



# SCHOOL CHARACTERISTICS AND STUDENT MOBILITY IN DETROIT



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## **RESEARCH NOTE**

This research result used data structured and maintained by the MERI-Michigan Education Data Center (MEDC). MEDC data is modified for analysis purposes using rules governed by MEDC and are not identical to those data collected and maintained by the Michigan Department of Education (MDE) and/or Michigan's Center for Educational Performance and Information (CEPI). Results, information and opinions solely represent the analysis, information and opinions of the author(s) and are not endorsed by, or reflect the views or positions of, grantors, MDE and CEPI or any employee thereof.

## **WE WANT TO HEAR FROM YOU**

This is the second report from the Detroit Education Research Partnership related to student mobility within the City of Detroit. This research was conducted to support educators, policymakers, and community organizations in their efforts to improve educational outcomes for Detroit students. We want to hear from you about whether this research helped you in your work and what other questions you have. Please go to <https://education.wayne.edu/detroit-education-research-partnership> to learn more and give us your feedback.

## **REFERENCE FOR THIS REPORT**

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# STUDENT MOBILITY IN DETROIT: SCHOOL CHARACTERISTICS AND STUDENT MOBILITY IN DETROIT

## COLLABORATIVE POLICY RESEARCH

This research is the result of a collaboration between Wayne State University's College of Education and a constellation of community partners interested in improving Detroit schools, called the Detroit Education Research Partnership. We orient our work around the pressing policy needs of the Detroit education community, and we seek to inform the design of local educational reforms. We believe that education reform in other places has important lessons for our collective work in Detroit, but any solution for Detroit will have to respond to the unique strengths and needs of our community.

Over 20 percent of Detroit resident students made a non-routine school move between the 2016-17 and the 2017-18 school year. Additionally, approximately 7 percent of Detroit resident students made a school move during the 2017-18 school year. At the student-level, a non-routine move (e.g., not the result of matriculating from an elementary/junior high to a high school) has the potential to negatively impact academic progress, and high rates of student mobility at the school level have the potential to negatively impact school organizational effectiveness. The frequent movement of students throughout the Metro Detroit region has created an unstable learning environment for thousands of Detroit resident students, exacerbating many of the challenges faced by students and schools in the city. It is essential that educational leaders at the City and State levels work to create a more stable educational environment for Detroit resident students.

## MAJOR FINDINGS

- Within- and between-year mobility was particularly high among Detroit resident students compared to other students in Metro Detroit.
- Students were less likely to make a within-year move if they attended a school categorized as having a high rating in organizational climate, as measured by the 5Essentials surveys.
- Rates of school-level chronic absence were associated with both within- and between-year mobility, suggesting that other elements of school organizational climate may influence student movement.
- On average, mobile students were not moving to schools that were significantly different from the ones they left in many observable school characteristics.
- A larger proportion of between-year mobile students moved from a DPSCD school to a charter school, but a larger proportion of within-year mobile students moved from a charter school to a DPSCD school, with financial implications for the losing districts.

Download the full report and see all of our research at <http://go.wayne.edu/DetEdResearch>

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**F**amilies in large urban school districts in America have more school options than ever before. However, when families choose to move their children to a new school, they risk the negative consequences of mobility on student performance. Therefore, it is critical to better understand why students make non-routine school moves and which schools they move to, in order to inform school improvement efforts and policy in a school choice landscape. This study combines school- and student-level data from one of the most active school choice cities in America – Detroit – to understand how school characteristics are associated with student mobility.

The expansion of school choice policies has ensured that many families have a myriad of K-12 school options to choose from. In addition to the belief that choice allows parents and students to find the school that is the best fit for them, advocates for expanded school choice suggest that competition for students puts needed pressure on all schools to improve in order to attract and retain students (e.g., Hoxby, 2003). However, research has shown that in some circumstances, moving between schools can disrupt the education process for a student and reduce achievement growth and other outcomes (Engec, 2006; Herbers et al., 2012; Lleras & McKillip, 2017; Mehana & Reynolds, 2004), and that high rates of student mobility disrupt the learning environment and lead to less effective education (Entwistle & Ramsden, 2015; Rumberger, 2003; South, Haynie, & Bose, 2007).

Because of the potential discrepancies between the theoretical benefits of market based school choice and the impact on students and school systems, it is important to better understand factors associated with student mobility. Building upon a report released in April 2019 which focused primarily on student-level factors associated with mobility (Lenhoff, Pogodzinski, Singer, & Cook, 2019), this report aims to fill in some of these gaps in the research by identifying the association between school characteristics (student demographics, teacher experience and retention, organizational climate, and school neighborhood environment) and student mobility in Detroit. Certain aspects of the school environment have previously been found to be related to important student outcomes, such as student achievement growth and attendance (e.g., Bryk et al., 2010; Pogodzinski & Lenhoff, 2018), which may influence parental/student preferences for particular school environments.



