The Frequency and Correlates of Teachers' Grade-level Reassignments: Evidence from Michigan

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Abstract

While recent research suggests that grade-level reassignments play an important role in fostering student achievement, the literature on teacher turnover and attrition has largely ignored the reassignment of teachers within schools. We seek to fill this gap using teacher-level micro data from Michigan to document the prevalence and distribution of grade-level reassignments across different types of schools and teachers. We find that inexperienced teachers and teachers who are new to their school are less likely to switch grades. The results also suggest that the disruptions associated with within-school teaching reassignments are inequitably distributed across schools and students. Urban schools, schools with higher attrition rates, and schools with higher concentrations of minorities have significantly higher rates of grade switching.

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1. Introduction

Teacher turnover, whether measured by attrition from the profession or mobility across schools, can disrupt the functioning of schools in a myriad of ways. For example, high rates of teacher turnover may reduce instructional quality, destabilize schools, and disrupt schools' curriculums and course offerings (Shields et al., 2001). Within-school teaching reassignments (i.e., grade-level and subject changes) and initial classroom assignments have similar consequences, as recent research suggests that teachers' returns to experience are greater when experience is accrued in the same grade and that the composition of teachers' initial classroom assignments significantly impacts subsequent mobility decisions (Ost, 2011; Feng, 2010). This evidence has led observers such as Jacob and Rockoff (2011) to argue that principals should think carefully about how to best allocate teachers to grades and subjects, as such decisions are typically non-controversial yet may have substantial effects on student achievement.

However, the large literature on teacher turnover generally ignores the within-school sorting of teachers into grade levels. This is a glaring omission, as student achievement is affected not only by the number of teachers new to the school, but also by the number of teachers who are teaching in a new assignment. In addition, within-school rates of grade switching are similar in magnitude to both rates of attrition from the profession and mobility across schools. Well-documented higher rates of teacher turnover in low-performing and impoverished schools (e.g., Hanushek, Kain, & Rivkin, 2004; Lankford, Loeb, & Wyckoff, 2002) suggest that such schools may necessarily experience more shuffling of teachers across grade levels and subjects. An inequitable distribution of within-school turnover in teaching assignments presents an additional challenge that students, teachers, and administrators in disadvantaged schools must overcome. The current study contributes to the literature on teacher turnover by investigating the teacher-

and school-level predictors of grade switching and the relationship between grade switching and other types of teacher turnover.

We use rich administrative panel data on the universe of self-contained kindergarten through fifth-grade Michigan public school teachers during the 2003-04 through 2008-09 school years. These data are well suited for the analysis, as Michigan is home to a large demographically and socioeconomically diverse student population, the panel nature of the data allows individual teachers to be tracked over several years, and the large sample size provides sufficient power with which to identify the predictors of grade switching. In addition, we verify that the phenomenon of grade switching is not unique to Michigan by showing that rates of grade switching and other types of teacher turnover in the nationally representative Schools and Staffing Survey (SASS) are similar to those in Michigan.

We find that grade switching is more prevalent in schools in urban areas, schools serving minority student populations, and schools with higher attrition rates. In addition, less experienced teachers switch grades more often, particularly those teachers who are new to their school. Grade switching strongly predicts future grade switching, but not other types of turnover. Interestingly, there is significantly less grade switching in charter schools and no relationship between grade switching and schools' academic performance.

These results imply that in addition to higher rates of teacher turnover, urban schools with high concentrations of minority students also experience significantly higher rates of grade-level reassignments. This is true even after conditioning on school-level turnover rates and suggests that policymakers concerned with problems of teacher turnover in disadvantaged schools should pay similar attention to the inequitable distribution of grade-level reassignments.

Section 2 proceeds with a brief review of the relevant literature. Section 3 describes the data and methods used to perform the empirical analysis of grade switching. Section 4 presents the results and section 5 concludes with a summary and discussion of the main findings.

2. Literature Review

Two studies tangentially touch on the frequency of within-school grade-level reassignments of self-contained classroom teachers. Chingos and West (2011) use administrative data from Florida to show that teachers in tested grades who have low value-added scores are more likely to move to non-tested positions within their current school and exit teaching than their higher-achieving counterparts. Of Florida's 24,475 self-contained tested-grade (4^{th} – 8^{th} grade) teachers in 2001-02, 84% remained in a tested-grade classroom the following year and 52% remained in a similar position seven years later (excluding retirements). These figures represent a lower bound for the percentage of tested-grade teachers who changed grades, however, as the analysis does not consider switches between tested grades (and does not consider teachers initially teaching in non-tested grades). Notably, 7% of the 2001-02 cohort taught in self-contained, non-tested classrooms the following year. Male, Hispanic, and experienced teachers were more likely to transition from tested to non-tested grades.

