What's Happening

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Trends in teacher mobility in Texas and associations with teacher, student, and school characteristics

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Key findings

- During the 2011/12 school year approximately 19 percent of Texas teachers moved between schools within a district, moved between districts in Texas, or left teaching in Texas public schools. By 2015/16 the teacher mobility rate had reached 22 percent. While teachers leaving Texas public schools accounted for the largest share of the teacher mobility rate over the period, teachers moving between districts accounted for most of the increase in mobility rates.
- Teachers with special education certification left Texas public schools at nearly twice the rate of teachers with other teaching certifications.
- Schools with higher proportions of special education, low-performing, and racial/ethnic minority students were associated with higher teacher mobility rates, while schools with higher proportions of English learner students were associated with lower rates.
- Schools with higher overall teacher ratings on the Texas Teacher Evaluation and Support rubric tended to have lower teacher mobility rates.

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Summary

Teacher mobility—defined as teachers moving between schools or leaving the public school system—creates financial costs for schools, districts, and teachers (Coggshall & Sexton, 2008; Costrell & Podgursky, 2009; Feng & Sass, 2016; Watlington, Shockley, Guglielmino, & Felsher, 2010). Some studies suggest that teacher turnover is greater in schools that serve disadvantaged students (Borman & Dowling, 2008), and other studies indicate that teacher turnover can reduce student achievement (Ronfeldt, Loeb, & Wyckoff, 2013).

The Regional Educational Laboratory Southwest Educator Effectiveness Research Alliance expressed interest in investigating annual teacher mobility in Texas. This resulting study, using data from the 2011/12–2015/16 school years, first asked how large teacher mobility was and how much of that movement was between schools in the same district, how much was between districts in Texas, and how much was out of public school teaching in Texas altogether. The study also addressed the relationships between teacher mobility and teachers' personal and professional characteristics, school-level student characteristics, and schools' average teacher ratings (under a new system piloted in 2014/15).

The study used 2011/12–2015/16 data collected by the Texas Education Agency on all Texas public schools. It also used data collected by the Texas Education Agency during the 2014/15 pilot of the Texas Teacher Evaluation and Support System (T-TESS) in 57 school districts—about 5 percent of districts in Texas.

This report provides state and district policymakers in Texas with updated information on trends in teacher mobility and on correlates of mobility in the teaching workforce, offering a systematic baseline for monitoring and planning. The findings will enable policymakers to formulate a strategic, targeted approach for recruiting and retaining teachers rather than relying on generic approaches for increasing the overall supply of teachers or improving recruitment. For example, informed efforts might target attracting and retaining teachers in specific fields (such as special education), at certain stages of their career (such as novice teachers), or in certain geographic areas. Moreover, the analysis enriches the knowledge base about schools' teacher retention and mobility in relation to the quality of the teaching force and may inform policy discussions about the importance of a stable teaching force for teaching effectiveness.

Key findings include:

- During the 2011/12 school year approximately 19 percent of Texas teachers moved between schools within a district, moved between districts in Texas, or left teaching in Texas public schools. By 2015/16 the teacher mobility rate had reached 22 percent. While teachers leaving Texas public schools accounted for the largest share of the teacher mobility rate over the period, teachers moving between districts accounted for most of the increase in mobility rates.
- Teachers with special education certification left Texas public schools at nearly twice the rate of teachers with other teaching certifications.
- Schools with higher proportions of special education, low-performing, and racial/ethnic minority students were associated with higher teacher mobility rates, while schools with higher proportions of English learner students were associated with lower rates.
- Schools with higher overall teacher ratings on the T-TESS teacher evaluation rubric tended to have lower teacher mobility rates.

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Why this study?

Teacher mobility—defined as teachers moving between schools or leaving the public school system—creates financial costs for schools, districts, and teachers themselves (Coggshall & Sexton, 2008; Costrell & Podgursky, 2009; Feng & Sass, 2016; Watlington et al. 2010). Teacher mobility costs the United States between $1.0 billion and $2.2 billion annually (Ingersoll, 2001) and the state of Texas between $108 million and $235 million (Alliance for Excellent Education, 2014).

In addition, teacher mobility may harm student learning by undermining the equitable distribution of teachers across schools, a growing concern for educators and policymakers. Some studies suggest that teacher turnover is greater in schools that serve disadvantaged students (Borman & Dowling, 2008), and a study of New York City schools indicated that teacher turnover can reduce student achievement (Ronfeldt et al., 2013). The U.S. Department of Education's Center on Great Teachers and Leaders (2014) includes teacher mobility as a recommended metric to inform state equity plans, particularly as mobility relates to inequities in the distribution of experienced teachers. If experienced teachers move to or remain at schools with the lowest proportions of economically disadvantaged students and racial/ethnic minority students while teacher turnover is higher at schools with the highest proportions of economically disadvantaged students and racial/ethnic minority students, inequities may result within or across districts. The costs of teacher mobility, therefore, may be borne disproportionately by schools serving higher proportions of disadvantaged students and racial/ethnic minority students.