To better understand factors associated with student mobility in Detroit, we couple student- and teacher-level administrative data from the State of Michigan’s Center for Education Performance and Information (CEPI) with publicly available school- and community-level data. Specifically, we have data for every student and teacher in Wayne, Oakland, and Macomb County for the years 2010-2018. We examine both non-routine moves between schools within a given school year and non-routine moves between school years. For within school year moves, we coded students as a mover if they were attending a different school at the end of year than they were in the fall of the same year. For between school year moves, we coded a student as a mover if they were attending a different school in Fall (year  $t$ ) than the end of the previous school year (year  $t-1$ ), and if the move was “non-routine”, defined as any move not necessitated by a school closure or matriculating out of a school (e.g., switching from a junior high school building to a high school building). Students who made a “routine” move due to school closure or matriculation were excluded from the analysis.

For the analysis with between-year mobility as the outcome, we excluded all students transitioning to the 9th grade in 2015-16. Less than half of these students attended a school that included both an eighth grade and ninth grade in the same building (making them eligible to make a non-routine move). Of the 9th graders in schools that served both 8th and 9th grades, approximately 74% made a non-routine move, while only approximately 18% of students in all other grades made a non-routine move. There seems to be something very unique about this group, and although this 9th grade “effect” deserves additional attention, it falls out of the scope of this study and therefore these outliers were excluded from the analysis.

We began the analysis by examining trends in student mobility by geographic location and school type, using data from the 2010-11 to 2017-18 school years. Then, using only data for Detroit residents attending schools in Detroit, we estimated a series of multi-level logistic regressions to identify the association between school characteristics and the likelihood that a student changed schools, controlling for student-level characteristics.

For the regression analysis, we used data from the 2014-15 and 2015-16 school years because we had the most robust measures of school



characteristics. Specifically, through a partnership with Excellent Schools Detroit, the vast majority of schools in Detroit administered the 5Essentials Surveys during this time period. The surveys were designed to measure organizational climate across five domains: a) effective leadership, b) collaborative teachers, c) ambitious instruction, d) supportive environment, and e) involved families (Bryk et al., 2010). For this analysis, we used a composite measure of a school's 5Essentials rating, taking the average of ratings across the five domains (measured on a scale of 0-99). In addition to the 5Essentials ratings, we also included the following school characteristics: a) average math z-score, b) percent students who were chronically absent, c) student discipline rate from Office of Civil Rights data (suspensions/expulsions), d) percent of students who were economically disadvantaged, e) teacher return rate, f) percent of teachers in the first three years of the profession, g) number of neighborhood crimes around the school, and h) percent vacant buildings in the school neighborhood.

We also controlled for whether a student attended a charter school or a school in the Education Achievement Authority (EAA). The EAA was an education system created through an inter-local agreement between the State of Michigan, Detroit Public Schools, and Eastern Michigan University, and took over operation of several schools previously under the jurisdiction of the Detroit Public Schools. The EAA began operation in 2011 and ended in 2017 when the schools were turned over to the Detroit Public Schools Community District.

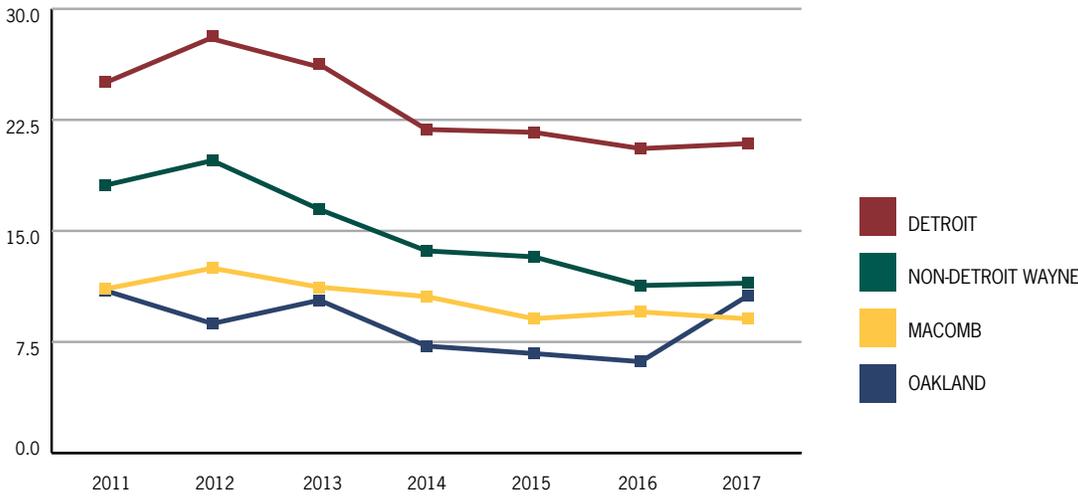
To help with ease of interpretation, for each of these continuous measures of school-level characteristics, we created categories of “low”, “median/mean-range”, and “high”. For variables that were not normally distributed, a school was rated “low” if it was more than one-quarter of the inter-quartile range below the median, and a school was rated “high” if it was more than one-quarter of the inter-quartile range above the median. For variables that were normally distributed, a school was rated as “low” if it was more than a quarter of a standard deviation below the mean, and rated high if it was more than a quarter standard deviation above the mean. For all of the regressions, the median/mean range was the reference category.

