violations of these OLS assumptions, the extent to which this analysis does not conform to linearity, normality, equal variance or any of the other OLS assumptions could bias the findings.
References


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Appendix A: Regression diagnostics

The following series of regression diagnostics test the model fit for the final model in this analysis (Educational environment).

**Linearity**

No clear pattern in the scatter plot of the standardized residuals and the fitted values suggest a linear relationship between variables.

**Normality**

Close fit on the normal probability plot and the standardized residuals suggest the model adheres to normality.
Equal variance

The lack of a clear pattern in the scatter plot indicates that the variance of the dependent variables does not appear to change much with difference values of the independent variables.

Uncorrelated errors

An index plot of the case identification numbers and the residuals doesn't reveal any clear signs of autocorrelation.

Multicollinearity

Low VIF scores (<10) for all the dependent variables indicate that there is not a problem with multicollinearity in the data.

<table>
<thead>
<tr>
<th>Variable</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>tlomomown</td>
<td>1.3</td>
</tr>
<tr>
<td>momagey0</td>
<td>1.2</td>
</tr>
<tr>
<td>blackmom</td>
<td>1.6</td>
</tr>
<tr>
<td>othermom</td>
<td>1.3</td>
</tr>
<tr>
<td>momatlscol</td>
<td>1.2</td>
</tr>
<tr>
<td>logmomhhinc</td>
<td>1.9</td>
</tr>
<tr>
<td>tlmarrriage</td>
<td>2.0</td>
</tr>
<tr>
<td>everlivewdad</td>
<td>1.4</td>
</tr>
<tr>
<td>clmisbehav</td>
<td>1.1</td>
</tr>
<tr>
<td>involvealot</td>
<td>1.1</td>
</tr>
</tbody>
</table>