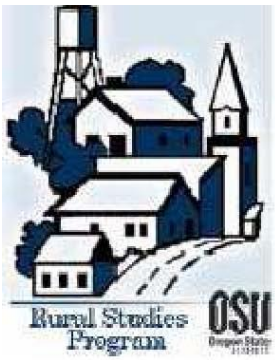

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Household and Economic Factors Associated with Geographic and School Mobility among Low Income Children

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Household and economic factors associated with geographic and school mobility among low income children

Child poverty has been shown to have lifelong consequences, and several policy interventions have sought to alleviate its effects. However, federal school policy insufficiently addresses 'out of school' factors including high rates of residential and school mobility among poor students. The detrimental effects of school mobility on achievement and classroom behavior have been well documented, but the literature on the household dynamics associated with residential and school mobility among the poor is limited. This study uses detailed administrative data from Oregon's Supplemental Nutrition Assistance Program (SNAP) to provide more information on residential and school mobility among low-income children of early elementary school age. Changes in household composition, income, employment, residential address and school catchment were analyzed over several years to measure the relationship between mobility and household dynamics. We find that Oregon children from low-income families have high rates of residential and school mobility and that family dynamics rather than economic opportunity appear to increase the probability of moving. We offer several policy recommendations in light of the findings.

Keywords: residential mobility, educational mobility, poverty, rural, urban

Background

The impacts of poverty on children and educational policy responses

In purely economic terms, the annual cost of child poverty has been estimated at $500 billion (4% of GDP) due to the impacts of lost income, increased crime, and poorer health over the lives of poor children (Holzer et al. 2008). Poverty among pre-schoolers appears to have particularly detrimental effects during this period of early brain development. For these and for school-aged children, family stress, dissolution and residential mobility, as well as lack of nutritious food, safe housing, and parental resources yield life-long negative impacts on subsequent educational attainment, earnings, and mental, emotional, and behavioral health (Duncan et al. 2012; Yoshikawa, Aber and Beardslee 2012). Among adolescents, poverty is also correlated with school dropout and non-marital teenage births (Brooks-Gunn and Duncan 1997).

Inequalities in educational attainment have inspired federal policy interventions to close the achievement gap and help students escape poverty (Anyon and Green 2007). However, these

policies generally have not addressed inequalities in out-of-school experiences of poor children. For example, the federal No Child Left Behind (NCLB) Act of 2001 (PL 107-110) articulated a goal of closing the achievement gap among students. NCLB's Title I identified populations of students targeted for specific educational policies, including those attending high poverty schools, those with limited English proficiency, children of migrant agricultural workers, homeless or disabled children, neglected or delinquent children, Native American children, and those with reading difficulties. NCLB instituted requirements to improve student achievement and teacher qualification, provided financial support to meet the requirements, and allowed students to attend a "school of choice" and receive other support if their local public school failed to make "adequate yearly progress" (AYP). However, Berliner (2009) observes that the processes by which poverty impacts children's ability to perform in school are ignored in this federal policy, arguing that "schools are told to fix problems that they have never been able to fix and that largely lie outside their zone of influence" (Berliner 2009). It is surprising that out-of-school influences were ignored given the extensive literature that, since the Coleman report (1966), has demonstrated that even when schools are equally resourced, family circumstances have profound and durable influences on children's educational attainment.

The impacts of residential and school mobility on poor children

A large body of work has documented the harmful effects of residential and school mobility on the academic success of poor children. Poor children are more likely to move frequently and children who move frequently are more likely to have lower achievement test scores, repeat a grade, have a learning disability, or have behavioral or developmental issues (Wood et al. 1993; Burkam, Lee, and Dwyer 2009; Xu, Hannaway, and D'Souza 2009; Fantuzzo, et al. 2012). These effects are somewhat mitigated for children in traditional two-

parent families as compared to children in other types of families (Tucker, Marx and Long 1998). High mobility among a student body affects all students, mobile or not, with what Rumberger (2003) calls the "chaos factor." High mobility also creates school accountability challenges, as year over year test score comparisons assume that the same group of students was tested in each year (Rumberger 2003). From the classroom perspective, student churn throughout the year creates additional challenges for teachers as they have to assess the achievement levels of new students and often try to "catch them up" to their new class (Lash and Kirkpatrick 1990).

In 2009, The National Research Council and Institute of Medicine held a workshop on student mobility and its effect on achievement. Several papers were presented that used administrative data from states and from New York City (Xu, Hannaway, and D'Souza 2009; Dukes 2009; Schwartz, Steifel, and Chalico 2009). These studies examined the relationship between non-structural[1] school mobility and race, ethnicity, income level, learning disability, and standard achievement test scores for school children in grades K-3. The studies corroborated earlier work as to the monotonic relationship between multiple school moves in early elementary school and lower achievement test scores. The administrative data provided detailed information about students' academic lives, but other than indicating whether they qualified for school lunch subsidies, they had little to say about students' lives outside of school. The data covered school, not residential, mobility so moves that did not result in a change in schools were not identified. The family situation that precipitated the move was also unknown.

Geographic mobility among the poor and its impact on poverty concentrations

Two substantial literatures on residential mobility focus on (a) the predictors of relocation, especially of the poor, and (b) the impacts of residential mobility on neighborhood

[1] *Non-structural school mobility* refers to changes in school that do not derive from grade promotion.

segregation, usually by race. Neighborhood segregation (by class and race) impacts poor families' opportunities to send children to quality schools, to easily commute to work, and to enjoy the protection of public safety services. Hence, our study of the impacts of poverty on geographic and school mobility situates within these literatures, assessing how the mobility of poor children's families impacts the child's school mobility.

Several studies have focused on geographic mobility among the poor and its role in forming spatial poverty concentrations (Wilson 1988; Quillian 1999; Voss, Hammer and Meier 2001). Others have extended this inquiry to compare the frequency, distance, and destination of moves by poor and non-poor households and provided evidence to evaluate theoretical explanations of mobility (Nord 1998; Foulkes and Newbold 2008; Foulkes and Schafft 2010). Nord (1998) used 1990 Census county migration files to evaluate the potential impact of differential opportunities. Neoclassical and human-capital theories had predicted that the poor would have lower rates of mobility than the non-poor and that poverty concentrations form when the latter respond to "pull-factors" such as higher wages. In contrast, Nord hypothesized that the poor and non-poor had similar rates of mobility, and that the poor would move toward high poverty areas that offered low cost housing and low-skilled job opportunities. His results supported these predictions with mobility rates and distances similar between the poor and non-poor, and with mobility patterns that tended to deepen poverty concentrations. He also found that the non-poor were attracted to suburban communities and counties with natural amenities. Foulkes and Schafft (2010) completed a similar analysis using data from Census 2000. They found that the poor move at higher rates and similar distances when compared to the non-poor, and that the poor are more likely than the non-poor to move to a poorer county and less likely to move to a richer one. An earlier study provided some rationale for these results, finding that

easily obtainable housing was an over-riding attraction for poor in-migrants into rural communities (Foulkes and Newbold 2008). Their study, using a mixed- methods approach, identified through interviews a subset of hypermobile families that moved from one unstable living situation to another, often involving evictions and temporary stays with friends or relatives. Long distance moves were rare, and families tended to rotate within areas where they had family ties.