Lastly, we compared the average characteristics of schools that students left with the ones that they moved to. In other words, we sought to identify whether or not students were moving to schools that were fundamentally different in observable characteristics from the ones they previously attended.

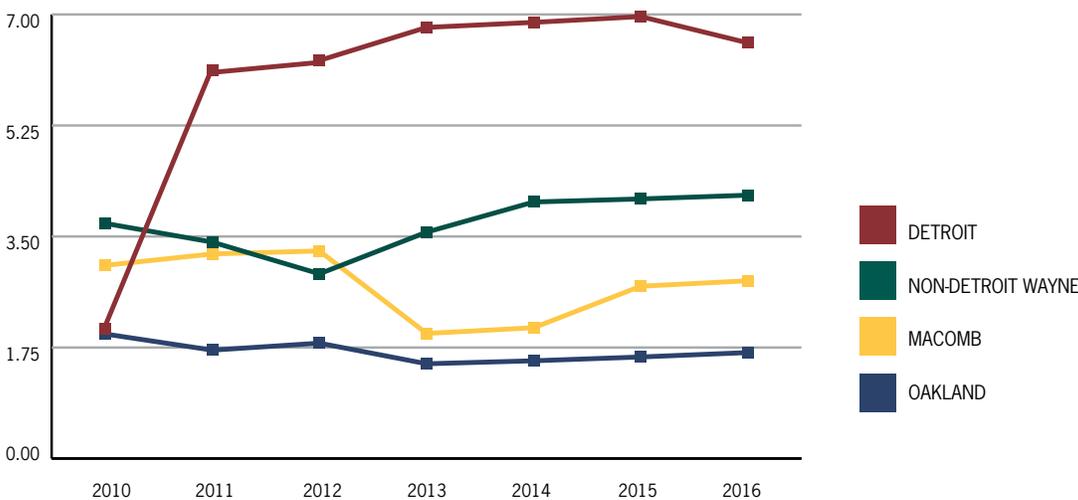


As shown in Figures 1 and 2, the within-year and between-year student mobility rates were significantly higher for Detroit resident students compared to their counterparts in Oakland, Macomb, and the remainder of Wayne County. For example, between the 2016-17 and 2017-18 school years, the non-routine between-year mobility rate for Detroit resident students was approximately 10 percentage points higher than for Oakland County and other Wayne County residents. The within-year student mobility rate for Detroit residents during the 2017-18 school year was 7%, while for Oakland County residents it was 2%. Additionally, over time the gap in the rate of mobility has remained large between Detroit resident students and their counterparts in Metro Detroit.

**Figure 1: Percent of Between-Year Movers**



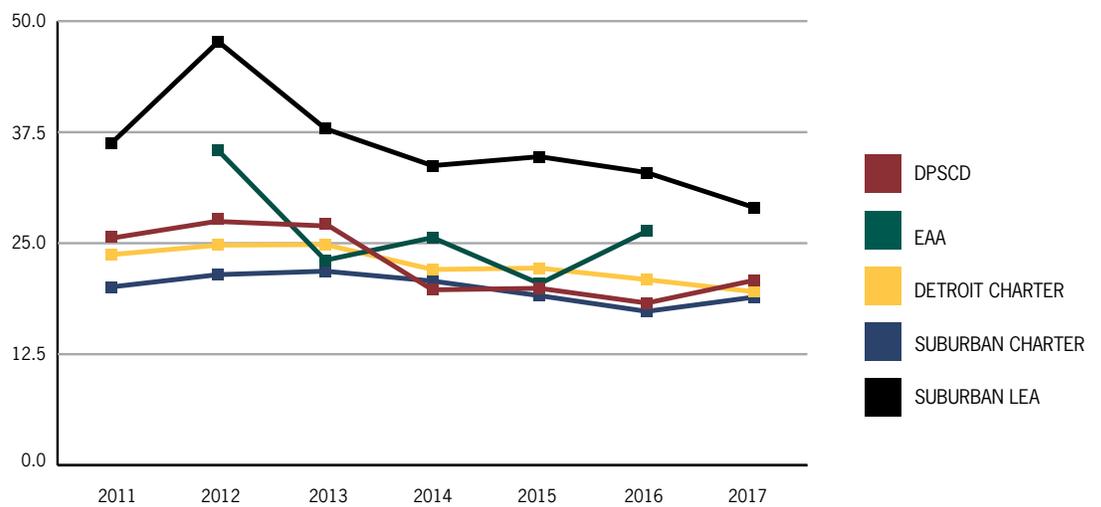
**Figure 2: Percent of Within-Year Movers**