Teacher mobility may harm student learning by undermining the equitable distribution of teachers across schools, a growing concern for educators and policymakers

Spurred by the development of Texas's educator equity plan, members of the Regional Educational Laboratory (REL) Southwest Educator Effectiveness Research Alliance[1] expressed interest in investigating teacher mobility in Texas. The Texas educator equity plan is part of the federal Excellent Educators for All initiative, which outlines requirements for states to ensure that all students have equitable access to excellent educators. As part of developing the Texas educator equity plan, the Texas Education Agency, in partnership with other state stakeholders, analyzed data to identify root causes of equity gaps (Texas Education Agency, 2015). They found that economically disadvantaged students and racial/ethnic minority students are taught by inexperienced, unqualified, or out-of-field teachers at higher rates than other children and sought strategies to reduce inequities. Although the Texas equity plan did not analyze data on teacher mobility, it mentioned teacher retention as an area needing attention (Texas Education Agency, 2015).

Past studies have assessed trends in teacher mobility in Texas, including relationships between mobility and various teacher and student characteristics (Garcia, Slate, & Delgado, 2009; Hanushek, Kain, & Rivkin, 2004; Sass, Flores, Claeys, & Pérez, 2012; Texas Education Agency, 1995). However, those studies examined data from 1993 to 2010 and may not account for recent changes in the teacher labor market, state demographics, and other factors that may affect teacher mobility. For example, enrollment in Texas educator preparation programs fell from 67,361 in the 2009/10 school year to 45,385 in 2013/14, a 33 percent drop (U.S. Department of Education, n.d.). Student enrollment in Texas public schools, however, grew from about 4.8 million in 2009/10 to 5.3 million in 2015/16, one of largest increases in public school enrollment in the country (Texas Education Agency, 2016). Other, less tangible factors that may have affected teacher mobility include an uncertain economy and changes in teacher evaluation systems, state academic standards,

and teachers' perceptions of their working conditions and professional experience. In addition, past studies presented only statewide results for Texas and may not adequately portray teacher mobility within the state or provide local administrators and educators with enough information to form appropriate policy strategies. Looking at differences in teacher mobility across regions and districts may identify disparities masked in statewide averages.

This report provides state policymakers in Texas updated information about state and regional patterns and trends in mobility in the state's teaching workforce, which offers a systematic baseline for monitoring and planning

This report provides state policymakers in Texas updated information about state and regional patterns and trends in mobility in the state's teaching workforce, which offers a systematic baseline for monitoring and planning. The report shows regional leaders patterns in their own region reflecting local conditions, district policies, and school climate so that they can better understand the factors and dynamics in the district that affect teacher mobility. The baseline provided by the study will allow policymakers to monitor teacher mobility rates to see whether certain groups of schools and districts are unable to hire and retain effective teachers, thereby increasing education inequities. Findings on the differences in teacher mobility rates among regions, districts, or schools with specific characteristics also may allow policymakers to further investigate what is being done differently that may influence teacher mobility.

What the study examined

The study examined the movement of teachers within Texas during the 2011/12–2015/16 school years and calculated teacher mobility rates and destination proportions (the proportions of teachers who moved between schools in the same district, between districts in Texas, and out of teaching in Texas public schools) (see box 1 for definitions of key terms). The following research questions guided the study:

1. What were teacher mobility rates and destination proportions at the regional and state levels in each school year from 2011/12 through 2015/16?

2. Were personal and professional characteristics of Texas public school teachers associated with their mobility behaviors?

3. Were school-level student characteristics associated with school-level teacher mobility rates?

4. Were average rubric ratings of teachers in schools participating in the 2014/15 Texas Teacher Evaluation and Support System (T-TESS) pilot associated with school-level teacher mobility rates?

For research question 1 the study team examined teacher mobility rates and destination proportions for each of the state's 20 education service center regions and for the state as a whole. For research questions 2 and 3 analyses explored links between mobility and teacher and student demographic characteristics (see box 2 for a brief description of data and methods and appendix A for full detail). For research question 4 the study used ratings for nearly 8,000 teachers across 237 schools and 51 districts from a pilot of the T-TESS.[2] The pilot was conducted in 2014/15, in advance of a 2015/16 refinement period and a 2016/17 statewide rollout. The T-TESS pilot data, which comprised teachers' ratings on 16 dimensions across four domains, were used to investigate how these dimensions of teacher effectiveness related to school-level teacher mobility. Because masking (see box 1) resulted

in a considerable amount of nonrandom missing data, school-level mobility metrics were pooled for 2013/14, 2014/15, and 2015/16, and 2012/13, 2013/14, and 2014/15 were used as the baseline years.

Box 1. Key terms

Destination proportion. Of the teachers who moved, the proportion in each school year who moved to each of three destinations: another school within the district, a school in another Texas district, or out of Texas public schools. Disaggregating teacher mobility reveals how each of the three teacher mobility behaviors contributes to the overall mobility rate.