Nord (1998) and Foulkes and Schafft (2010) acknowledged that their studies were limited by the use of census data which registers whether or not the respondent moved during the previous five years, but does not record the frequency of moves. Also, because their objectives included measuring the effect of mobility on county poverty concentrations, they omitted intra-county moves. Consequently, the type of hypermobile households described by Foulkes and Newbold (2008) were not identified in the Census-based studies because such families generally only move within the same county. If at least one of their moves crossed a county line, they would be indistinguishable from a family who moved only once in the five-year period. Additionally, both of the Census-based studies had to assume that those who were poor when measured by the census were also poor five years previous. However, an analysis of Panel Study of Income Dynamics data indicated that just under half of poor Americans were poor for four or more years (Blank 1997). Iceland and Bauman (2007) found that 32% of families in the 1996 Survey of Income and Program Participation had been poor for at least one month, and among those ever poor 15% were poor for all 32 months analyzed. Neither of the Census-based studies had access to information on changes in household composition nor income dynamics. Foulkes and Schafft (2010) pointed out the need for further research on intra-county mobility patterns and

the relationship between mobility and household decision making. Our approach addresses this gap in the literature while specifically focusing on poor children and school mobility.

This study supplements research on residential mobility and school mobility among the poor by providing detailed information on the household dynamics that are associated with a move. We first seek to describe very carefully the extent and patterns of geographic and school mobility for low income children. Our study improves on earlier studies of geographic and school mobility among the poor by using unusually detailed geographic data to model residential and school moves for poor and near poor young children. We use state administrative data on Supplemental Nutrition Assistance Program recipients (SNAP, formerly Food Stamps) to examine mobility for several years in low income families with young school age children. Changes in residence location, school catchment boundary, household structure, income, and employment were measured over several years to gain insight into the role that household dynamics plays in residential mobility. The study provides some of the household information that was missing from the 2009 studies of early elementary school mobility. It also adds to the efforts to understand the relationship between poverty and mobility by measuring the association between moving and factors within the household while controlling for factors pertaining to geography. We also add to the literature by comparing factors associated with children who move just once versus multiple times during their early elementary years.

Data and Methods

Administrative data from the Oregon SNAP program were used to identify low-income households with children between the ages of five and eight. SNAP is administered by the Oregon Department of Human Services (DHS). Oregon's SNAP program has one of the highest participation rates in the nation, topping 90% for most of the last decade. The high rate of

participation allows the use of Oregon SNAP clients to represent Oregon's low-income residents as a whole. While some clients are eligible with incomes as high as 185% of the federal poverty level (FPL), as of September 2013, according to personal correspondence with DHS staff, 75% of Oregon SNAP recipients had incomes at or below FPL.

SNAP data were pulled from an integrated client services data warehouse. The warehouse contains de-identified information about clients in all DHS programs. Employment hours and earnings data for workers covered by the unemployment insurance system (aka "covered" employment) are available for all DHS clients through an agreement with the Oregon Employment Department. Each client is assigned a unique identification number that is constant across all program areas so that the full extent of program and employment participation for each client is known. Each client has a case number that allows household[2] grouping. The warehouse contains an extensive GIS component permitting precise address identification of clients from month to month.

Data were drawn for five cohorts of children who were receiving SNAP benefits, were five years of age in September of 2005 through 2009, and who received benefits continuously for the three subsequent years. This approach permitted us to confirm that we were studying persistently low-income families rather than having to assume it as the Census studies did. If a family had multiple receipt spans with each separated by one month of non-receipt, the separate spans were considered continuous and they were joined. We focused on low family income during the K-3 school years, but most of these children had been low income during the critical period described by Duncan et al. (2012): Seventy-seven percent of children in the cohorts had

[2] SNAP cases are called 'households.' We use 'family' and 'household' interchangeably in this paper.

been on SNAP prior to their fifth birthday, half had started at age three or younger, and 17% had been on SNAP since birth.

The study period continued through the period of the Great Recession, a time when long-distance geographic mobility of U.S. residents declined, but when local moving tended to increase (Stoll 2013). As a result, our descriptive estimates of the aggregate level of movement for low income children locally may be somewhat inflated and could have declined during the recent weak economic recovery. However, our regression models partially address this concern by including housing affordability.

Geographic characteristics data were added by assigning an x:y coordinate to the SNAP household's address of record. If coordinates could not be assigned using the SNAP address of record, other program records were searched to find a valid address that was effective for the date in question.[3] Next, the 2010 Census block and 2010-11 elementary school catchment areas were assigned to the coordinates. Virtually all of the children had addresses that could be reliably located for the three year period, even when they moved several times. The result was five cohorts of children (n=31,926) living in low-income households from the time that they would typically have started kindergarten up until the time that they would typically have started the third grade. We observed each cohort four times – at the beginning of each school year from kindergarten to third grade. We refer to these as either the "reference" children or "low income children" to retain focus on the fact that our sample includes only children officially designated as "poor" or "near poor" via enrollment in SNAP. However, our findings speak directly to the literature focused just on officially "poor" children since most of this SNAP population likely had household incomes below the poverty line at some point during the three years of

[3] Less than 1% of SNAP children are coded as homeless at any given time. Clients coded as homeless do not have addresses that can be reliably assigned to a coordinate and so were omitted from the analysis.

observation. One-third of reference children were in the same household as another reference child – either as a sibling or as part of a blended household. Three percent appeared to be twins and 0.1% appeared to be triplets.

A change in location was defined as a move that resulted in a change in census block. This definition was adopted to filter out false moves that result when an address error is corrected in the source data. The tradeoff was that using this definition no doubt understated the true number of reported moves when children's families moved within a neighborhood. The nearly 32,000 reference children occupied a total of 75,187 locations during the three elapsed years between starting kindergarten and starting the third grade.