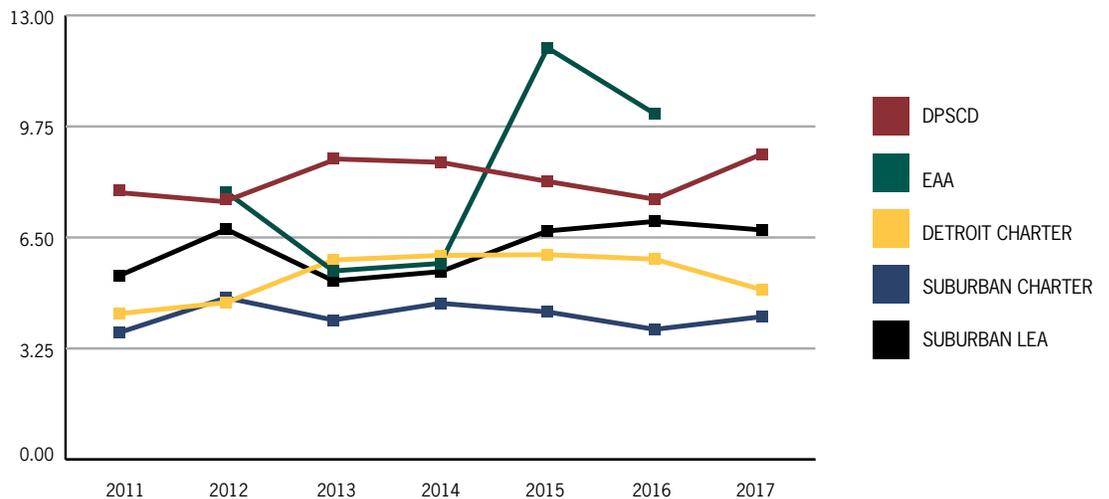


Figures 3 and 4 show the within-year and between-year student mobility rates for Detroit resident students across different school systems. As shown in Figure 3, for the most current year of data, the between-year student mobility rate was considerably larger (~ 10 percentage points) for Detroit residents who attended a suburban traditional public school compared to students attending a school in a different sector. Conversely, during the 2017-18 school year, within-year mobility was highest for students attending a DPSCD school and lowest for students attending a charter school either in Detroit or in the suburbs (see Figure 4).

