Teacher Mobility and Contextual Factors: The Case of Michigan High Schools

by

Elizabeth Covay Minor, Guan Saw, Kenneth Frank, and Barbara Schneider

Michigan State University

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In studying teacher mobility, educational sociologists often focus on what is occurring within schools; however, it is equally important to consider the larger context in which schools are situated, and the impact this may have on teacher turnover. This study addresses the role of contextual factors on teacher turnover within and between school years. Using eight year of Michigan state-wide data, two specific contextual factors are examined: a state-wide curriculum change and the recent economic recession. Results show that while the recent recession is related to higher rates of teacher mobility, following the announcement of statewide curricular change, teacher mobility rates also increased. Factors related to teacher mobility are contingent upon the locale of the school; the recession was significantly related to teacher mobility rates for schools in towns and rural areas, yet this was not the case in urban and suburban areas where curricular reform was more significantly related to teacher mobility. We also find surprising rates of within school year mobility. Given the implications of these findings, we conclude by discussing the potential consequences of not considering locale contextual factors in estimating teacher mobility.

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Schools, not unlike many organizations, contend with the churn of their workforce. While some turnover within an organization is common and sometimes positive, high turnover rates can decrease their effectiveness and efficiency (Ingersoll 2001). In 2007-2008, about 15% of the nation's teachers either moved schools or left teaching altogether to pursue other work (Keigher & Cross 2010).Past research shows that high teacher turnover has negative effects on school operations and even more troublesome is the impact on student outcomes (Ingersoll 2001; Ronfeldt, Loeb, & Wyckoff 2013). Research on why teachers leave has primarily looked within the schools focusing on principal leadership, student behavior, and school climate (Ingersoll 2001; Kukla-Acedvedo 2009; Stuit and Smith 2010). However, what has received limited attention are other local contextual factors that lie outside the school that may also be having an impact on teacher mobility.

This study focuses on two specific contextual factors, among different high schools, that have recently impacted teacher mobility: (1) the recession and its impact on parent employment and fluctuations in state aid; and (2) the adoption of a state-wide curricular policy. The ongoing economic crisis is profoundly limiting available resources for teacher hires and other school expenditures but also impacting various aspects of the organization that cannot easily be captured by reduction in dollars, such as curricular reforms. Keesler (2010) suggests that changes in educational reform may be related to teacher workforce composition in a particular school. When a reform requires changes to the curriculum (e.g., requiring that students take particular courses), schools may need to make adjustments to their teacher staff to ensure that instructors' expertise is appropriate for the content material specified by the reform.

The current study examines recession relevant economic factors and changes in state school curricular policy, focusing on their relationships to teacher mobility rates between high schools. Using historical data on high schools in the state of Michigan for the past eight years, results show that economic factors and state policy are related to teacher mobility in public secondary schools. More specifically, findings show that in years coinciding with the announcement of an education policy that required a more rigorous high school curriculum are associated with increases in the teacher mobility rates, especially within schools with higher than average part-time teacher staff. Second, independent of this curriculum change, results also show an effect for the recession both with respect to employment rates and decline in state aid. This significant increase in teacher mobility is found primarily in towns and rural areas, both of which are often overlooked in studies which have tended to examine urban districts and surrounding SMSAs.

Factors Related to Teacher Mobility

Research shows that teachers tend to leave schools with significant proportions of minority, poor, and academically struggling students (Allensworth, Ponisciak, & Mazzeo 2009; Keigher & Cross 2010). A recent national survey reports that approximately one out of every four public school teachers changed schools due to personal life factors (Keigher & Cross 2010). Other explanations for teacher turnover include undesirable working conditions, lack of administrative support, poor student motivation, disruptive behavioral climate, and unfulfilled salary needs (Ingersoll 2001; Kukla-Acedvedo 2009; Stuit and Smith 2010). One limitation of previous research is treating teacher decision-making as though it happens within a school-centric bubble independent of larger contextual factors (e.g., Kukla-Acedvdeo 2009). The examination of larger contextual factors is critical to the study of teacher mobility as these are

the conditions often related to hiring and firing decisions within a school. Schools make staffing decisions based on many factors such as resources for faculty salaries, facilities, and instructional materials; all of which are influenced by larger economic and policy forces.

It can be challenging to capture larger contextual factors without multiple years of data to gauge longitudinal changes. In the current study, we have eight years of administrative and continuous demographic census data for all public schools and students in the state of Michigan. These data allow the study of changes in teacher mobility before and after major contextual changes such as curricular and economic fluctuations.