Elementary school information for the reference children was included if the local school provided grades K-3. Ninety-six percent of the reference children (n=30,746) lived within the boundary of such a school. Reference children lived within the boundaries of 649 of Oregon's 669 public schools (96%) that offered grades K-3 during the 2010-11 school year. About three-quarters of Oregon's 5 to 19-year olds attend public schools (Oregon Department of Education 2013). The percentage is certainly higher for poor children since their families would not have the financial wherewithal to pay private school tuition. NCLB provided children with the opportunity to attend a "school of choice" if their own school failed to make AYP for two consecutive years. However, national participation in this program was reported to be just 1% (U.S. Department of Education 2009). Some districts provide in-district or out-of-district transfers to allow students to attend schools beyond their residential school catchment area or district. However, these transfers usually require the child to obtain private transportation, an additional burden that most poor families would not be able to afford. Therefore, our study assumes that a school change occurred when a child moved across a school boundary. Our

school mobility numbers are likely undercounted because school catchments were measured each September which would not count multiple school changes during a school year.

Data on the reference child, location, and household members were pulled for each September when the child was ages five through eight. Each child, then, had four observations (one for the initial observation and one for each of the three subsequent years) from which three year over year changes could be measured. The final data set contained information in six categories:

i. *Reference child information:* Gender and kindergarten cohort year. Language preference, race, and ethnicity were tabulated along with other household members

ii. *Household structure as of each September:* number of children and adults in the household, number of non-English speakers, number of non-white or Hispanic members (including reference child), gender and age of head of household

iii. *Covered employment and earnings for adults in household as of each September and pertaining to the preceding four quarters:* total wages paid, total hours worked, number of workers in the household and the North American Industrial Classification Code (NAICS) of the sector providing most of the household's earnings

iv. *Poverty level:* flagged if the child was on a TANF case during the preceding 12 months (in Oregon must be at or below 40% FPL to qualify for TANF)

v. *Geographic information as of each September:* 2010 Census ID for census block and county. Block data included the census urban/rural flag and tract data included the poverty rate, the percentage of renters paying 35% or more of their income on rent, and the percentage of renter-occupied units (2006-10 American Community Survey). County data included the OMB classification of Metropolitan, Micropolitan, or Non-core and the

average annual unemployment rate of each county for the four years that the cohorts were measured. Additionally, two raw counts of locations were recorded: all locations from birth to the September of grade 3 and all locations from the September of kindergarten (reference location) through the September of grade 3.[4]

vi. *2010-11 elementary catchment:* Primary school boundary containing reference child's residence as of September 1st of the years in which they would normally attend grades K-3. Each record included a flag for each year that a school was listed as needing improvement under NCLB or was identified as a *priority* or *focus* school pursuant to Oregon's 2012-13 Elementary and Secondary Education Schools Act (ESEA) waiver. Priority and focus schools are roughly analogous to schools needing improvement.

The resulting data set permits us to link family structure and status variables with both geographic and school moves. Other available data sets permit researchers to track intra-tract moves (such as the USPS Change of Address database) but without knowing about family income and structure, or they have detailed information about families, but they lack the geographical specificity which we have included.

Oregon Geography and Demographic Characteristics

The data draw from the entire state, but the majority of residents live in western Oregon in the Willamette Valley. This area is comprised of the Portland metro area (2.3 million out of Oregon's 3.9 million residents), with three disconnected cities of 75 to 150 thousand residents south of Portland along the Interstate 5 freeway. The Willamette Valley has continued to experience modest net in-migration from other parts of the state during the past decade (Oregon

[4] The total number of locations for each child was recorded, but the mobility analyses only considered whether or not the child moved during each year between grades K to 3. This allowed a full year to capture changes in work and household composition that may not have precisely predated each move.

Office of Economic Analysis 2013). In spite of the fact that most of Oregon's land mass is considered rural, the high level of urbanization in the Willamette Valley makes Oregon more comparable to other U.S. states than one might initially suspect. Approximately 80% of Oregon's residents live in urban locations, a rate very similar to that of the U.S. as a whole (U.S. Census Bureau 2014a). Oregon's Latino and Black populations are smaller than in the rest of the U.S. – 12% v. 17%, and 2% v. 12%, respectively (U.S. Census Bureau 2014b). So, in some respects, Oregon's geography and demographic make-up differ from many other states, and in other respects, there is much about the state which resembles the rest of the country. An analysis of Oregon children can be instructive for examining processes and patterns of mobility among low income children in one state, but additional studies of other states, using detailed data such as ours, are necessary.

Results

Characteristics of children and their households

The cohort size of reference children grew by 14% after the first year, and then by an average of 21% in each of the ensuing three years, coinciding in part with the start of the Great Recession (Table 1). Consequently, the 2009 cohort was double the size of the 2005 cohort. The last two cohorts were composed of a slightly lower percentage of single-adult households and a higher percentage of multiple-adult households. In 2009, Oregon experienced a large drop in employment that coincided with a large increase in SNAP caseload (Oregon Department of Human Services 2013).

Sixty-nine percent of the children lived in a household headed by a single adult and more than half lived with two or more other children. One-quarter lived in a household with a non-English speaker. Seventy-two percent lived in a household where an adult was employed for at

least one quarter, and more than one-third of those working adults earned most of their wages in the retail or health care/social assistance sectors.

[Table 1 here]

Our cohorts of low-income children were distinct from children in all Oregon households. Reference children lived in households averaging 4.2 persons compared to 2.5 persons for all Oregonians. Nearly two-thirds of them lived in households headed by a single female compared to 29% of all Oregon children. One quarter of adults in reference children's households during the first observation preferred a language other than English compared to 14% of all Oregonians (U.S. Census Bureau 2011). More than one-third of working adults in reference children's households were employed in health care/social assistance or retail trade, while 23% of all working Oregonians were employed in those sectors over the same years (Oregon Employment Department 2013). All in all, the persistently low-income children in the study were concentrated among households that face well-documented barriers to escaping poverty: a single mother with multiple children, limited English proficiency, and adults who work in economic sectors characterized by lower pay and part-time work.

Mobility patterns

The families of the children in our study were highly mobile with 59% having moved at least once between the child's start of kindergarten and third grade. On average, the children occupied 3.1 locations prior to kindergarten and 2.4 locations between kindergarten and third grade. Almost half (49%) of all reference children changed schools (or 79% of children who moved), and they lived in 1.7 school catchments on average. More than one-third of the children lived in a high-poverty census tract (poverty rate of 20% or higher) when they were kindergarten-age (Table 1).

Year over year comparisons were made from each child's four September observations, leaving three observations of change (n=95,778) regarding household composition, neighborhood characteristics, TANF history, adult employment, and location. The year over year migration patterns among low income children and their families reveal an overwhelming pattern of short-distance moves. Two-thirds of moves involved a change in census tract within the same county, 18% a change in county, and 15% a change in census block within the same tract. There was no discernible preference toward moving to a lower poverty tract, with 50% moving in that direction and 48% moving to a tract with a higher poverty rate. Similarly, there were negligible differences in the percentage of movers going from urban to rural versus rural to urban Census tracts. Cross-county moves showed slightly greater propensity for non-metro movers to go to metro counties, a pattern consistent with the overall trend of modest net in-migration to Oregon's more populated areas.