**Figure 3:** Percent of Detroit Resident Student Between-Year Mobility by School Sector



**Figure 4:** Percent of Detroit Resident Student Within-Year Mobility by School Sector



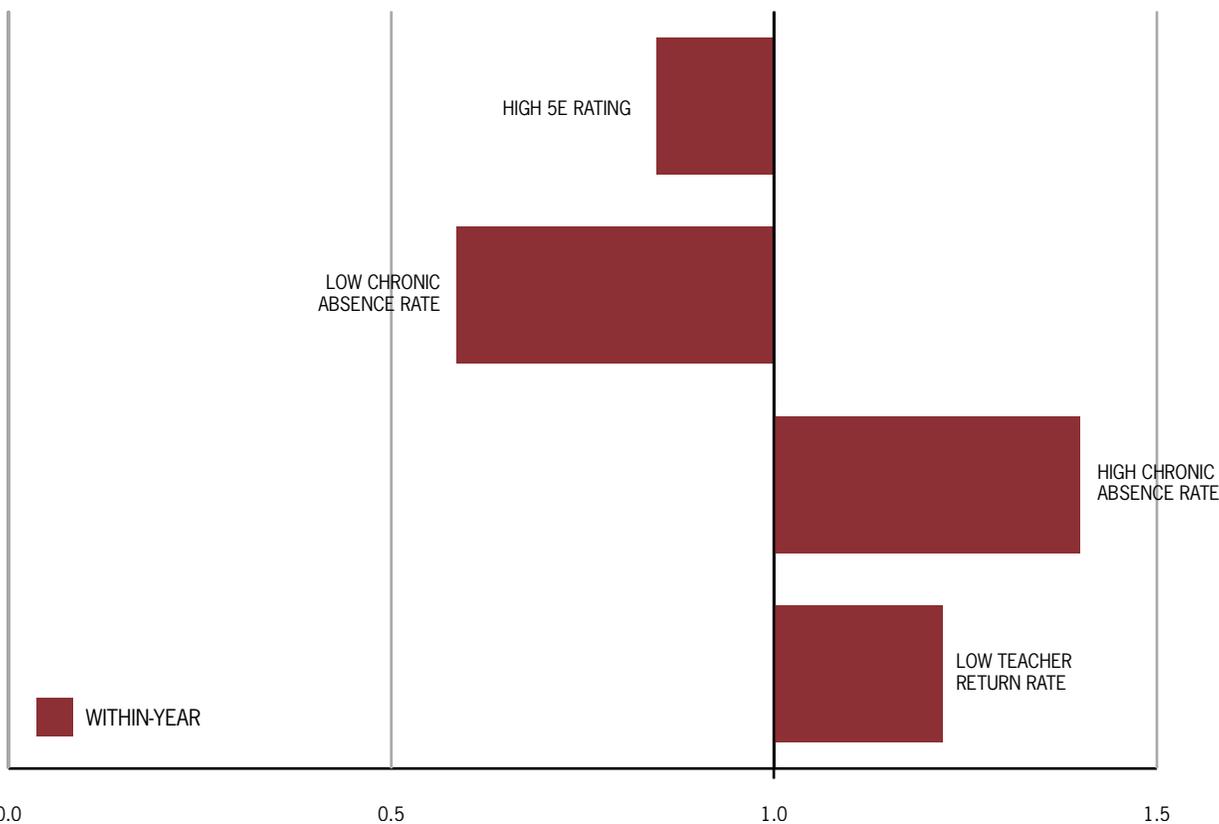


## SCHOOL CHARACTERISTICS ASSOCIATED WITH WITHIN-YEAR STUDENT MOBILITY

We began our analysis of within-year mobility by estimating an unconditional logistic regression model, which identified that 12% of the variance in student-mobility was between schools ( $p < 0.01$ ), indicating that there were some differences in within-year mobility across schools. We then estimated a series of conditional models to identify student- and school-level variables associated with within-year mobility, with particular focus on school-level characteristics. As shown in Figure 5, a student who attended a school with a low rate of chronic absence (less than 37%) had significantly lower odds of making a within-year move compared to a student in a median-range school, all else equal. Conversely, a student who attended a school with a high rate of chronic absence (greater than 55%) had higher odds of within-year mobility.

The odds of within-year mobility were also higher for a student who attended a school with a low teacher return rate (less than 60%). With regard to school culture, the odds of within-year mobility were lower for a student who attended a school categorized as high in the composite 5Essentials measure. No other school-level variables were statistically significantly associated with within-year mobility.

**Figure 5:** Odds Ratios for Within-Year Mobility



\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

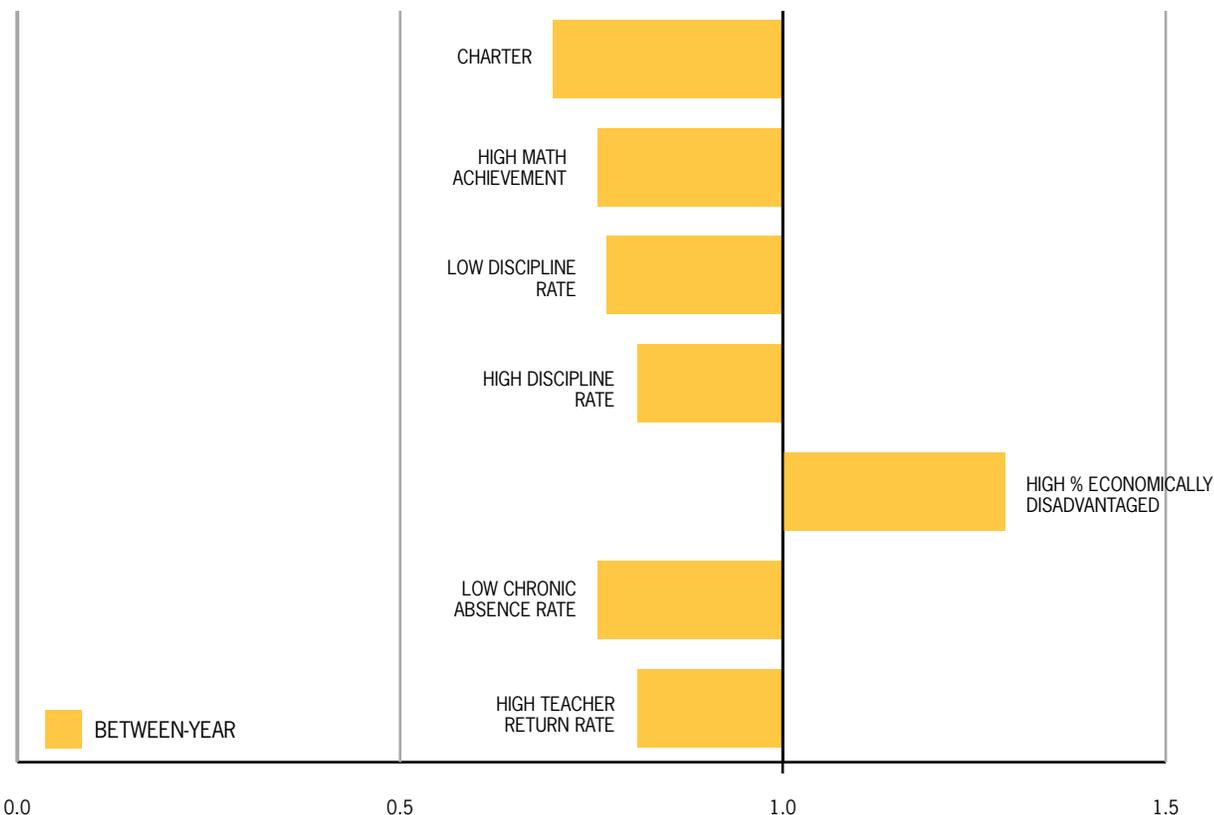
**Note.** Only odds ratios for school-level characteristics shown; odds ratios for student-level characteristics can be found in the Technical Appendix.