Ost (2011) is primarily concerned with identifying grade-specific returns to teaching experience. Ost shows that of North Carolina teachers who taught in self-contained classrooms in consecutive years between 1995 and 2007, about 70% remained in the same grade, most reassignments were to an adjacent grade, moving to higher and lower grades was equally likely, and that within-school grade switching is weakly related to students' current performance.

More generally, the current study is related to the literatures on teacher attrition and teacher sorting, as grade-level reassignments are a type of teacher turnover. Guarino et al. (2006)

thoroughly review the literature on teacher attrition and mobility, which generally finds higher rates of teacher turnover in urban and low-performing schools, schools comprised of low-income or minority students, and amongst inexperienced, female, white, and highly-credentialed teachers. Loeb et al. (2005) find good working conditions and higher pay to be associated with reduced rates of turnover. However, the existing literature largely ignores within-school changes in teaching assignments as a type of teacher turnover.

An exception to this critique is Boyd, Lankford, Loeb, & Wyckoff (2008), who investigate the effect of a newly-implemented fourth-grade test in New York State on fourth-grade teacher turnover, where turnover is defined as either leaving the fourth grade or leaving the public-school system. Using administrative data, the authors find that teachers were more likely to remain in the newly-tested fourth grade and that this change was primarily driven by a decrease in the grade-level reassignments of fourth-grade teachers (as opposed to attrition from the profession). The Boyd et al. (2008) study exemplifies the potential importance of grade-level reassignments in operationalized definitions of teacher turnover.

Similarly, Cohen-Vogel (2011) investigates the extent to which principals in ten Florida elementary schools use student-performance data to reassign teachers across grade levels and make staffing decisions more generally. The author presents qualitative evidence that principals felt free to make grade-level reassignments and typically considered both teachers' preferences and performance when making such decisions. Cohen-Vogel and Osborne-Lampkin (2007) analyze the collective-bargaining agreements of 66 Florida school districts and find that while teachers' seniority matters, administrators retain a reasonable amount of discretion in changing teachers' assignments. Furthermore, the authors find that collective-bargaining agreements are not more rigid in low-performing, poor, or minority schools.

We contribute to the existing literature by examining patterns in the frequency of grade switching and documenting the distribution of grade switching across different types of schools and teachers. We further test whether grade switching predicts other types of teacher turnover and compare the predictors of grade switching to those of other types of teacher turnover. By providing a more comprehensive picture of the distributions of different types of teacher turnover, the current analysis furthers our understanding of the functioning of teacher labor markets and the equity of teacher quality.

3. Data and Methods

The primary analysis examines teachers' grade-level assignments in the Registry of Educational Personnel (REP) database, an administrative employee-level panel data set maintained by Michigan's Center for Educational Performance & Information (CEPI). The REP contains information on all public-education employees in Michigan, but the sample is restricted to teachers in self-contained classrooms for the 2003-04 through 2008-09 school years. This leaves a final sample of 113,978 observations on 33,390 unique teachers.

We augment the REP data with publicly available school- and district-level information from two additional sources. First, data on school type, student demographics, and locale are taken from the National Center for Education Statistics' Common Core of Data. Second, we use grade-level math proficiency rates, publicly provided by the Michigan Department of Education.[2] Proficiency rates indicate the fraction of the schools' students who tested as proficient on the Michigan Education Assessment Program (MEAP) standardized test.[3] Proficiency rates increased statewide throughout the sample period. To ensure comparability

[2] See: http://www.michigan.gov/mde/0,4615,7-140-22709_31168_31530---,00.html.
[3] See MDE (2005) for an overview of the MEAP tests.

across years and grades, we standardize proficiency rates to have a mean of zero and a standard deviation of one within each year and grade.

Because the external validity of state-level analyses is always a concern, we also compute a variety of teacher turnover rates using data from the nationally representative 1999 and 2003 Schools and Staffing Surveys (SASS) and corresponding Teacher Follow-Up Surveys (TFS).[4] The SASS and TFS are conducted by the U.S. National Center for Education Statistics (NCES) and are publicly available.[5] The SASS is a nationally-representative random sample of approximately 43,000 elementary and secondary public school teachers in each survey year. The TFS follows up with approximately 5,300 randomly sampled SASS respondents the following year to see if and where they are still teaching. The SASS-TFS analysis is restricted to regular full-time kindergarten through fifth-grade self-contained classroom teachers who were surveyed by the TFS. The final sample excludes special education teachers and teachers who taught more than one grade in the SASS survey year. These restrictions yield samples of 763 and 1,069 teacher observations for the 1999-00 and 2003-04 school years, respectively.