Reference children experienced a degree of mobility much greater than is typical for American children as a whole. Only 13% did not move between birth and third grade with five being the median number of locations. The distribution in the number of locations is right-skewed (skewness 1.3, s.e. 0.014), with a 90^{th} percentile of 11 locations and a 99^{th} percentile of 18 locations. A manual review of case notes of a few hyper-mobile cases in our data revealed an unstable housing pattern that included living with friends or relatives or at shelters or motels, particularly in the pre-school years. Such living arrangements are considered homelessness under some federal definitions. This pattern is consistent with Foulkes and Newbold's (2008) description of migration patterns among hyper-mobile low-income families in rural Illinois.

Hyper-mobility did not affect all children equally. Recall that children in our study were also concentrated among households where at least one member did not speak English.

Surprisingly, while reference children in English-speaking households had lived in an average 6 locations, children in non-English speaking households had lived in an average of 3.8 locations. This non-intuitive relative stability may be explained by the presence of cultural enclaves that attract non-English speakers. Such enclaves provide resources to help immigrants navigate a new culture, including access to friends and relatives with English skills that can provide translation services and other help during a family crisis. These cultural supports may provide a form of refuge and support that makes a move both more challenging and less necessary.

The school-referenced analysis omitted observations in which the child was residing in the catchment of a school that did not offer all grades K-3. Hence, school-referenced analysis children are a subset of the low income children included in our original sample. Among these students there was no clear pattern regarding the relationships of mobility and the designation of schools as being in need of improvement (as rated under the provisions of NCLB). One-fifth of moves involved going from a school that had ever been listed as in need of improvement to one that had not, and one-fifth of moves went in the opposite direction. Other mobility

[Table 2 here]

characteristics of the school analysis children are similar to all reference children (Table 2).

Factors associated with geographic and school mobility

Four logistic regression models were specified.[5] The first was a binary logistic regression predicting whether or not the child had moved since the prior September. This model, like subsequent ones, included out-of-school characteristics that may impact mobility. In Model 2 the dependent variable was school change (Table 3). In order to see if there were differences in

[5] 8,713 reference children shared a household *and* an observation date with one or more other reference children. One child was chosen at random from each of these 4,079 shared households and the others were omitted from the regression analyses. The regression analyses were then based on 27,292 reference children and 81,876 observations.

children that moved only once versus multiple times during the early elementary years, two additional models were specified. Using the tally of total locations between kindergarten and grade 3, each child was classified as one of three 'mover-types:' 1) did not move; 2) moved once; and 3) moved multiple times. Multiple-movers were omitted in Model 3 and single-movers were omitted in Model 4 (Table 4). None of the models were strongly predictive (Nagelkerke R^2 ranged from .05 to .19), but they do illuminate some of the factors that are associated with mobility among low income children.

[Tables 3 and 4 here]

In all models, a change in head of household more than doubled the odds of moving or changing schools. The *head of household* on a SNAP case is an adult that is the primary contact on the case. A new head of household may be selected any time the household composition changes. Otherwise, a change in head can only be made at the time of annual redetermination (OAR 2013). Changes in household composition could include marital dissolution or the breakup of intimate partners, consolidation or dissolution of multiple households, creation of stepfamilies, or the reference child moving to live with another household that is SNAP-eligible. Starting TANF during the prior twelve months increased the odds of moving 1.8 times and increased the odds of changing schools 1.6 times. For single-movers, starting TANF increased the odds of moving by 1.6 times and doubled the odds of moving for multiple-movers. Starting TANF during a year indicates that the family's income may have deteriorated to the point where they became TANF-eligible (below 40% FPL). In all models, starting TANF was more strongly associated with having moved than was ending TANF during the prior twelve months.

In Model 1 the dependent variable was having moved or not. After changing the head of household and starting TANF, the independent variables most strongly associated with having

moved were increasing the number of adults in the household (1.5 times more likely to have moved) and changing the major industry of employment (1.3 times more likely). The factors with the strongest association with not having moved included the number of adults in the household (29% less likely to have moved for each additional adult) and having a non-English speaker in the household (27% less likely to have moved).

In Model 2, the relationship between changing schools and the set of independent variables was similar to Model 1. Children living in non-metro counties were 28% less likely to change schools, possibly because school catchments in these areas tend to be larger and so require a longer-distance move to cross a school boundary. Notably, school quality appeared to have had no impact on low income children's mobility - a NCLB rating of "needs improvement" had no significant relationship with the odds of changing schools. Whether the rating occurred before or after the child attended the school was immaterial. Despite NCLB's emphasis on school choice, our model did not provide any evidence that school quality as measured by the law was an important factor associated with moving or staying in a given area (Table 3).

The same factors that were associated with moving in general were also important factors for predicting moves among children who moved only once (Model 3). One important distinction was that starting first grade increased the odds of having moved by 1.5 times and starting third grade decreased the odds of having moved by 25%. The preference for moving prior to first grade and staying for subsequent years remained regardless of which of the three binary *observation* variables was omitted from the model. Among the 6,922 children who moved only once, 44% moved between kindergarten and first grade, 32% moved between first and second grades, and 24% moved between second and third grades. This was the only instance in which our models suggested any school consideration associated with moving. For multiple movers, no

such preference was evident (Model 4). The same factors that were associated with moving in general were also associated with children who moved multiple times. For the 9,316 multiple-movers, the odds ratios for these important variables were further from zero than in the other models (Table 4).

Discussion

The evidence from our study documents the degree of residential, and perhaps more importantly, school mobility among low income children in Oregon. The dynamics that are associated with mobility among Oregon's low income children are likely to exist in other states as well. The high percentage of school mobility among young low income students supports the notion that child poverty not only impacts individual children as they develop, but it also impacts all children and their teachers. When children frequently move to and from schools, the "chaos" factor may substantially impact all who are present. Some factors associated with these moves are illuminated by this study.

The evidence from our study does not provide clear support for the differential opportunities theory for residential mobility. Among our explanatory variables, family dynamics, rather than economic opportunity, appeared to play the major role in residential mobility. Starting TANF indicates a loss of income or support while changing the head of household and increasing the number of adults suggest household change or consolidation. The quality or affordability of the neighborhood or the local unemployment rate were not important factors associated with moving. Among those who moved once, there appeared to be a preference for moving prior to the start of first grade and 'staying put' for the next two years.