## SCHOOL FACTORS ASSOCIATED WITH BETWEEN-YEAR STUDENT MOBILITY

With regard to between-year student mobility, based on the unconditional model, approximately 10% of the variance in mobility was between schools ( $p < 0.01$ ). As shown in Figure 6, several of the school-level characteristics were associated with between-year mobility. Specifically, the odds of between-year mobility were lower for a student who attended a charter school, all else equal. The odds of mobility were also lower for a student who attended a school with a low student discipline rate (lower than 13.7 suspensions/expulsions per 100 students), as well as lower for students who attended a school with a high student discipline rate (more than 25.15 suspensions/expulsions per 100 students), relative to a student in a median-range school. The odds of mobility were also lower for a student who attended a school with a low rate of chronic absence or with a high average math z-score (greater than -0.81). Conversely, a student who attended a school with a high percentage of economically disadvantaged students (greater than 93%) was more likely to make a non-routine between-year move.

**Figure 5:** Odds Ratios for Between-Year Mobility



\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

**Note.** Only odds ratios for school-level characteristics shown; odds ratios for student-level characteristics can be found in the Technical Appendix.



One measure related to teachers was associated with student mobility, as a student who attended a school with a high rate of teacher return (more than 76%) was less likely to be mobile. It should be noted that the measures of school climate as defined by 5Essentials were not statistically significant.

## DIFFERENCES BETWEEN SENDING AND RECEIVING SCHOOLS

Our final analysis compared the differences between observable characteristics of the schools that students moved to compared to the ones they had moved from (see Tables 1 and 2). Although there were several statistically significant differences among “sending” and “receiving” schools, many of the differences were by practical purposes small and insignificant. For example, within-year mobile students on average ended up in schools with slightly lower average math achievement scores and slightly higher rates of chronic absence. Additionally, between-year movers on average ended up in schools with a slightly higher percent of new teachers and lower teacher return rate. Overall, there were not stark differences between sending and receiving schools across most measures.

**Table 1:** T-tests for Differences Between Sending and Receiving Schools (Within-Year)

Variable	Fall 2015-16 School	EOY 2015-16 School	Statistically Significant Difference
Charter	0.3043	0.2440	***
EAA	0.0927	0.0736	***
% Econ Disadvantaged	0.8594	0.8595	
Discipline Rate	24.9301	24.1925	
N Crimes	567.4171	559.7819	
% Vacant	0.2907	0.2948	
Avg Math Z-Score	-1.0264	-1.0652	***
Percent Chronically Absent	0.5299	0.5734	***
Teacher Return Rate	0.6693	0.6961	***
% New Teachers	0.1350	0.1245	***

\*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.10.

**Table 2:** T-tests for Differences Between Sending and Receiving Schools (Between-Year)

Variable	EOY 2014-15 School	Fall 2015-16 School	Statistically Significant Difference
Charter	0.3116	0.4156	***
EAA	0.0668	0.0596	*
% Econ Disadvantaged	0.8770	0.8496	***
Discipline Rate	24.1384	24.6336	*
N Crimes	468.2204	555.6340	***
% Vacant	0.2749	0.2729	
Avg Math Z-Score	-0.9595	-0.9432	***
Percent Chronically Absent	0.4821	0.4650	***
Teacher Return Rate	0.6684	0.6538	***
% New Teachers	0.1316	0.1481	***

\*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.10.