In the empirics we identify the predictors of grade switching and other types of turnover in Michigan by estimating logit models of the form

$$\Pr\left(y_{igst}=1\,|\,\cdot\right)=\Lambda\left(\beta_0+\boldsymbol{\beta}_1\mathbf{x}_{it}+\boldsymbol{\beta}_2\mathbf{z}_{st}+\eta_g+\tau_t\right), \tag{1}$$

where y is a binary indicator of teacher turnover between years t and $t+1$, i indexes teachers, g indexes grades, s indexes schools, $\mathbf{x}$ is a vector of possibly time-varying teacher characteristics, $\mathbf{z}$ is a vector of possibly time-varying school characteristics, η is a grade fixed effect (FE), and τ is a year FE. Extensions of equation (1) are considered that add school, district, or grade-by-year FE to the model. The parameters of equation (1) are estimated by maximum likelihood, from

[4] We are unable to use the 2007 SASS, as the 2008 TFS does not record current grade.
[5] See http://nces.ed.gov/surveys/sass/dataproducts.asp.

which we compute average partial effects (APE) of each covariate on the conditional probability of turnover.[6] Subsequent analyses report APE standard errors that are adjusted for clustering at the district level. Adjusting for clustering at the district level makes statistical inference robust to the presence of correlation within districts *and* schools, as schools are nested in districts.[7]

4. Analysis

4.1 The Prevalence and Distribution of Grade Switching

Table 1 displays the prevalence of teacher grade reassignments in relation to other types of teacher turnover. In particular, the first panel of table 1 describes the overall and year-specific turnover of Michigan's self-contained kindergarten through fifth-grade classroom teachers between 2003-04 and 2008-09. Of teachers remaining in a self-contained classroom in the same school the following year, 76% remained in the same grade. The percentage of teachers who changed grades but remained in a self-contained classroom in the same school is 6.7%. Notably, this figure is similar in magnitude to two commonly-used measures of turnover: the percentages who changed schools (6.1%) and who exited the Michigan public school system (5.3%). The frequency of within-school grade-level reassignments in Michigan is fairly constant across years, ranging from 6 to 7%. Not reported in table 1 is the finding that grade switch rates are also similar across grades, ranging from 5% to 8%, and that most grade changes are to an adjacent

[6] See Wooldridge (2010, p. 577) for the definitions and estimation of APE for both continuous and discrete explanatory variables in binary choice models such as logit.

[7] See Angrist and Pischke (2009, p. 319) for a discussion of "clustering at the highest level." Technically, two-way standard errors that allow for correlation within both teachers and districts are appropriate, as teacher sometimes change districts (Cameron, Gelbach, & Miller, 2011). Changing districts is rare in the current data, however, and estimated two-way standard errors are marginally smaller than one-way district clustered standard errors in the current application. Thus we report the more conservative (i.e., larger) district-clustered standard errors.

grade.[8] Similarly, other types of turnover are fairly constant over time and across grades. The second panel of table 1 reports similar average turnover rates derived from nationally representative SASS data. The SASS data suggest that grade switching is a national phenomenon and that national rates of teacher turnover, including grade switching, are similar in magnitude to those observed in Michigan.

Table 2 examines the distribution of switching across individual teachers in Michigan. Grade switching is not driven by a small number of serial switchers, as 63% of grade-level reassignments were experienced by teachers who changed grades only once and another 24% of reassignments involved teachers who changed grades twice. Overall, a non-trivial 18% of Michigan's self-contained classroom elementary-school teachers experienced at least one grade-level reassignment between the 2003-04 and 2008-09 school years.

4.2. The Correlates of Grade Switching

Table 3 documents the unadjusted differences in average teacher and school characteristics included by the number of teacher switches. The first column reports overall averages for the six-year sample. Each subsequent column of table 3 reports the same average characteristics separately by the number of times that teachers changed grades between 2003-04 and 2008-09. A few differences emerge between the teachers who never changed grades and those who did. For example, non-switchers were more likely to hold a Master's degree and to have ten or more years of teaching experience. Similarly, teachers who experienced no grade-level reassignments were less likely to be in urban and charter schools, and were more likely to be in the highest-

[8] Markov transition matrixes reported in appendix table A.1 show that teachers are most likely to move to adjacent grades and that moving to lower grades is slightly more common. These patterns are similar to those documented by Ost (2011) using data from North Carolina and do not vary by year.

performing (fourth-quartile of proficiency rates) schools.[9] In addition, teachers who switch grades are more likely to teach in urban schools and schools with high proportions of students eligible for free or reduced-price lunch. The following section examines these correlates in more detail, by conditioning on teacher and school observables and focusing on teacher-years as the unit of analysis.

Table 4 reports logit-model APE of teacher and school characteristics on the probability that self-contained classroom teachers changed grades, but remained in the same school the following year. Column 1 of table 4 contains a baseline specification that conditions on teacher and school characteristics, grade taught, and a full set of year dummies. Teachers' race and education are not significant predictors of grade switching. A small, marginally significant effect of gender is found, suggesting that female teachers are about half of a percentage point more likely to be reassigned than male teachers. Teachers' age and experience are strongly statistically significant predictors of grade switching, although only the experience effects are practically significant: teachers with two to nine years of experience are between one and two percentage points less likely to change grades than new teachers, while those with ten or more years of experience are more than three percentage points less likely to do so. Teachers in urban schools are significantly more likely to experience grade-level reassignments than their counterparts in rural and suburban schools. The most important predictor of grade switching in column 1 is charter-school status, as teachers in charter schools are more than four percentage points less likely to change grades than teachers in traditional public schools, and this difference is strongly statistically significant.