The association between moving and variables pertaining to changes in household composition and finances may well be simultaneously determined and thereby introduce

endogeneity bias into the model. One way to control for this bias would be to replace potentially endogenous variables with suitable instruments (Fisher, 2005) or use residuals from auxiliary regressions (Terza, Basu, and Rathouz 2012). Fisher sought to determine whether rural residence was endogenous to poverty and was able to use instrument variables that were strongly predictive of rural residence and not directly predictive of poverty. Among the variables in the present data set the strongest predictors of starting TANF or changing the head of household were also significant predictors of having moved, making the use of instrument variables problematic. Another means of controlling for endogeneity would be to lag suspected variables. The data used in the current study do not lend themselves well to a lagged structure as measurements were taken annually and for many families similar changes occurred in consecutive years. For example 11% of children in this study lived in households where employment changes occurred in consecutive years. Future efforts could better control for endogeneity by measuring change quarterly rather than annually.

Missing-variable bias was another concern. Latent variables could be time-invariant (such as the educational attainment of the household head or the neonatal health of the child) or they could change over time (such as the household's poverty level or housing costs). To investigate the importance of potential unobservable time-invariant characteristics, a fixed effects model was specified. In this model repeated measures of children were acknowledged and all time-invariant variables were omitted. A change in head of household increased the odds of moving by 2.9 times in the fixed effects model compared to 2.7 times in Model 1. Starting TANF increased the odds of moving by 1.5 times in the fixed effects model compared to 1.8 times in Model 1. These results suggest that any unobserved variable bias may derive from measures that can change over time.

Policy implications

While much research has documented the effect of mobility on individual students' test scores, the effect of mobility on overall school test scores is an important question still to be answered. A quarter century of research has documented the detrimental effects of school mobility on achievement, yet federal policy such as No Child Left Behind does not adequately consider this nor are school turnover measures widely available. Schools tabulate standardized test outcomes for many subsets of children including economically disadvantaged, English language learners, students with disabilities, racial and ethnic groups and gender. In spite of the long-standing recognition of school mobility as a challenge to achievement, highly mobile students are not a subset for whom achievement is specifically tabulated. Indeed, states have some flexibility in determining the minimum number of days that students must attend in order to have their scores reported, and hence may less systematically report on highly mobile children. But tested or not, students' mobility can affect their own academic success and that of their classmates.

The McKinney-Vento Homeless Assistance Act (incorporated into NCLB) provides special assistance for educating homeless children and youths. McKinney-Vento's definition of homeless is broad, even covering children who are sharing housing with others due to economic circumstances. It is highly likely that some of the low income children described in this study were eligible for and received McKinney-Vento services. However, McKinney-Vento's focus on living arrangements can make identifying homeless children difficult as some families are not forthcoming with information. School personnel may require some time to observe the student and then inquire as to the living situation (National Center on Homeless Education, 2013). Our study illustrates that residential and school mobility among low income children happens

frequently and appears to be associated with fairly turbulent circumstances regardless of whether or not the move resulted in a 'doubling up' or a temporary living arrangement. This turbulence may explain why a recent comparison of mobile students versus homeless non-mobile students showed that the former had greater academic and social challenges than the latter (Fantuzzo et al. 2012). Those authors also recommended educational policies specifically directed to highly mobile students. Given that our single-mover households appeared to give some consideration to school matters in their mobility decision, our research suggests that, for early elementary children, more than one move since starting kindergarten might define 'highly mobile.'

Policy-makers should consider expanding McKinney-Vento services to children who are low-income *and* highly mobile. This change would enable school personnel to extend services to children at the time they enroll without the need to assess the child's current living situation. It would also likely lead to published measures of student turnover and possibly greater recognition of its effects in annual measures of school and student performance. A more holistic approach would also target housing supports to low income families with young children, possibly avoiding some mobility in the first place. It is likely that many more students would be eligible for service through expanding McKinney-Vento and housing services, and that cost increases to the federal government, state governments, and local school districts would follow. To counter the cost argument we end where we started: the lifelong costs of child poverty, $500 billion per year.

References

Anyon, Jean and Kiersten Greene. 2007. "No Child Left Behind as an Anti-poverty Measure." *Teacher Education Quarterly* 34(2):157- 162.

Berliner, David C. 2009. *Poverty and Potential: Out-of-School Factors and School Success.* Boulder, CO: Education and the Public Interest Center & Education Policy Research Unit. Retrieved July 8, 2013 from http://nepc.colorado.edu/files/PB-Berliner-NON-SCHOOL.pdf.

Blank, Rebecca. 1997. *It Takes a Nation: A New Agenda for Fighting Poverty*. Princeton, NJ: Princeton University Press.

Brooks-Gunn, Jeanne and Greg Duncan. 1997. "The Effects of Poverty on Children." *Children and Poverty* 7(2):55-71.

Burkam, David T., Lee, Valerie E., and Julie Dwyer. 2009. "School Mobility in the Early Elementary Grades: Frequency and Impact from Nationally-Representative Data." Retrieved November 22, 2013 from http://pop.visionforchildren.org/dmdocuments/QE-School_Mobility in_the_Early_Elementary_Grades.pdf.

Coleman, James S. 1966. *Equality of Educational Opportunity.* Retrieved April 17, 2014 from http://files.eric.ed.gov/fulltext/ED012275.pdf.

Dukes, Lavan. 2009. *Student Mobility in Primary Grades in Florida.* Presentation retrieved July 17, 2013 from http://www.iom.edu/~/media/Files/Activity%20Files/Children/ ChildMobility/5%20Dukes%20Presentation%20to%20Post%20Online.ashx.

Duncan, Greg., Katherine Magnuson, Ariel Kalil, and Kathleen Ziol-Guest. 2012. "The Importance of Early Childhood Poverty." *Social Indicators Research* 108:87-98.

Fantuzzo, J.W., LeBoeuf, W.A., Chen, C.-C., Rouse, H.L. and Culhane, D.P. 2012. "The Unique and Combined Effects of Homelessness and School Mobility on the Educational Outcomes of Young Children." *Educational Researcher* 41:393-402.

Fisher, Monica 2005. "On the Empirical Finding of a Higher Risk of Poverty in Rural Areas: Is Rural Residence Endogenous to Poverty?" *Journal Agricultural and Resource Economics* 30(2):185-99.

Foulkes, Matt and Bruce Newbold. 2008. "Poverty Catchments: Migration, Residential Mobility, and Population Turnover in Impoverished Rural Illinois Communities." *Rural Sociology* 73(3):440-462.

Foulkes, Matt and Kai Schafft. 2010. "The Impact of Migration on Poverty Concentrations in the United States, 1995-2000." *Rural Sociology* 75(1):90-110.

Holzer, Harry, Diane Schanzenbach, Greg Duncan, and Jens Ludwig. 2008. "The Economic Costs of Child Poverty in the United States." *Journal of Children and Poverty* 14(1): 41-61.

Iceland, John and Kurt Bauman. 2007. "Income Poverty and Material Hardship: How Strong is the Association?" *Journal of Socio-Economics* 36:376-396.