Shifts in Education Policy

Few studies have examined how the adoption and implementation of more macro educational policies may be related to the changes in the composition of the teaching force (Keesler 2010). For example, schools may need to redirect resources to meet the demands of the curriculum by placing a de-emphasis on certain courses such as art and music and reducing the number of staff in these areas while augmenting other core subjects. The Michigan Merit Curriculum (MMC) is such a reform, with a focus on increasing the number and rigor of math and science courses intended to increase students' college and career readiness.

The MMC requires all high school students in Michigan to take a rigorous curriculum including math courses such as algebra II and science courses such as chemistry or physics. While some schools are currently offering these courses other schools have had to make significant changes to their curricular offerings and staff composition. Both schools and teachers may have had to cope with these new curricular agenda, forcing certain teachers to either change schools or find other sources of employment. Relevant to this study, Michigan announced the MMC in the spring of 2006 and implemented in the 2007-2008 school year. We suspected that

the announcement of MMC would be related to changes in the teaching force in the following year(s) given the emphasis on meeting these demands.

Economic and Locale Influences on Teacher Mobility

Prior to the implementation of the MMC in 2006, Michigan's economy was changing. While the national recession primarily occurred in 2007-2009, Michigan experienced a "one-state recession" in the early 2000s.[1] Figure 1 shows a sustained decline in per-capita personal income for Michigan residents relative to the nation, beginning in 2003. In 2009 Michigan experienced a further dip in their per-capita personal income that coincided with the national recession further reducing state revenues, and consequently the general education fund. These major economic transitions can have significant repercussions on localized institutions such as schools which are dependent upon these predetermined revenues. Our study with its longitudinal data allows us to examine pre-and post-conditions that are oftentimes unaccounted for in studies of teacher mobility.

While recent research has examined teacher mobility on a national level (e.g. Ingersoll & May 2012) and within particular districts (e.g. Allensworth Ponisciak, & Mazzeo 2009; Ronfeldt, Loeb, & Wyckoff 2013), few studies have examined an entire state. Since teachers are hired at the district level, large urban districts may be more likely to shift their teachers from one high school to the next depending on particular school needs. Thus, in urban areas there are many more possibilities for redistributing teachers among several schools than in small towns or rural areas mainly due to differences in school size and student teacher ratios. Consequently, while studies focusing on urban locales help us to calculate measures of teacher mobility in cities, we lack a fuller understanding of teacher mobility within other locales, such as rural areas, as well as across locales, an issue which a state-wide dataset like ours addresses.

Time during School Year

Not only is previous research limited by the inability to reflect larger contextual factors—parental unemployment, economic conditions, and changes in the population—most studies examining teacher mobility look at the overall mobility from one school year to the next but do not consider turnover within the academic year (e.g., Allensworth, Poniscaik, & Mazzeo 2009; Kukla-Acevedo 2009; Keigher & Cross 2010; Ingersoll & May 2012). Typically, teachers leave at the end of the school year; however, the teachers who leave in the middle of the year may be different than those teachers who leave in June. Given the different populations of teachers that may leave within the school year versus those who leave at the end of the year it is important to consider differences in mobility within the school year compared to mobility in June; as well as changes in mobility from one year to the next. This study examines these variations in the timing of teacher turnover observing that rates in the fall are higher than expected.

While the focus of the current study is on teacher mobility rates, we also take into account student and principal mobility rates as important contextual factors that may be impacting teacher turnover (e.g., Ingersoll 2001; Kukla-Acedvedo 2009; Stuit and Smith 2010). Additionally, we account for other factors traditionally associated with teacher mobility, such as school poverty and other demographic characteristics. We are able to determine these characteristics for all schools in the state and control for them, thus allowing us to isolate variations in teacher turnover by locale.

Research Questions

This study examines three questions: (1) what economic and policy reforms are related to teacher mobility; (2) how does teacher mobility at the school level vary in accordance with these

economic conditions and reforms; and (3) how do these variation in teacher mobility vary over time and locale?

Data and Methods

Data

This study uses a state-wide longitudinal sample of teachers in Michigan, who are employed in regular public high schools. The data come from the Registry of Educational Personal (REP), provided by Michigan Department of Education (MDE), which includes all certified teachers from 2003-2004[2] through 2011-2012 school years. Each year there is a fall and a spring collection of employed teachers allowing for the examination of teacher mobility at both time points during the school year. These analyses are restricted to teachers with a full-time equivalent (FTE) of one and with part of their teaching assignment in high schools. Depending on the specific school year-semester over the course of the eight years, the sample ranges from 17,918 to 23,555 high school teachers with 649 to 706 Michigan public high schools each semester.