[9]The practice of looping (i.e., teachers changing grades in lockstep with a student cohort) may cause certain schools to have multiple teachers who repeatedly change grades. However, we find no evidence of systematic looping in Michigan, and do not believe that this drives the results.

We include school-level attrition from the school, district or Michigan public education in the model to test whether grade switching is more common in schools with high attrition rates, or if grade switching is a substitute for other types of teacher turnover. The former may result from principals shuffling teachers' grade-level assignments in an effort to fill the vacancies created by teacher attrition when the availability of external replacements is limited. Alternatively, the latter would occur if dissatisfied teachers change (or are asked to change) grades before changing schools or leaving the profession to see if a different grade provides a better fit. Attrition's positive and statistically significant APE suggests that grade switching is more common in high-attrition schools, although the difference is practically small.[10]

An interesting non-finding regards the relationship between school achievement levels and grade switching: the grade-level indicators of schools' math-proficiency quartiles are individually and jointly insignificant. In fact, the APE appear to be precisely-estimated zeros, which suggest that grade switching is not concentrated in either high- or low-performing schools. This non-finding is robust to instead measuring school quality with Michigan's School Report Card grades (MDE, 2007).

Relative to fifth-grade teachers and the omitted group of kindergarten teachers, the results in column 1 of table 4 show that first, second, third, and fourth-grade teachers are between 1 and 2 percentage points more likely to change grades and that these differences are strongly statistically significant. This is likely because in the sample, kindergarten and fifth-grade teachers have only one adjacent grade switch to, and the majority of grade-level reassignments are to an adjacent grade. Of course, the result for fifth-grade teachers may change if the analysis

[10] The results on teacher- and school-level predictors of grade switching are qualitatively similar when controlling for higher-order polynomials of turnover or quartiles of turnover.

was extended to include sixth-grade teachers. The year dummies, which omit 2003-04 as the base year, indicate no clear trends in the frequency of grade switching.

Column 2 of table 4 adds grade-by-year fixed effects (i.e., grade-year interaction terms) to the baseline specification of column 1. Doing so is potentially important, as the years studied in the current analysis witnessed the implementation of high-stakes tests in certain grades associated with the 2001 No Child Left Behind Act. As a result, pressures to change grades potentially varied systematically by grade-year during this time period. However, adding grade-by-year fixed effects (FE) does not change the estimated effects of the teacher or school characteristics in a meaningful way; nor does this addition explain a significant amount of variation in grade switching, as evidenced by the nearly identical pseudo-R^2 in columns 1 and 2.

Columns 3 and 4 of table 4 add district and school FE to the baseline specification, respectively. The estimates in columns 3 and 4 are nearly identical to one another, suggesting that variation across schools is less important than variation across districts. The district and school FE do explain a nontrivial amount of variation in within-school grade-level reassignments, as the pseudo-R^2 increases by a factor of 3 when district FE are added to the baseline model and by a factor of 4 with the addition of school FE.[11]

With two exceptions, the estimates in columns 3 and 4 are remarkably similar to those of the baseline specification in column 1, suggesting that the main results are not driven by unobserved differences between districts. First, when looking at within-district (or within-school) variation, teachers holding a master's degree become significantly less likely to change grades. This result is interesting despite the relatively small effect size, as it suggests that some combination of the

[11] It is also reasonable to condition on principal FE. Unfortunately, reliable principal data is missing for more than 20% of school-year observations, so we do not report these results. However, estimates of such models using observations for which principal data are available yield qualitatively similar results to those that include school FE.

distribution of teachers and the functioning of internal (within-school) teacher labor markets vary by unobserved district characteristics. Second, the estimated APEs of the school's black population and school-level attrition rate lose statistical significance, which is likely the result of these variables exhibiting little within-district variation between 2003 and 2008.

Finally, we attempt to better understand the relationship between teachers' experience and grade switching, as experience is consistently one of the most important predictors of grade switching in columns 1 through 4 of table 4. We distinguish between total teaching experience and tenure in the current school, as the predictive ability of experience may vary by type of experience. Such differences may arise because teachers' within-school seniority or relationships with school administrators matter more than general teaching experience, or because teachers with substantial teaching experience have identified their preferred grade level, regardless of their tenure at their current school.