**Note:** The overall reported number of crimes increased overall in Detroit between 2014-15 and 2015-16.

The findings related to charter schools for both within- and between-year mobility though are noteworthy. A larger proportion of movers between the 2014-15 and 2015-16 school year moved from a DPSCD school to a charter school. Conversely, a larger proportion of within-year movers during the 2015-16 school year moved from charter schools to a DPSCD school. These shifts likely explain some of the statistically significant differences in average school characteristics, as there are differences in characteristics between school sectors (e.g., on average, chronic absenteeism was higher across DPSCD schools than charter schools).

Yet, these patterns of mobility may be of particular policy relevance as it relates to how schools are funded in Michigan, with 90% of the state foundation allowance allocated to a district based on student enrollment on Fall Count Day. Although it was a two-way street, during the 2015-16 school year, in aggregate DPSCD gained more students after the Fall Count Day from charter schools than it lost to charter schools, thus bearing additional costs without the full state foundation allowance.



Rates of student mobility among Detroit students are high and should be of considerable concern. Although student characteristics account for much of the variation in student mobility (e.g., residential moves due to housing instability), policymakers and practitioners should also attend to school characteristics that are associated with student mobility. Although school characteristics are often a reflection of the student body (i.e., compounded issues of a high concentration of economically disadvantaged students), policymakers and practitioners can focus on school organizational characteristics which may mediate student-level factors associated with student mobility. Finally, student mobility not only impacts individual students, but in aggregate impacts districts both organizationally and financially. Below we offer key takeaways, policy implications, and suggestions for future research.

## KEY TAKEAWAYS



- Within- and between-year mobility was particularly high among Detroit resident students compared to other students in Metro Detroit.
- Students were less likely to make a within-year move if they attended a school categorized as having a high rating in organizational climate, as measured by the 5Essentials surveys.
- Rates of school-level chronic absence were associated with both within- and between-year mobility, suggesting that other elements of school organizational climate may influence student movement.
- On average, mobile students were not moving to schools that were significantly different from the ones they left in many observable school characteristics.
- A larger proportion of between-year mobile students moved from a DPSCD school to a charter school, but a larger proportion of within-year mobile students moved from a charter school to a DPSCD school.



## POLICY IMPLICATIONS

- School and district leaders should continue efforts to improve organizational climate within schools and specifically attend to mediating factors that may predict student mobility (e.g., factors associated with chronic absence are also likely related to student mobility).
- State policy makers should re-evaluate how districts are funded, particularly regarding how the state foundation allowance weights enrollment at the Fall Count Day which may penalize districts that lose a disproportionate number of students between school years but gain a disproportionate number of students after the Fall Count Day.



## FUTURE RESEARCH

- There is a need for additional quantitative and qualitative research to more fully understand the reasons why parents move their students between schools, particularly when on average they end up in schools that are not fundamentally different based on many observable school characteristics.
- There is a need for research to identify the financial impact of student mobility on districts across different district contexts, and how this ultimately impacts school organizational effectiveness.
- There is a need for the collection and analysis of school culture/climate data across all schools that serve Detroit children.



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This report focused on inter-year and intra-year student mobility within the City of Detroit. For both inter-year and intra-year moves, we estimated a series of logistic regressions to identify the association between student mobility and student- and school-level characteristics. For intra-year mobility, the outcome variable indicated whether a student changed schools during the 2014-15 school year (0 = was not mobile; 1 = mobile). For inter-year mobility, the outcome variable indicated whether a student a student changed schools between the end of the 2014-15 school year and beginning of the 2015-16 school year during a non-transition year (0 = was not mobile; 1 = mobile). For the inter-year analysis, students who were in a transition year at their school were coded as missing. Additionally, all students transitioning into the 9th grade for the 2015-16 were excluded. Less than half of these students attended a school that included both an eighth grade and ninth grade in the same building (making them eligible to make a non-routine move). Of the 9th graders in schools that served both 8th and 9th grades, approximately 74% made a non-routine move, while only approximately 18% of students in all other grades made a non-routine move.

Our outcome variable notation –  $Mob_{ij}$  – refers to the mobility status of student  $i$  in school  $j$ , with school-level variables measured at  $t-1$  (fall 2014 for intra-year, and spring 2015 for inter-year). We confined our analysis to students who lived in Detroit and attended school in Detroit, as well as excluded students who attended either a juvenile detention facility or virtual school.