Dependent Variables

The dependent variable is the teacher mobility rate at the school level. To calculate the school level percent of teachers leaving in a given semester, we first use individual teacher records. Since teachers may have teaching assignments in more than one school[3], we focus on the teacher's school in which they have their highest FTE and spend the most time. We then compare this school assignment to the school in which that teacher has their highest FTE the following semester. If a teacher's primary FTE the following semester is in a different school, that teacher is considered to have left the school. Also, if the teacher is not working at a school the following semester or exits from the REP system, that teacher is also considered to have left

the school. We then aggregate to the school level and divide the number of teachers who left by the total number of teachers with a FTE of one or greater in the school to calculate a school level percentage of teachers leaving.

Independent Variables

The first economic context variable is the unemployment rate for the area in which the school is located and where most of the students reside. This rate is obtained from the Bureau of Labor Statistics (Bureau of Labor Statistics 2011). This rate is calculated monthly, and we average it across the year and weight by enrollment. According to BLS (2012), while the most recent national recession began in December 2007, employment reached its bottom during late 2009 and early 2010. Thus we expect the effects of the recent economic recession on teaching labor force in Michigan may not become measurable until 2009-2010 school years. We include dummy year variables in our models to account for the timing of the recession.

The next independent variable is the year prior to the implementation of the MMC. The MMC was officially implemented in the 2007-08 school year. We expect to see its immediate effects on changes in teaching force following the announcement of the policy in the spring of 2006 as schools will start to make changes in anticipation of the implementation.

Student mobility and principal instability are also expected to impact teacher mobility. Student mobility is calculated by following the same procedure used for teacher mobility. A student's school for a given semester is compared to the student's school the next semester.

Principal instability is based on principals who have an FTE equal to one in a given semester. If the principal in a school leaves by the end of the semester the school has a value of one for principal instability. For this measure we have a considerable amount of missing data (roughly 27%), and the inclusion of this variable in our models would reduce our sample by a

fourth. To decrease the amount of missing data, we also include assistant principals as they are part of the leadership/administration in a school. When there are more than one principal or assistant principal within a school, the school is considered to have stability in principal leadership even if one of the principals/assistant principals has left the school in the following semester. To maintain the sample size we also include a measure of whether the school is missing information about principal instability as a dummy variable.

Finally, locale is measured by four categories: urban, suburban, town, and rural, based on the definitions from the Common Core of Data.

Control Variables

To account for other contextual and compositional factors that may be related to teacher mobility, we include a series of control variables. To calculate the size of the teaching force in a school, the percent of full-time teachers within a school was divided by the number of teachers with an FTE of at least one at the high school level by the number of full- and part-time teachers within the school. Using data from the Common Core of Data, we also include the percentage of students receiving free or reduced price lunch, the percentage of minority students, and school size.

Methods

To examine the factors related to the baseline year of data, we ran an ordinary least squares (OLS) regression for the 2003-2004 school year estimated by the following:

$$TchMob_{it} = \beta_0 + \beta_1 Jobless_{it} + \beta_2 StuMob_{it} + \beta_3 PrinMob_{it} + \beta_4 Urban_{it} + \beta_4 Town_{it} + \beta_4 Rural_{it} + \beta_4 Fall_{it} + \gamma X_{it} + u_{it} \quad (1)$$

where the dependent variable $TchMob_{it}$ corresponds to a measure of teacher mobility rate for school *i* in year *t*, $Jobless_{it}$ is the county unemployment rate, $StuMob_{it}$ is the student mobility rate, $PrinMob_{it}$ is an indicator of whether the principal in school has left, $Fall_{it}$ is a dummy

variable indicating the fall semester, X_{it} is a vector of school covariates, and u_{it} is an error term. As school locale indicators,$Urban_{it}$, $Town_{it}$, and $Rural_{it}$ are three categories of urban, town, and rural area respectively, with suburban as reference group.

Taking advantage of the fact that there are multiple years/semesters of observations for a school, we estimate additional school fixed effects models. In our second fixed effects models, we add the series of year dummy variables to measure the larger contextual factors that may be related to teacher mobility rates. As a time-invariant variable, all locale dummies are automatically dropped in fixed effects estimations. Therefore, in addition to full sample models, we run our fixed effects models separately for urban, suburban, town, and rural locale.

In our data, there are 18 possible year (2004-2012) and semester (fall and spring) combinations. Schools do not have to be present for all 18 possible time points (90% of our school samples have information of at least16 time points). Restricting the sample to those schools that are present for the 18 time points does not alter our results.