Lash, Andrea and Sandra Kirkpatrick. 1990. "A Classroom Perspective on Student Mobility." *The Elementary School Journal* 91(2):177-191.

National Center on Homeless Education. 2013. *Potential Warning Signs of Homelessness.* Retrieved October 25, 2013 from http://center.serve.org/nche/nche/warning.html.

Nord, Mark. 1998. "Poor People on the Move: County to County Migration and the Spatial Concentration of Poverty." *Journal of Regional Science* 38(2):329-351.

OAR. 2013. Oregon Administrative Rule 461-001-0015, paragraphs 14a and 14b, retrieved November 1, 2013 from http://apps.state.or.us/caf/arm/A/461-001-0015.htm.

Oregon Department of Education. 2013. *Statewide Report Card 2011-2012.* Retrieved July 11, 2013 from http://www.ode.state.or.us/data/annreportcard/rptcard2012.pdf.

Oregon Department of Human Services. 2013. *Spring 2013 DHS/OHA Caseload Forecast.* Retrieved June 30, 2013 from http://www.oregon.gov/dhs/ofra/ofradocuments/Spring %202013%20Forecast.pdf.

Oregon Employment Department. 2013. *Oregon Annual Average Nonfarm Employment.* Retrieved September 11, 2013 from http://www.qualityinfo.org/olmisj/CES.

Oregon Office of Economic Analysis 2013. "Migration". Retrieved March 23, 2014 at http://oregoneconomicanalysis.com/2013/08/29/migration/.

Quillian, Lincoln. 1999. "Migration Patterns and the Growth of High-Poverty Neighborhoods, 1970-1990." *American Journal of Sociology* 105(1):1-36.

Rumberger, Russell W. 2003. "The Causes and Consequences of Student Mobility." *Journal of Negro Education* 72(1):6-21.

Schwartz, Amy E., Leanna Stiefel, and Luis Chalico. 2009. *The Multiple Dimensions of Student Mobility and Implications for Academic Performance: Evidence from New York City Elementary and Middle School Students.* Retrieved July 17, 2013 from http://papers.ssrn.com/sol3/papers. cfm?abstract_id=1508603.

Stoll, Michael A. 2013. "Great Recession Spurs a Shift to Local Moves." US2010 Project. Retrieved March 27, 2014 from http://www.s4.brown.edu/us2010/Data/ Report/report02202013.pdf.

Terza, Joseph V., Basu, Anirban, and Rathouz, Paul J. 2009. "Two-Stage Residual Inclusion Estimation: Addressing Endogeneity in Health Econometric Modeling." Retrieved April 2, 2014 from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2494557/.

Tucker, C. Jack., Jonathan Marx. and Larry Long. 1998. "'Moving On': Residential Mobility and Children's School Lives." *Sociology of Education* 71:111-129.

U. S. Census Bureau. 2014a. "Table H2: Urban and Rural: 2010", *United States Census 2010*. Washington: US Census Bureau. Retrieved March 27, 2014 from http://factfinder2. census.gov/faces/ tableservices/jsf/pages/productview.xhtml? pid=DEC_10_SF1_ H2&prodType=table.

U.S. Census Bureau. 2014b. "US State and County QuickFacts." *United States Census 2010*. Washington: US Census Bureau. Retrieved August 12, 2014 from http://quickfacts. census.gov/qfd/states/41000.html.

U.S. Census Bureau. 2011, American Community Survey (ACS) 2006-2010 five year estimates. Tables S1101, S0901, DP04, and S1601.

U.S. Department of Education. 2009. *State and Local Implementation of the No Child Left Behind Act, Volume VII—Title I School Choice and Supplemental Educational Services: Final Report*. Retrieved September 11, 2013 at http://www2.ed.gov/rschstat/eval/choice/nclb-choice-ses-final/choice-ses-final.pdf.

Voss, Paul R., Roger Hammer, and Ann Meier. 2001. "Migration Analysis: A Case Study for Local Public Policy." *Population Research and Policy Review* 20(6):587-603.

Wilson, William J. 1987. *The Truly Disadvantaged: The Inner City, the Underclass, and Public Policy*. Chicago, IL: University of Chicago Press.

Wood, David, Neal Halfon, D. Scarlata, Paul Newacheck, and S. Nessim. 1993. "Impact of Family Relocation on Children's Growth, Development, School Function, and Behavior." *JAMA, The Journal of the American Medical Association* 270(11):1334-8.

Xu, Zeyu., Jane Hannaway, and Stephanie D'Souza. 2009. "Student Transience in North

Carolina: The Effect of School Mobility on Student Outcomes Using Longitudinal Data." Working Paper 22. National Center for Analysis of Longitudinal Data in Education Research. Retreived July 8, 2013 from http://www.eric.ed.gov/PDFS/ED509673.pdf.

Yoshikawa, Hirokazu, J. Lawrence Aber, and William R. Beardslee. 2012. "The Effects of Poverty on the Mental, Emotional, and Behavioral Health of Children and Youth." *American Psychologist* 6:272-284.

Table 1: Characteristics of Oregon poor children and their households[1]

	Cohort					
	2005	2006	2007	2008	2009	Total
Number of children	4,453	5,091	6,018	7,404	8,960	31,926
Female	47.8	48.1	48.9	49.1	50.5	49.1
African-American (non-Hispanic/non Spanish speaking)	7.2	6.7	6.3	5.7	4.7	5.9
White (non-Hispanic/non-Spanish-speaking)	55.8	56.3	54.6	53.7	53.5	54.5
Other (non-Hispanic/non-Spanish-speaking)	5.2	4.6	5.0	4.8	5.1	4.9
Hispanic/Latino or Spanish-speaking (any race)	21.4	22.7	24.5	24.8	25.9	24.2
No race or ethnicity specified	10.4	9.7	9.6	11.0	10.7	10.4
Non-English language preference	22.7	23.1	25.0	24.8	25.9	24.6
Children living in a household with (year 1)						
Single adult	70.9	70.1	70.4	68.6	66.8	69.0
Multiple adults	29.1	29.9	29.6	31.4	33.2	31.0
Only child	13.2	12.1	12.1	12.6	13.5	12.8
2 children	33.6	33.5	33.1	33.0	33.2	33.3
3 or more total children	53.2	54.4	54.8	54.4	53.3	54.0
Average household size	4.1	4.2	4.2	4.2	4.2	4.2
Average age of head of household	31.3	31.1	31.2	31.3	31.3	31.2
Received TANF at any time during study period	16.3	17.1	17.6	18.7	19.7	18.2
Adult in household worked at any time in study period	75.3	73.4	73.0	71.6	69.6	72.1
Average number of years in which an adult worked[2]	2.4	2.3	2.3	2.2	2.1	2.2
Percent of working adults with major employment in health care and social assistance or retail trade[3]	35.3	34.5	35.9	37.0	35.4	35.7
Child moved at least once during study period	59.2	62.3	61.6	60.1	55.6	59.4
Child moved across a school boundary " "[4]	48.5	51.0	51.0	49.5	45.1	48.7
Average number of locations during study period	2.3	2.4	2.4	2.4	2.2	2.4
Average number of school catchment areas " "[4]	1.7	1.8	1.8	1.7	1.6	1.7
Average number of locations between birth and reference	3.5	3.4	3.4	2.9	2.7	3.1
Reference location in high poverty census tract (>=20%)	35.8	36.4	35.4	35.1	35.2	35.5
Resided in a census-designated rural area at least once	16.1	17.0	17.0	17.2	16.8	16.9
Lived within the boundary of an *improvement status* school[5]	35.5	34.4	35.0	33.7	34.2	34.4