Specifically, the model estimated in column 5 of table 4 adds a "new to school" indicator to the school-FE specification of column 4.[12] The results suggest that all else equal, teachers in their first year in a school are about one percentage point more likely to change grades than teachers with more school-specific experience. The overall effect of experience diminishes slightly, but remains strongly statistically significant for teachers with more than ten years of experience; estimated effects of the other teacher and school characteristics are unchanged. This basic finding is robust to either removing the school FE or replacing them with district FE.

[12] We lose one year of data in the process, as the administrative data records total experience in the school district, but not in any particular school.

4.3. The Relationship between Grade Switching and Other Types of Teacher Turnover

We now consider the relationship between grade switching and other types of teacher turnover. We begin by testing grade switching's ability to predict future teacher turnover, as grade switching may be indicative of teachers' unease in the classroom or schools' instability. In table 5 we extend table 4's baseline specification (column 1) to include a year-specific count of teachers' previous grade-level reassignments and examine the effect of previous grade changes on the probability of remaining in the same teaching assignment, changing grades, changing schools, and leaving Michigan public education in four separate logit models.[13] As in column 5 of table 4, one year of data is lost when creating this variable.

Column 1 of table 5 shows that past switches significantly lower the probability of teachers' remaining in the same grade and school in consecutive years. Column 2 suggests that most of this decrease is due to the 5 percentage point increase in the probability of changing grades associated with each past switch. However, columns 3 and 4 of table 5 suggest that grade switching does not strongly predict other sorts of teacher turnover.

It is also of interest to compare the predictors of grade switching reported in table 4 to those of other types of teacher turnover, as the optimal design and targeting of policies aimed at decreasing teacher turnover may vary by turnover type. Accordingly, columns 1 and 2 of table 6 report logit-model APE of select covariates on the probability of changing schools and of leaving teaching, respectively. The specifications estimated in table 6 are otherwise identical to the baseline specification of column 1 in table 4. Again, adding district or school FE to the logit models estimated in table 6 does not change the qualitative results.

[13] We estimate separate logits rather than a multinomial logit (MNL) to avoid making the strong Independence of Irrelevant Alternatives assumption, though MNL results are qualitatively similar.

A comparison of the estimated APE in table 6 to those in column 1 of table 4 yields several similarities: teacher's experience and the racial makeup of schools similarly influence the probability of all three types of teacher turnover. There are some notable differences, however, especially among the school characteristics. For example, teachers in charter schools are significantly less likely to change grades or schools, but are more likely to leave the teaching profession. Similarly, school performance (as measured by grade-level proficiency quartiles) is not associated with changing grades or leaving the profession, but is significantly negatively correlated with changing schools. This may be reflective of teachers systematically moving from lower- to higher-performing schools throughout as their careers progress.

5. Discussion

This study examines the frequency and predictors of teachers' within-school grade-level reassignments using rich administrative data from Michigan between 2003-04 and 2007-08. This time period witnessed a nontrivial number of such grade changes, as in any given year about 7% of the state's self-contained kindergarten through fifth-grade teachers experienced a grade-level reassignment. The phenomenon of grade switching is not unique to Michigan, as a similar rate of about 9% is found in nationally representative data over a similar time period. In Michigan, and nationally, the rate of grade switching is similar in magnitude to rates of attrition from the profession and mobility across schools.

Grade switching is more common in schools with high attrition rates, which may be the result of principals' responses to vacancies created by teachers' departures. Urban schools with higher fractions of minority students are found to have higher levels of grade switching, even conditional on the amount of teacher turnover in the school. While grade switching does not

appear to vary by schools' achievement levels, charter schools have significantly fewer grade-level reassignments than their traditional public school counterparts. This suggests that charter school principals may be following the advice of researchers such as Jacob and Rockoff (2011) by minimizing grade-level reassignments.

Teachers with more experience, both overall and in the current school, are found to be significantly less likely to change grades, as are teachers in charter schools. The negative correlation between grade switching and teachers' experience likely results from some combination of experienced teachers having relatively more input in their teaching assignments and having learned which grade(s) they are most comfortable in. Importantly, grade switching predicts future grade switching but no other types of teacher turnover, suggesting that grade switching is not an "early indicator" of teachers' dissatisfaction with the profession.

A limitation of the current study is its inability to differentiate between teacher- and principal-induced reassignments. While nearly 90% of teacher mobility across schools is at teachers,' as opposed to administrators,' discretion (Keigher, 2010), it is difficult to determine the corresponding percentage of grade-level or subject reassignments initiated by teachers. Indeed, Cohen-Vogel (2011) suggests that such reassignments are initiated by both teachers and principals. Furthermore, some reassignments may be determined by mutual agreement or compromise. Future iterations of nationally representative surveys of teachers and/or principals might consider adding items that ask the reason for grade and subject reassignments.