Results

What are the trends in Michigan in terms of percentages of teachers leaving their school?

From the beginning of the 2003-2004 school year to the end of the 2011-2012 school year, the number of FTE high school teachers[4] in the state of Michigan decreased by nearly five thousand teachers (see Table 1). Whereas there were 22,641 high school teachers in the fall of the 2003-2004 school year, there were only 17,918 high school teachers in the spring of 2011-2012. This is an overall decrease of about 21%. In general, most of the teachers are retained at the same school from semester to semester; however, anywhere from 5.0 to 17.6% of teachers leave a school depending on the semester and the year. The percentages in spring are fairly consistent with national surveys. The 2008-2009 Schools and Staffing Survey (SASS) and

Teacher Follow-up Survey (TFS) show that most public school teachers stay at the same school from one year to the next, but about 15% of teachers do not (ranging from 12-16% depending on the year) (Keigher & Cross 2010).

<Insert Table 1 about Here>

Conventional wisdom would suggest that we would see most of the teacher mobility in the spring of the school year. In Michigan, while most of the teacher mobility that we see is in the spring of the school year (10.1 to 17.6%), there is also more than expected numbers of teachers leaving during the fall semester, which may create more organizational disruption in the middle of a school year. From 2003-2004 to 2011-2012, the percentages of teachers leaving after the fall semester range from 5.0 to 8.5%. For the most part, the percentage of teachers leaving in the fall is around 5 to 6% with the exception of the percentage of teacher leaving after the fall of the 2009-2010 school year, which corresponds to the economic downturn in Michigan.

The percentages of teachers leaving after the spring of the school year have increased steadily from the 2003-2004 school year, with the exception of spring 2005-2006 and 2009-2010. In spring of 2003-2004, 10.1% of teachers left their current school and the percentage of teachers leaving increased to 13.2% by the spring of the 2010-2011 school year. The two notable exceptions to the pattern are two large increases for spring 2005-2006 with 17.6% of teachers leaving and 2009-2010 with 16.9%. These correspond to the announcement of the MMC and to the economic downturn.

What types of schools have high percentages of teachers leaving?

A growing body of literature has shown that disadvantaged schools tend to have higher teacher turnover rates. Michigan is not an exception. As presented in Table 2, schools that enroll a higher percentage of students from low-income family and enroll a higher percentage of

minority students have higher percentages of teacher mobility. Schools in the highest quintile of free and reduced priced lunch students have 15.3% of their teachers leaving each year. The next highest percentage of teachers leaving is for the fourth quintile with 11% of teachers leaving. Nationally, teachers who move from school to school tend to leave schools that have higher percentages of students eligible for free and reduced priced lunches. About 15% of the teachers in schools with 75% or more of their students eligible for free and reduced priced lunch leave those schools from one year to the next. Slightly fewer teachers leave schools with less than 35% free and reduced priced lunch students at 14% (Keigher & Cross 2010). The percentage of teachers leaving the lowest category of percentage of free and reduced priced lunch students in the national data is higher than the percentage of teachers leaving the lowest quintile of free and reduced priced lunch schools in Michigan, which has 7.8% of teachers leaving on average.

In Michigan, schools with the highest percentages of black students have considerably higher percentages of teachers leaving. Schools in the highest quintile have 16.1% of teachers leaving, which is almost twice that of the other quintiles at 8.6-9% of teachers leaving.

<Insert Table 2 about Here>

Schools with high percentages of teachers leaving tend to be in counties with higher unemployment rates and in urban areas. More specifically, when dividing the schools into quintiles, schools in the highest quintile of county unemployment rates have a teacher mobility rate of 14.5% compared to the other four quintiles which have teacher mobility rates of 8.4-9.9%. Not surprisingly, the lowest quintile also has the lowest rate of teacher mobility. Nationally, teacher mobility is fairly even across locale (Keigher & Cross 2010); however, in Michigan urban areas have the highest percentages of teachers leaving at 14.5%. Schools in suburban locations, towns, and rural locations tend to have about 8-9% of their teachers leave.

Schools with higher rates of instability of students and principals also have higher rates of teacher mobility. Schools in the highest quintile of student mobility have 17.4% of their teachers leave compared to schools in the lowest quintile of student, which have 7.5% of their teacher leaving. In terms of principal instability, schools that have principals leave have 18.4% of their teachers leave compared to schools that retain their principals who have 9.6% of their teachers leave.

To what extent is local context related to school level percentages of teaching leaving?