1. All counts are percentages unless otherwise noted. N=31926.
2. Work was measured for the year ending at the observation date (September 1).
3. NAICS=North American Industrial Classification System. Health care and social assistance includes NAICS code starting with 62 and retail trade includes those starting with 44 or 45. These sectors were the most common among working adults in all cohorts.
4. School boundaries were measured each September, so multiple school changes during a year are omitted (N=30,746).
5. School was on improvement status or was a priority or focus school at any time between 2004-5 and 2012-13 (N=30,746).

Table 2: Characteristics of moves

	All reference children	Reference children in school analysis
Number of children	31,926	30,746
Total observations (cohort years 2-4)	95,778	90,656
Number of moves	28,134	26,358
Percent moving from urban to rural block group	7.1	6.9
Percent moving from rural to urban block group	6.6	6.3
Percent moving from urban to urban block group	82.2	82.6
Percent moving from rural to rural block group	4.1	4.2
Number of inter-tract moves	18,766	17,739
Percent moving to a lower-poverty tract	49.9	49.8
Percent moving to a higher-poverty tract	47.8	48.0
Percent moving to a more affordable tract[1]	50.0	49.7
Percent moving to a less affordable tract	49.6	49.8
Percent moving to a tract with lower proportion of renter-occupied units	51.6	51.5
Percent moving to a tract with higher proportion of renter-occupied units	48.4	48.5
Number of inter-county moves	5,043	4,594
Percent moving from a metro to non-metro county	11.4	10.9
Percent moving from a non-metro to metro county	13.5	13.4
Percent moving from a metro to metro county	67.5	68.7
Percent moving from a non-metro to non-metro county	7.6	7.0
Percent moving to a county with lower unemployment rate	40.8	40.9
Percent moving to a county with higher unemployment rate	57.8	57.7
Number of inter-school moves[2]		21,764
Percent moving from a *needs improvement (NI)* school to a *~needs improvement (~NI)* school[3]		19.8
Percent moving from ~NI to NI school		19.7
Percent moving from ~NI to ~NI school		46.2
Percent moving from NI to NI school		14.3

1. A 'more affordable' tract had a lower percentage of renters paying 35% or more of their gross income on rent. A 'less affordable' tract had a higher percentage of renters paying 35% or more of their gross income on rent.
2. School boundaries were observed each September, so multiple school changes during a year are omitted (N=30,746).
3. School was on improvement status or was a priority or focus school at any time between 2004-5 and 2012-13 (N=30,746).

Table 3: Results of logistic regressions predicting geographic and school mobility[1]

	Model 1					Model 2				
Independent Variable	B	S.E.	Wald	Sig.	Exp(B)	B	S.E.	Wald	Sig.	Exp(B)
Child										
Gender	0.00	0.02	0.09	0.76	1.00	0.00	0.02	0.00	0.98	1.00
Age cohort										
Kindergarten in 2005	-0.03	0.03	1.06	0.30	0.97	-0.03	0.03	1.01	0.31	0.97
Kindergarten in 2006	0.07	0.03	5.41	0.02	1.07	0.04	0.03	1.69	0.19	1.04
Kindergarten in 2008	-0.01	0.03	0.10	0.75	0.99	-0.04	0.03	1.48	0.22	0.96
Kindergarten in 2009	-0.13	0.03	20.49	0.00	0.88	-0.15	0.03	23.45	0.00	0.86
Observation[2]										
Entering Grade 1	0.20	0.02	98.47	0.00	1.22	0.19	0.02	76.64	0.00	1.21
Entering Grade 3	-0.20	0.02	94.49	0.00	0.82	-0.18	0.02	64.09	0.00	0.83
Household characteristics										
Age of household head	-0.03	0.00	398.71	0.00	0.97	-0.02	0.00	262.52	0.00	0.98
Non-English speaker[3]	-0.31	0.02	184.89	0.00	0.73	-0.32	0.03	157.41	0.00	0.73
Non-white member[3]	0.00	0.03	0.02	0.90	1.00	0.08	0.03	8.78	0.00	1.09
Number of adults	-0.34	0.02	293.19	0.00	0.71	-0.33	0.02	223.48	0.00	0.72
Number of children	-0.02	0.01	6.76	0.01	0.98	-0.01	0.01	2.65	0.10	0.99
Fewer adults	0.19	0.04	23.77	0.00	1.21	0.16	0.04	14.11	0.00	1.18
More adults	0.41	0.04	98.86	0.00	1.51	0.29	0.05	41.65	0.00	1.34
Fewer children	0.21	0.04	30.81	0.00	1.24	0.24	0.04	32.42	0.00	1.27
More children	0.20	0.03	53.43	0.00	1.22	0.20	0.03	46.46	0.00	1.22
Change in head	0.99	0.05	391.42	0.00	2.70	0.89	0.05	295.80	0.00	2.44
Number of pre-K locations	0.13	0.00	2193.74	0.00	1.14	0.13	0.00	1872.70	0.00	1.14
TANF history										
Started during year	0.58	0.04	169.65	0.00	1.79	0.50	0.05	105.01	0.00	1.64
Stopped during year	0.27	0.04	44.33	0.00	1.31	0.20	0.04	21.02	0.00	1.23
Employment history										
Change in NAICS[4]	0.29	0.02	165.30	0.00	1.34	0.28	0.02	130.23	0.00	1.33
More workers	0.15	0.03	23.62	0.00	1.16	0.15	0.03	20.03	0.00	1.17
Fewer workers	0.13	0.03	19.28	0.00	1.14	0.13	0.03	15.28	0.00	1.14
Increased earnings	0.01	0.02	0.40	0.53	1.01	0.00	0.03	0.00	0.99	1.00
Decreased earnings	0.08	0.02	10.19	0.00	1.08	0.07	0.03	7.24	0.01	1.08
Place characteristics[5]										
Poverty rate	0.00	0.00	4.54	0.03	1.00	0.00	0.00	7.78	0.01	1.00
Affordability	0.00	0.00	1.43	0.23	1.00	0.00	0.00	0.92	0.34	1.00
Percent rentals	0.00	0.00	22.37	0.00	1.00	0.00	0.00	34.97	0.00	1.00
In a rural block group	-0.04	0.03	1.55	0.21	0.97	-0.18	0.03	28.70	0.00	0.84
In a non-metro county	0.02	0.02	0.91	0.34	1.02	-0.33	0.03	146.87	0.00	0.72
County unemployment rate	0.02	0.00	15.24	0.00	1.02	0.02	0.00	14.40	0.00	1.02
School boundary[5]										
NI prior to attendance[6]						-0.02	0.03	0.41	0.52	0.98
NI after attendance						0.01	0.02	0.23	0.63	1.01
Constant	-0.35	0.08	21.03	0.00	0.71	-0.71	0.08	72.62	0.00	0.49