Nonetheless, the general finding that grade switching is non-random has several implications for administrators, principals, and policy makers seeking to improve student outcomes. That the predictors of teacher turnover vary by turnover type suggests that principals, policymakers, and analysts must think carefully about the operationalized definition of teacher turnover and

recognize grade (and potentially subject) reassignments as a nontrivial type of within-school turnover when devising and implementing teacher-retention programs and investigating the impact of high-stakes accountability on teacher turnover (Boyd et al., 2008).[14]

Finally, the finding that new teachers are more likely to change grades following their first year in a new school, even after controlling for total years of teaching experience, suggests that the within-school politics of seniority play an important role in determining grade-level reassignments. This is not to say that all schools should adjudicate teaching assignments in the same manner, as the optimal level of grade switching will depend on the specific school and district context. Rather, the results of the current analysis underscore the potential benefits of paying greater attention to teachers' grade-level and subject reassignments. The relatively high rates of grade switching observed in Michigan and nationally suggest that there are potentially large gains in student performance to be had by reconsidering the frequency with, and reasons for, which teachers change grades.

[14] The frequency and non-random distribution of grade switching may also have implications for value-added modeling. For instance, omitting grade-specific experience from value-added models may contribute to the time instability frequently observed in rankings of estimated teacher effects (e.g., McCaffrey et al., 2009).

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Table 1: Self-contained Teachers' Assignments the Following Year

Year(s)	Same self-contained grade 1	New self-contained grade 2	Changed school 3	Changed district 4	Left self-contained classroom 5	Left teaching 6	Left (MI) public education 7	N 8
	In Michigan (REP Administrative Data)							
2003/04	76.4%	6.0%	5.8%	0.9%	3.6%	0.5%	6.8%	22,933
2004/05	73.8%	7.0%	6.6%	1.2%	4.1%	1.5%	5.8%	22,250
2005/06	75.8%	6.3%	6.5%	1.0%	3.9%	1.5%	5.1%	23,018
2006/07	75.8%	7.3%	6.3%	0.9%	3.6%	1.3%	4.8%	22,905
2007/08	78.3%	6.8%	5.2%	1.0%	3.1%	1.5%	4.0%	22,872
All	76.0%	6.7%	6.1%	1.0%	3.6%	1.3%	5.3%	113,978
	In U.S. (SASS Nationally Representative Sample)							
1999/00	72.7%	8.2%	3.6%	3.0%	6.8%	.	5.6%	760
2003/04	70.8%	9.5%	3.5%	2.5%	8.0%	.	5.6%	1,070
Both	71.7%	8.9%	3.6%	2.7%	7.5%	.	5.6%	1,830

Notes: The definitions of columns 1 – 7 are mutually exclusive and sum to 100%. "By year" refers to the initial self-contained year (e.g., the 2003-04 row reports the 2004-05 destination of teachers who were self-contained in 2003-04). SASS means are weighted to account for unequal probabilities of sample selection. SASS sample sizes are unweighted and are rounded to nearest ten.

Table 2: Incidence of Grade-level Reassignments per Teacher

Switches per teacher	Teacher-year switches	% of switches	Teachers
1	4,761	62.6%	4,761
2	1,834	24.1%	917
3	660	8.7%	220
4	200	2.6%	50
5	150	2.0%	30
Total	7,605	100%	5,978

Notes: Michigan REP data. 5,978 teachers constitute 17.9% of the 33,390 teachers who taught in a self-contained kindergarten through fifth-grade classroom in Michigan between 2003-04 and 2007-08.

Table 3: Average Characteristics by Teacher-year

	All teachers	Switches per teacher		
		0	1	> 1
Teacher				
Black	4.0%	3.8%	4.8%	4.5%
Age	43.2	43.9	40.7	40.5
Female	89.6%	89.3%	90.5%	90.2%
Master's	51.9%	52.5%	50.2%	48.5%
No prev.	4.0%	4.1%	4.1%	3.2%
1 year	4.7%	4.5%	5.6%	4.8%
2 years	5.1%	4.8%	6.4%	5.7%
3-4 years	10.7%	9.9%	13.3%	13.9%
5-9 years	25.0%	23.5%	30.5%	31.7%
10+ years	50.5%	53.3%	40.3%	40.6%
New to	34.7%	36.2%	30.5%	25.8%
2nd Year in	24.5%	24.4%	25.1%	23.6%
3rd Year in	17.9%	17.4%	19.5%	20.8%
School				
Urban	21.1%	20.0%	24.7%	25.8%
Rural	32.4%	33.4%	28.8%	27.3%
Suburban	31.6%	31.1%	33.0%	34.6%
Title 1	37.2%	36.8%	38.7%	38.3%
%	14.1%	13.3%	17.1%	16.8%
% black	6.8%	6.9%	6.9%	4.7%
Charter	22.7%	22.5%	23.1%	26.4%
Proficiency				
1st (lowest)	24.5%	24.6%	24.2%	25.1%
2nd	25.8%	26.0%	25.2%	23.6%
3rd	21.1%	20.0%	24.7%	24.9%
4th (highest)	32.4%	33.4%	28.8%	25.8%
N	113,978	89,354	19,155	5,469

Notes: Michigan REP data. Grade-level reassignments refer to the total number of reassignments experienced by each teacher during the six-year period.