For our data, 2004 is our baseline year. Model 3.1 (see Table 3) is the OLS regression results predicting initial teacher mobility. Student mobility rates and percent black students are positively related to teacher mobility. In other words, schools that have high percentages of student mobility and percent black students tend to have higher percentages of teachers leaving the schools. School size and percent of full time teachers are negatively related to teacher mobility. As the size of the student population within a school increases and the percent of full time teachers increase, the school's percentage of teacher mobility decreases. Additionally, the towns and rural areas have lower percentages of teachers leaving compared to suburban areas. Of note, the county unemployment rate is not statistically significant when predicting teacher mobility in 2004.

<Insert Table 3 about Here>

Initial disadvantage in teacher mobility is related to schools having higher percentages of minority student, small school size, lower percentages of full time teachers, as well as being in suburban areas. Models 3.2 and 3.3 are the fixed effects models that allow us to examine a rich set of contextual factors such as the recession and the MMC as well as take into account the multiple years of data. The results in models 3.2 and 3.3 are similar. In both, student mobility

and principal instability are significantly related to teacher mobility. In schools that have higher percentages of students leaving, there are also higher percentages of teachers leaving. Moreover, schools have their principal instability tend to also have higher percentages of teachers leaving. Additionally, as the percentage of full time teachers increases the percentage of teachers leaving decreases, and there are fewer teachers leaving in the fall semester than in the spring semester.

In Model 3.2, the county unemployment rate is statistically significant. As the county unemployment rate increases, schools have higher percentages of teachers leaving. Model 3.3 uses year dummy variables in addition to the county unemployment rate in order to capture larger contextual effects. Compared to 2004, the years following have seen an increase in the percentages of teachers leaving. More specifically, 2006 and 2007 have statistically significantly higher percentages of teachers leaving. In 2006, there was 4.0 percentage points more teachers leaving than in 2004 and roughly 1.0 percentage points more in 2007. The findings suggest that the effects of the MMC in the changes of teaching force may occur starting in 2006, immediately after the announcement of the policy. Similarly, we find that both year 2010 and 2011 has significantly higher teacher mobility rates, increasing by 3.9 and 1.7 percentage points respectively, suggesting that the recent economic recession has affected teacher labor market substantially.

To account for locale in the fixed effects models, we estimate our models by locale (see Table 4). When teacher mobility is examined separately by locale, we see some consistent factors across locales that are related to teacher mobility. As in the models in Table 3, the fall semester has a lower percentage of teachers leaving compared to the spring semester. Additionally, 2006 sees an increase in teacher mobility compared to 2004 with the magnitude dependent on the locale. Schools in an urban location see a 5.2 percentage point increase in

teacher mobility when comparing 2004 to 2006. Suburban schools have a 2.1 percentage point increase, towns have a 5.0 percentage point increase, and rural areas have a 4.3 percentages point increase compared to 2004.

<Insert Table 4 about Here>

There are also some factors that are significant only in particular locales. Only in schools with rural locales is the percentage of full time teachers significantly related to teacher mobility. As the percent of full time teachers in rural schools increase, the percentage of teachers leaving decreases. Additionally, significantly higher teacher mobility rates were detected in 2010 (economic recession) for only town and rural schools (and marginally suburban) but not for urban schools. For schools in towns, there was a 7.6 percentage point increase in teacher mobility in 2010 and a 4.9 percentage point increase for 2011 compared to 2004. Similarly, for schools in rural areas there was a 5.7 percentage point increase in 2010 and 3.4 percentage point increase in 2011 compared to 2004.

Conclusion

Much of the previous research on teacher mobility rates is limited by neglecting the larger contextual factors that may be related to teacher mobility. In this study, we specifically focus on how contextual factors such as the recession and a change in educational policy are related to rates teacher mobility, finding that context is related to teacher mobility rates.

In terms of types of schools that teachers leave, results are consistent with previous research. Schools with more disadvantaged populations tend to have higher percentages of students leaving. Factors, such as student mobility, percent of minority students, school size, and percent of full-time teachers, all affect the school's teacher turnover rate at baseline (i.e., 2004).

The factors that are related to the initial percentage of teacher mobility are also subsequently related to later turnover rates.

Examining the fixed effects models, we find that context matters for teacher mobility. We observe significantly larger percentages of teachers leaving schools following the announcement of the MMC as well as the economic downturn. It should be noted that the MMC effect is independent of the recession effect. We see contextual effects for both of these factors. Additionally, the factors that predict teacher mobility depend on the locale of school. Teacher turnover in towns and rural areas appear affected by the recession whereas urban areas seem more affected by the curricular reform. It may be that in towns and rural areas where economic downturns have been a long term reality, the latest economic shock was the breaking point for schools forcing them to reduce their teacher population as the economic base of the communities continued to decline. By examining only one type of locale (e.g., urban areas), we may overlook a fuller understanding of teacher mobility.