1. Model 1 is a binary logistic regression with dependent variable 1=move, 0=did not move. Nagelkerke R^2 =.12; degrees of freedom (df)=1. Model 2 is a binary logistic regression with dependent variable 1= crossed a school boundary, 0=did not cross a school boundary. Nagelkerke R^2 =.11; df=1. A move is defined as a change in census block, tract, or county.
2. Measurements were taken in consecutive Septembers when child would have started grades 1 through 3; comparisons were made to the prior September.
3. These measures include the subject child.
4. The major industry of employment for the household for the twelve months immediately preceding the current observation, measured at the six-digit NAICS level, did not equal the major industry of employment for the twelve months immediately preceding the prior observation.
5. Characteristics of the block group, tract, school boundary, and county are based on the prior September.
6. NI=school given a rating of "Needs Improvement."

Table 4: Results of logistic regressions predicting one or more moves[1]

	Model 3: moved once					Model 4: moved two or more times				
Independent Variable	B	S.E.	Wald	Sig.	Exp(B)	B	S.E.	Wald	Sig.	Exp(B)
Child										
Gender	0.04	0.03	1.86	0.17	1.04	0.01	0.02	0.20	0.65	1.01
Age cohort										
Kindergarten in 2005	-0.05	0.05	1.23	0.27	0.95	-0.03	0.04	0.65	0.42	0.97
Kindergarten in 2006	0.07	0.05	2.47	0.12	1.08	0.08	0.03	5.82	0.02	1.09
Kindergarten in 2008	0.01	0.04	0.10	0.75	1.01	-0.03	0.03	0.75	0.39	0.97
Kindergarten in 2009	-0.07	0.05	2.27	0.13	0.93	-0.19	0.03	31.78	0.00	0.83
Observation[2]										
Entering Grade 1	0.38	0.03	144.10	0.00	1.46	0.06	0.02	6.95	0.01	1.07
Entering Grade 3	-0.28	0.04	64.75	0.00	0.75	-0.14	0.02	32.08	0.00	0.87
Household characteristics										
Age of household head	-0.02	0.00	75.30	0.00	0.98	-0.04	0.00	523.09	0.00	0.96
Non-English speaker[3]	-0.18	0.03	26.68	0.00	0.84	-0.46	0.03	258.86	0.00	0.63
Non-white member[3]	0.02	0.04	0.23	0.63	1.02	-0.01	0.03	0.04	0.84	0.99
Number of adults	-0.23	0.03	52.19	0.00	0.80	-0.46	0.02	341.61	0.00	0.63
Number of children	0.00	0.01	0.11	0.74	1.00	-0.03	0.01	12.01	0.00	0.97
Fewer adults	0.14	0.07	4.48	0.03	1.16	0.19	0.05	15.85	0.00	1.21
More adults	0.35	0.07	26.62	0.00	1.42	0.49	0.05	98.16	0.00	1.63
Fewer children	0.07	0.07	1.11	0.29	1.07	0.29	0.05	40.44	0.00	1.34
More children	0.10	0.04	5.38	0.02	1.11	0.28	0.03	72.02	0.00	1.32
Change in head	0.83	0.09	93.90	0.00	2.29	1.06	0.06	328.22	0.00	2.88
Number of pre-K locations	0.08	0.01	273.07	0.00	1.09	0.17	0.00	2648.70	0.00	1.19
TANF history										
Started during year	0.49	0.07	45.37	0.00	1.63	0.67	0.05	157.48	0.00	1.95
Stopped during year	0.21	0.07	9.79	0.00	1.23	0.34	0.05	48.53	0.00	1.40
Employment history										
Change in NAICS[4]	0.19	0.04	24.64	0.00	1.21	0.36	0.03	179.44	0.00	1.44
More workers	0.04	0.05	0.55	0.46	1.04	0.19	0.04	26.78	0.00	1.21
Fewer workers	0.04	0.05	0.49	0.48	1.04	0.18	0.04	26.70	0.00	1.20
Increased earnings	0.07	0.04	3.40	0.07	1.07	0.03	0.03	0.76	0.38	1.03
Decreased earnings	0.07	0.04	3.05	0.08	1.07	0.10	0.03	10.95	0.00	1.10
Place characteristics[5]										
Poverty rate	0.00	0.00	1.94	0.16	1.00	0.00	0.00	8.83	0.00	1.00
Affordability	0.00	0.00	0.57	0.45	1.00	0.00	0.00	2.25	0.13	1.00
Percent rentals	0.00	0.00	15.90	0.00	1.00	0.00	0.00	21.33	0.00	1.00
In a rural block group	-0.10	0.05	4.40	0.04	0.90	-0.03	0.03	0.70	0.40	0.97
County unemployment rate	0.01	0.04	0.08	0.78	1.01	0.03	0.03	1.11	0.29	1.03
Constant	0.01	0.01	4.43	0.04	1.01	0.02	0.01	21.13	0.00	1.02

1. Model 3 is a binary logistic regression with dependent variable 1=move, 0=did not move and omitting children who moved multiple times. Nagelkerke R^2 =.05; degrees of freedom (df) =1. Model 4 is binary logistic regression with dependent variable 1=move, 0=did not move and omitting children who moved once. Nagelkerke R^2 =.19; df=1. A move is defined as a change in census block, tract, or county. There were 6,922 single-movers, 9,316 multiple-movers, and 11,054 non-movers.
2. Measurements were taken in consecutive Septembers when child would have started grades 1 through 3; comparisons were made to the prior September.
3. These measures include the subject child.
4. The major industry of employment for the household for the twelve months immediately preceding the current observation, measured at the six-digit NAICS level, did not equal the major industry of employment for the twelve months immediately preceding the prior observation.
5. Characteristics of the block group, tract, school boundary, and county are based on the prior September.