Table 4: Logit Average Partial Effects on Probability of Changing Grades

	1	2	3	4	5
Teacher					
Black	0.0014	0.0014	-0.0009	-0.0028	-0.0007
	(0.0045)	(0.0045)	(0.0041)	(0.0042)	(0.0052)
Age	-0.0011***	-0.0011***	-0.0011***	-0.0012***	-0.0012***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Female	0.0057*	0.0057*	0.0055	0.0068*	0.0068
	(0.0034)	(0.0034)	(0.0035)	(0.0036)	(0.0043)
Master's degree	-0.0036	-0.0036	-0.0055**	-0.0053**	-0.0078***
	(0.0025)	(0.0025)	(0.0023)	(0.0024)	(0.0027)
1 year experience	-0.0060	-0.0060	-0.0062	-0.0055	0.0048
	(0.0044)	(0.0044)	(0.0046)	(0.0052)	(0.0064)
2 years exp.	-0.0129***	-0.0129***	-0.0139***	-0.0139**	-0.0070
	(0.0047)	(0.0047)	(0.0050)	(0.0055)	(0.0071)
3-4 years exp.	-0.0134***	-0.0133***	-0.0128***	-0.0122**	-0.0048
	(0.0044)	(0.0044)	(0.0047)	(0.0053)	(0.0065)
5-9 years exp.	-0.0170***	-0.0170***	-0.0171***	-0.0171***	-0.0050
	(0.0046)	(0.0046)	(0.0050)	(0.0053)	(0.0066)
10+ years exp.	-0.0322***	-0.0321***	-0.0337***	-0.0374***	-0.0269***
	(0.0056)	(0.0056)	(0.0059)	(0.0062)	(0.0074)
New to school	.	.	.	.	0.0117***
					(0.0031)
School					
Urban	0.0115**	0.0115**	0.0047	.	.
	(0.0055)	(0.0055)	(0.0065)		
Rural	-0.0033	-0.0033	-0.0041	.	.
	(0.0039)	(0.0039)	(0.0049)		
Title 1	0.0016	0.0017	0.0032	0.0072	0.0145**
	(0.0041)	(0.0041)	(0.0042)	(0.0055)	(0.0065)
% free/reduced	-0.0031	-0.0031	0.0048	-0.0076	-0.0011
	(0.0083)	(0.0083)	(0.0112)	(0.0219)	(0.0240)
% black	0.0261***	0.0262***	-0.0025	-0.0591	-0.0706
	(0.0080)	(0.0080)	(0.0111)	(0.0531)	(0.0676)
Charter	-0.0425***	-0.0424***	.	.	.
	(0.0066)	(0.0066)			
Attrition	0.0238**	0.0237**	0.0143	0.0240	0.0189
	(0.0110)	(0.0110)	(0.0125)	(0.0147)	(0.0188)
Proficiency					
2nd	0.0048	0.0048	-0.0017	-0.0049	-0.0041
	(0.0037)	(0.0037)	(0.0037)	(0.0050)	(0.0064)
3rd	0.0025	0.0025	-0.0015	-0.0055	-0.0028
	(0.0041)	(0.0041)	(0.0043)	(0.0056)	(0.0070)

Table 4, Continued

4th (highest)	-0.0007	-0.0007	-0.0025	-0.0057	-0.0080
	(0.0048)	(0.0048)	(0.0046)	(0.0063)	(0.0080)
Classroom					
First grade	0.0152***	.	0.0165***	0.0163***	0.0207***
	(0.0035)		(0.0035)	(0.0040)	(0.0047)
Second grade	0.0226***	.	0.0241***	0.0243***	0.0284***
	(0.0037)		(0.0037)	(0.0041)	(0.0047)
Third grade	0.0156***	.	0.0167***	0.0161***	0.0189***
	(0.0034)		(0.0035)	(0.0040)	(0.0046)
Fourth grade	0.0119***	.	0.0127***	0.0130***	0.0174***
	(0.0040)		(0.0040)	(0.0046)	(0.0052)
Fifth grade	-0.0074*	.	-0.0074*	-0.0021	0.0002
	(0.0040)		(0.0040)	(0.0046)	(0.0054)
2005	0.0110**	.	0.0115**	0.0121*	0.0017
	(0.0056)		(0.0058)	(0.0063)	(0.0056)
2006	0.0045	.	0.0047	0.0051	-0.0072
	(0.0057)		(0.0058)	(0.0060)	(0.0051)
2007	0.0153***	.	0.0161***	0.0173***	0.0056
	(0.0052)		(0.0053)	(0.0056)	(0.0044)
2008	0.0113**	.	0.0115**	0.0124**	-
	(0.0053)		(0.0052)	(0.0053)	-
Fixed Effects	None	Grade-year	District	School	School
Log likelihood	-27335	-27327	-25857	-24400	-19520
Pseudo R^2	0.0214	0.0217	0.0660	0.0941	0.0996
Districts	692	692	597	598	588
Schools	2158	2158	2029	1603	1513
Observations	113,978	113,978	110,406	100,408	77,317