Teacher mobility is problematic for the functioning of organizations, particularly when it occurs within the school year. High teacher turnover may restrict the flow of resources, especially local knowledge critical for teaching, within schools. In particular, when teacher turnover is high teachers may not develop an identity with the collective of the school. In turn, they may allocate their help or other resources only to specific colleagues that they have come to trust (Frank, 2009). The result is that resources such as curricular materials or local knowledge become isolated in pockets within the school, restricting the flow from where it could be most valuable. For example, a junior teacher may have few close colleagues within her school, and therefore must rely on others to help her out of a general contribution to the school. But in schools with high turnover, senior teachers with knowledge or other resources may limit their

investments in junior colleagues who are likely to leave in a short period. As a result the junior teacher who is most in need of various supports is least able to access them.

Note that because the helper's logic is based on the *expectation* that a teacher will remain in a school, vicious cycles can occur. In a school with high turnover, teachers may restrict their investments in other teachers and their students. This could affect even teachers with high intentions and likelihood to stay in a school. In turn, the restricted investments reduce the quality of the workplace, and thus reduce the probability that any given teacher will remain in the school. In some sense this is the inverse of a positive cycle in which actors increasingly contribute to a well-functioning collective action (Macy, 1991).

Why teachers leave has not been the focus of this analysis; rather, our main goal in this paper is to instead examine the cyclical nature of teacher mobility rates across different locales while accounting for economic conditions and policy reforms. In some instances, the exiting of a teacher from a school is not a personal decision but one spurred by administrative actions beyond their control and those administrative actions are influenced larger external forces. On the basis of our results when estimating probabilistic models of teacher mobility, we need to factor in these larger conditions and their impacts over time. This is perhaps most notable in the instance of teacher mobility in urban areas, which seemingly were not affected by the economic downturn but were very much affected by the longer term implementation of the MMC's required modification of the teaching force. The value of state data here is most evident when estimating teacher mobility, especially for determining potential teacher shortages, revealing that there is no consistency in the precise factors at play and not all locales are affected equally.

TABLE 1

Distribution of teachers who will be retained or left, 2003-2012

School Year[1]	Semester	Number of Schools	Number of Teachers	Will be retained		Will be left	
				N	%	N	%
2004	Fall	649	22,641	21,434	94.7	1,207	5.3
	Spring	661	23,046	20,723	89.9	2,323	10.1
2005	Fall	667	23,555	22,200	94.3	1,355	5.8
	Spring	667	23,043	20,366	88.4	2,677	11.6
2006	Fall	672	23,424	22,097	94.3	1,327	5.7
	Spring	669	23,318	19,218	82.4	4,100	17.6
2007	Fall	666	21,727	20,504	94.4	1,223	5.6
	Spring	651	21,165	18,685	88.3	2,480	11.7
2008	Fall	664	21,557	20,488	95.0	1,069	5.0
	Spring	662	21,187	18,746	88.5	2,441	11.5
2009	Fall	669	21,307	20,240	95.0	1,067	5.0
	Spring	668	20,893	18,333	87.8	2,560	12.3
2010	Fall	669	20,725	18,971	91.5	1,754	8.5
	Spring	664	19,570	16,264	83.1	3,306	16.9
2011	Fall	657	19,063	17,921	94.0	1,142	6.0
	Spring	659	18,655	16,187	86.8	2,468	13.2
2012	Fall	656	18,405	17,283	93.9	1,122	6.1
	Spring	654	17,918	-	-	-	-

Note. [1] Year in which spring semester of academic year occurred, for example, "2004" refers to 2003-2004 school year.

TABLE 2

Teacher mobility rates in Michigan public high schools by school characteristics[1], 2004-2012 (n=706)

	Teacher mobility rate (%)		Teacher mobility rate (%)
County unemployment rate		Urbanicity	
Q1 (Lowest quintile)	8.4	City	14.5
Q2	9.1	Suburban	9.0
Q3	8.7	Town	8.4
Q4	9.9	Rural	9.3
Q5 (Highest quintile)	14.5	% of full time teachers	
% of free/reduced lunch students		Q1	12.2
Q1	7.8	Q2	8.8
Q2	8.0	Q3	8.3
Q3	8.5	Q4	8.9
Q4	11.0	Q5	12.1
Q5	15.3	Student mobility rate	
% of black students		Q1	7.5
Q1	9.0	Q2	7.8
Q2	8.6	Q3	8.5
Q3	8.7	Q4	9.9
Q4	8.6	Q5	17.4
Q5	16.1	Principal status	
School size		Retained	9.6
Q1	13.5	Left	18.4
Q2	10.3	(Missing)	10.2
Q3	8.7		
Q4	9.3		
Q5	8.4		

Note. [1] Every school measure, except urbanicity and principal status, is divided into five quintiles based on the average values for each measure over years of available data (2004-2012).