Our base model, which incorporates random intercepts (but not random slopes), is specified as:

**Level-1 Equation:**

$$\ln(Mob_{ij}/1-Mob_{ij}) = \beta_{0j} + \beta_{1j}Latinx + \beta_{2j}Asian + \beta_{3j}White + \beta_{4j}OtherRace + \beta_{5j}Economic Dis + \beta_{6j}ELL + \beta_{7j}Spec Ed + \beta_{8j}Upper Elem + \beta_{9j}Jr High + \beta_{10j}HS + \beta_{11j}Residential Move + \beta_{12j}Sch Concentration + \beta_{13j}Distance to School + \beta_{14j} (Distance to School)^2 + \mu_j + \epsilon_{ij} \quad (1).$$

**Level-2 Equation:**

$$\beta_{0j} = \gamma_{00} + \gamma_{01}Charter + \gamma_{02}EAA + \gamma_{03}Low 5E + \gamma_{04}High 5E + \gamma_{05}Low Math + \gamma_{06}High Math + \gamma_{07}Low Discipline + \gamma_{08}High Discipline + \gamma_{09}Low Economic Dis + \gamma_{010}High Economic Dis + \gamma_{011}Low Absence Rate + \gamma_{012}High Absence Rate + \gamma_{013}Low Tch Return Rate + \gamma_{014}High Tch Return Rate + \gamma_{015}Low Pct New Tch + \gamma_{016}High Pct New Tch + \gamma_{017}Low Crime Rate + \gamma_{018}High Crime Rate + \gamma_{019}Low Vacancy + \gamma_{020}High Vacancy \quad (2).$$

$$\beta_{1j} = \gamma_{10} \quad (3a).$$

⋮

$$\beta_{14j} = \gamma_{140} \quad (3b).$$

**Table A1:** Odds ratios for intra-year mobility

Variable	Odds Ratio	95% Confidence Limits	
Hispanic	0.699	0.537	0.910
Asian	0.270	0.142	0.515
White	1.060	0.826	1.359
Other Race	0.681	0.447	1.038
Economic Dis	2.361	2.116	2.634
ELL	0.612	0.475	0.789
Special Ed	1.138	1.054	1.228
Upper Elem	0.870	0.804	0.941
JrHigh	0.858	0.787	0.936
HS	0.958	0.798	1.149
Residential Move	2.159	2.014	2.315
School Concentration	0.996	0.987	1.004
Distance to School	0.995	0.961	1.030
(Distance to School) <sup>2</sup>	1.003	1.000	1.006
Charter	0.872	0.652	1.167
EAA	0.977	0.711	1.342
Low 5E	1.113	0.911	1.361
High 5E	0.847	0.720	0.997
Low Math	0.908	0.729	1.131
High Math	0.900	0.752	1.078
Low Discipline	1.008	0.834	1.217
High Discipline	1.031	0.871	1.221
Low Economic Dis	0.981	0.819	1.174
High Economic Dis	1.110	0.915	1.345
Low Absence Rate	0.586	0.475	0.723
High Absence Rate	1.402	1.148	1.713
Low Tch Return Rate	1.215	0.973	1.516
High Tch Return Rate	0.921	0.765	1.110
Low Pct New Tch	1.083	0.910	1.288
High Pct New Tch	0.928	0.770	1.118
Low Crime Rate	1.082	0.904	1.295
High Crime Rate	1.123	0.948	1.331
Low Vacancies	0.906	0.750	1.093
High Vacancies	1.072	0.897	1.281

**Table A2:** Odds ratios for inter-year mobility

Variable	Odds Ratio	95% Confidence Limits	
Hispanic	0.649	0.514	0.818
Asian	0.483	0.319	0.733
White	0.638	0.499	0.815
Other Race	1.787	1.357	2.354
Economic Dis	1.485	1.371	1.608
ELL	1.078	0.885	1.314
Special Ed	0.879	0.818	0.944
Upper Elem	1.049	0.973	1.132
JrHigh	1.269	1.170	1.376
HS	1.006	0.806	1.256
Residential Move	14.086	13.233	14.994
School Concentration	1.016	1.008	1.025
Distance to School	1.132	1.096	1.169
(Distance to School) <sup>2</sup>	0.993	0.990	0.996
Charter	0.696	0.473	1.024
EAA	0.798	0.493	1.290
Low 5E	1.057	0.832	1.343
High 5E	1.052	0.828	1.338
Low Math	1.041	0.819	1.322
High Math	0.761	0.593	0.977
Low Discipline	0.771	0.614	0.968
High Discipline	0.809	0.644	1.015
Low Economic Dis	0.930	0.739	1.171
High Economic Dis	1.294	1.021	1.640
Low Absence Rate	0.764	0.587	0.996
High Absence Rate	1.029	0.806	1.315
Low Tch Return Rate	1.244	0.926	1.672
High Tch Return Rate	0.805	0.634	1.023
Low Pct New Tch	1.189	0.944	1.498
High Pct New Tch	0.941	0.709	1.250
Low Crime Rate	0.924	0.741	1.153
High Crime Rate	1.047	0.843	1.300
Low Vacancies	0.970	0.780	1.207
High Vacancies	0.831	0.660	1.048