Notes: Michigan REP data. *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is an indicator of within-school grade switching. Parentheses contain standard errors that are robust to clustering at the district level. Omitted categories include 0 years of prior experience, suburban school, proficiency quartile 1, kindergarten teacher, and 2004. In column 3, each charter school is coded as a unique district and receives its own fixed effect. The sample size decreases in columns 3 and 4, as observations from districts/schools that experience no within-school grade-level reassignments are dropped from the logit likelihood function. In column 5, a year of data is lost in constructing the "new to school" indicator.

Table 5: Grade Switching as a Predictor of Teacher Turnover (Logit APE)

Outcome	Stay Put	Switch grades	Leave school, district, or self-cont. classroom	Leave teaching or state
	1	2	3	4
Previous Switches	-0.0697***	0.0506***	0.0009	-0.0044*
	(0.0060)	(0.0030)	(0.0030)	(0.0025)
N	91045	91045	91045	91045
Pseudo R-squared	0.0391	0.0457	0.0511	0.0748
Log-Likelihood	-48279	-21699	-29611	-20029

Notes: Michigan REP data. *** p<0.01, * p<0.1. Parentheses contain standard errors that are robust to clustering at the district level. In addition to the "number of previous switches," the logit models estimated in this table include the same set of covariates as the model estimated in column 1 of table 4. One year of data was lost in creating the "previous switches" variable. Adding school FE to the model produces qualitatively similar results.

Table 6: Logit Average Partial Effects on Teacher Turnover

Type of turnover:	Leave school/district 1	Leave teaching/state 2
Teacher		
Master's degree	0.0058*	-0.0113***
	(0.0031)	(0.0017)
1 year experience	-0.0231***	-0.0177***
	(0.0057)	(0.0046)
2 years experience	-0.0344***	-0.0178***
	(0.0070)	(0.0049)
3-4 years exper.	-0.0428***	-0.0359***
	(0.0066)	(0.0051)
5-9 years exper.	-0.0586***	-0.0728***
	(0.0074)	(0.0050)
10+ years exper.	-0.0883***	-0.0606***
	(0.0082)	(0.0049)
School		
% free/red.lunch	0.0480***	0.0067
	(0.0146)	(0.0053)
% black	0.0379***	0.0117**
	(0.0102)	(0.0047)
Charter	-0.0551***	0.0620***
	(0.0084)	(0.0040)
Quartile 2	-0.0197***	-0.0042
	(0.0049)	(0.0026)
Quartile 3	-0.0289***	-0.0033
	(0.0059)	(0.0026)
Quartile 4 (highest)	-0.0395***	-0.0020
	(0.0069)	(0.0028)
Pseudo R^2	0.049	0.073
Log Likelihood	-36925	-25643

Notes: Michigan REP data. N = 113,978. *** p<0.01, ** p<0.05, * p<0.1. Parentheses contain standard errors that are robust to clustering at the district level. Only selected variables are reported; the specifications estimated in this table are identical to that estimated in column 1 of table 4, less attrition. Adding school FE to the models produces qualitatively similar results.

Appendix Table A.1: Within-school Grade-level Reassignment Origins and Destinations

In Michigan (REP Administrative Data Universe)

Grade in year t	Grade in year t + 1					
	K	1	2	3	4	5
K	75.2%	3.1%	1.2%	0.8%	0.4%	0.3%
1	1.6%	77.1%	3.6%	1.1%	0.5%	0.3%
2	0.8%	2.9%	76.0%	2.7%	0.9%	0.4%
3	0.4%	0.9%	2.1%	75.5%	2.6%	1.0%
4	0.3%	0.5%	0.8%	2.1%	76.0%	3.0%
5	0.2%	0.4%	0.5%	1.3%	2.7%	75.9%

In U.S. (SASS Nationally Representative Sample)

Grade in year t	Grade in year t + 1					
	K	1	2	3	4	5
K	83.5%	1.6%	0.6%	0.0%	0.0%	0.5%
1	1.7%	67.6%	6.3%	3.8%	0.0%	0.5%
2	0.5%	5.9%	68.7%	1.4%	2.2%	0.0%
3	0.6%	0.0%	5.1%	74.1%	3.0%	2.6%
4	0.0%	0.7%	0.3%	0.7%	73.1%	2.0%
5	0.0%	1.0%	1.4%	0.1%	5.2%	71.3%

Notes: Rows do not sum to 100% because the table is restricted to self-contained teachers who remained in a self-contained classroom in the same school in subsequent years.