TABLE 3
Baseline and fixed effects models for predicting teacher mobility rates, 2004-2011

	Teacher mobility rate					
	2003-2004		FE			
	(1)		(2)		(3)	
County unemployment rate	0.0882		0.2867	***	0.1635	
	(0.1828)		(0.0572)		(0.1681)	
Student mobility rate	0.3069	**	0.2312	***	0.2287	***
	(0.1078)		(0.0545)		(0.0538)	
Principal left (ref: retained)	0.0341		0.0345	***	0.0331	***
	(0.0263)		(0.0091)		(0.0090)	
% of free/reduced lunch students	-0.0434	†	0.0003		-0.0103	
	(0.0226)		(0.0180)		(0.0182)	
% of black students	0.0631	**	0.0645		0.0726	
	(0.0238)		(0.0459)		(0.0511)	
log(school size)	-0.0271	**	-0.0205		-0.0246	†
	(0.0085)		(0.0135)		(0.0136)	
% of full time teachers	-0.0902	**	-0.0480	*	-0.0479	*
	(0.0332)		(0.0203)		(0.0216)	
City (ref: suburban)	0.0018					
	(0.0131)					
Town (ref: suburban)	-0.0233	**				
	(0.0079)					
Rural (ref. suburban)	-0.0281	**				
	(0.0088)					
Fall semester (ref: Spring)	-0.0176		-0.0536	***	-0.0540	***
	(0.0111)		(0.0061)		(0.0060)	
Year dummy - 2005 (ref: 2004)					0.0083	*
					(0.0037)	
Year dummy – 2006					0.0403	***
					(0.0045)	
Year dummy – 2007					0.0099	*
					(0.0041)	
Year dummy – 2008					0.0031	
					(0.0040)	
Year dummy – 2009					-0.0025	
					(0.0085)	
Year dummy – 2010					0.0394	**
					(0.0120)	
Year dummy - 2011					0.0167	†
					(0.0086)	
Constant	0.3300	***	0.2447	**	0.2712	**
	(0.0668)		(0.0881)		(0.0892)	
Number of observations	1,227		10,395		10,395	

Note. All models include a dummy variable indicating if the school is missing information about principal instability in order to maintain the sample size. Tests of significant differences are based on standard errors clustered by school. Standard errors in parentheses. † p<0.1; * p<0.05; ** p<0.01; *** p<0.001.

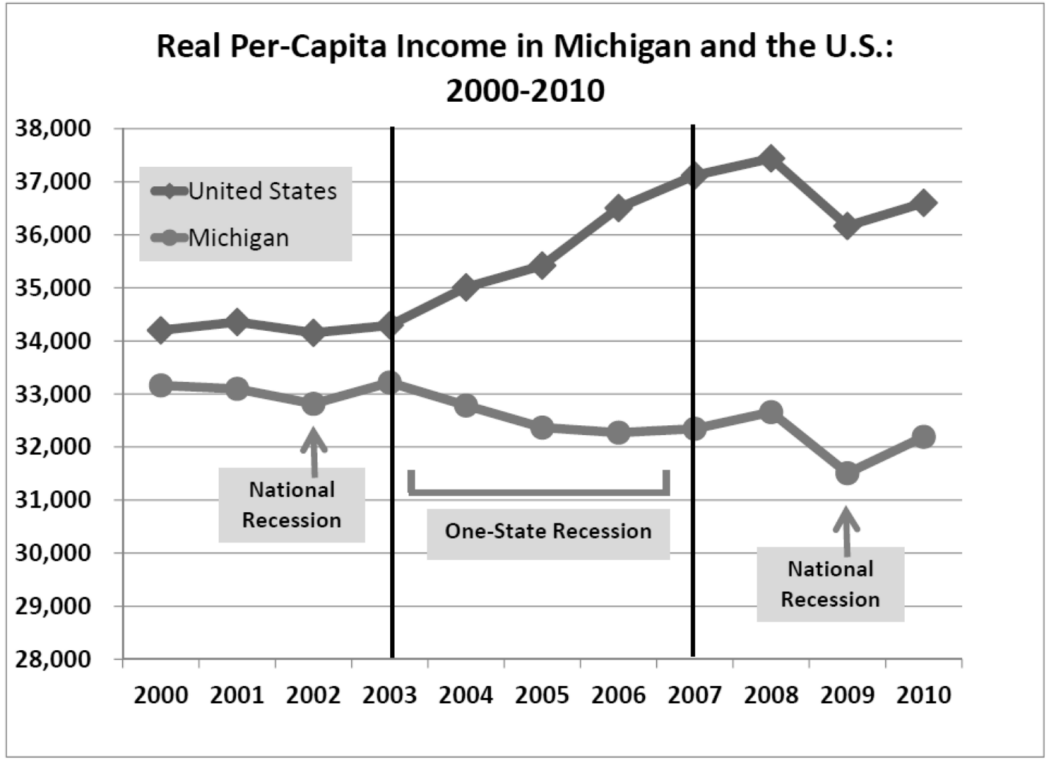
TABLE 4

Fixed effects models for predicting teacher mobility rates by urbanicity, 2004-2011

	Urban	Suburb	Town	Rural
County unemployment rate	0.7585†	0.0583	-0.6078†	-0.2314
	(0.3972)	(0.2400)	(0.3153)	(0.2561)
Student mobility rate	0.3816**	0.1161	0.1056	0.1161†
	(0.1221)	(0.1096)	(0.0782)	(0.0691)
Principal left (ref: retained)	0.0665*	0.0568†	0.0453*	0.0181†
	(0.0316)	(0.0328)	(0.0184)	(0.0095)
% of free/reduced lunch students	-0.0143	-0.0169	-0.0111	-0.0069
	(0.0527)	(0.0479)	(0.0536)	(0.0195)
% of black students	0.0684	0.0500	-0.3701*	0.3029
	(0.0955)	(0.0737)	(0.1715)	(0.3023)
log(school size)	-0.0002	-0.0252	-0.0578	-0.0395
	(0.0286)	(0.0184)	(0.0566)	(0.0246)
% of full time teachers	-0.0860	0.0352	-0.0330	-0.0612**
	(0.1216)	(0.0506)	(0.0501)	(0.0234)
Fall semester (ref: Spring)	-0.0504*	-0.0502***	-0.0500***	-0.0686***
	(0.0213)	(0.0118)	(0.0071)	(0.0073)
Year dummy - 2005 (ref: 2004)	0.0270*	0.0017	-0.0008	0.0056
	(0.0105)	(0.0069)	(0.0090)	(0.0052)
Year dummy – 2006	0.0519***	0.0208**	0.0495***	0.0433***
	(0.0135)	(0.0078)	(0.0117)	(0.0064)
Year dummy – 2007	0.0196	0.0023	0.0030	0.0126*
	(0.0121)	(0.0074)	(0.0093)	(0.0058)
Year dummy – 2008	0.0193	-0.0035	-0.0018	0.0030
	(0.0133)	(0.0079)	(0.0079)	(0.0055)
Year dummy – 2009	-0.0164	-0.0028	0.0336*	0.0086
	(0.0240)	(0.0146)	(0.0146)	(0.0125)
Year dummy – 2010	0.0165	0.0425*	0.0759***	0.0572**
	(0.0353)	(0.0191)	(0.0188)	(0.0180)
Year dummy - 2011	-0.0159	0.0174	0.0485**	0.0337**
	(0.0245)	(0.0148)	(0.0155)	(0.0128)
Constant	0.0658	0.2337	0.5474	0.4015**
	(0.2321)	(0.1490)	(0.3504)	(0.1498)
Number of observations	1704	2734	1127	4830

Note. All models include a dummy variable indicating if the school is missing information about principal instability in order to maintain the sample size. Tests of significant differences are based on standard errors clustered by school. Standard errors in parentheses. † p<0.1; * p<0.05; ** p<0.01; *** p<0.001.

Figure 1. One State Recession



Source: "Real Per-Capita Personal Income in Michigan and the U.S.:2000-2010" by the Michigan Department of Technology, Management, & Budget

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Endnotes

[1] See "Real Per-Capita Personal Income in Michigan and the U.S.:2000-2010" by the Michigan Department of Technology, Management, & Budget

[2] When referring to the school year we use the second year listed to represent the year. For example, we use 2004 when discussing the 2003-2004 school year.

[3] Only 1-3% of our teachers have teaching assignments in multiple schools.

[4] In the results and the discussion, the term "high school teacher" is used to refer to teachers who has FTE of at least 1 and who has at least one assignment in 9th, 10th, 11th, or 12th grade.