Emergency certification. Certification issued to an individual who does not have the qualifications required to fill a vacant position that cannot otherwise be filled. An emergency certification is valid for teaching for one year only.

Leaver. A teacher who taught in one school year but not in the following one in Texas public schools. This includes teachers who are no longer teaching, teachers who moved to a private school, teachers who moved across state lines, and teachers who moved into an administrative position.

Masking. To prevent teachers' personally identifiable information from being disclosed, certain data were excluded (masked) prior to public release. (See appendix A for additional information on masking.)

Mobility rates. The proportion of teachers who moved between schools within a district, moved between schools across districts, or left Texas public schools each year. Teachers' school assignments are tracked between school year pairs (that is, a teacher's 2010/11 school assignment compared with a teacher's 2011/12 school assignment). (See appendix A for additional information on teacher school assignments and mobility calculations.)

Mover. A teacher who moved between schools within a district or between districts within Texas public schools from one school year to the next.

Novice teacher. A teacher with three or fewer years of experience, as defined by the Texas Education Agency.

Region. Texas public school districts are organized into 20 regions; each region includes an education service center. These centers function as a liaison between the Texas Education Agency and districts and provide support to school districts.

STAAR. The State of Texas Assessments of Academic Readiness are the standardized tests used to assess elementary and secondary student academic achievement in Texas.

Stayer. A teacher who remained at the same school from one school year to the next.

Teacher. Any individual who taught at least one class during the school year.

T-TESS. Texas Teacher Evaluation and Support System. T-Tess rubric data include ratings on a five-point scale for 16 dimensions across four domains: planning, instruction, learning environment, and professional practice and responsibilities. Data were collected in the 2014/15 school year for 237 schools in 51 districts.

Box 2. Data, sample, and methods

The study team analyzed data collected by the Texas Education Agency and the Texas Higher Education Coordinating Board for the 2010/11–2015/16 school years. (A fuller explanation of all data sources and analyses can be found in tables A1–A4 in appendix A.) For research questions 1–3 the analytic sample for each school year consisted of teachers who taught at least one class in a Texas public school from 2011/12 through 2015/16. For each school year each teacher was assigned to the school with the majority of his or her classroom assignments. For example, the analytic sample for 2011/12 compared teachers' school assignments in 2011/12 with those in 2010/11 to determine teacher mobility. The annual baseline sample of teachers ranged from 341,673 in 2013/14 to 355,958 in 2015/16 across all Texas public schools (see table B1 in appendix B). For research question 4 the analytic sample consisted of 7,822 teachers in 237 schools in 51 districts, a subset of the districts that participated in the 2014/15 Texas Teacher Evaluation and Support System (T-TESS) pilot.

Teacher school assignments were compared across years to categorize teachers as staying in the same school, moving between schools within the district (within-district mobility), moving between schools across districts (between-district mobility), or leaving Texas public schools. These mobility categories served as the foundation for aggregating mobility rates and destination proportions at the regional and state levels and comparing them across the five school years for research question 1. Teacher mobility rates for each of the 20 regions were also broken into quartiles for comparison.

For research question 2 cross-tabulations examined the percentages of teachers who were stayers, movers, and leavers by teacher demographic characteristics—gender, race/ethnicity, educational attainment, experience, and certification (see box 1 for definitions). A difference of 2 or more percentage points was set as the threshold for determining substantive differences among stayers, movers, and leavers. Lochmiller, Adachi, Chesnut, and Johnson (2016) used a similar threshold in their study of teacher mobility in West Virginia, noting that although the threshold was arbitrary, it was "selected on the basis that it would yield the most policy-relevant information" (p. 4).

Teacher mobility rates and destination proportions at the school level were correlated with school demographic data to address research question 3. School-level student demographic data included student enrollment; student–teacher ratio; proportions of students identified as English learners, economically disadvantaged (defined by eligibility for the federal school lunch program), gifted and talented, and in special education programs; student academic achievement (defined by proportions of students passing English language arts and math on the standardized State of Texas Assessments of Academic Readiness); and student race/ethnicity.

For research question 4 the study team examined the relationships between the school-level average teacher ratings collected as part of the 2014/15 pilot implementation of the T-TESS with school-level mobility rates (percentage of teachers who leave a school) aggregated to the school level.[1] Data from the pilot comprised ratings on a five-point scale (improvement needed, developing, proficient, accomplished, or distinguished) assigned to teachers based on the T-TESS rubric, which included 16 dimensions across four domains. During the pilot year, domain scores were obtained by averaging dimension scores, and overall scores were obtained by averaging domain scores. The study team first conducted a correlation analysis and then ordinary least squares regression analysis using school-level mobility rates as the dependent variable, school-level average teacher evaluation ratings as the main independent variable, and school characteristics as covariates, with clustering by district. (See appendix C for the full description of the rubric.)

Note

1. Due to the small sample size, mobility rates for moving within a district and between districts, and all destination proportion metrics, had to be eliminated from the analysis for research question 4 to avoid disclosing personally identifiable information on teachers. Additional information on masking is in appendix A.

What the study found

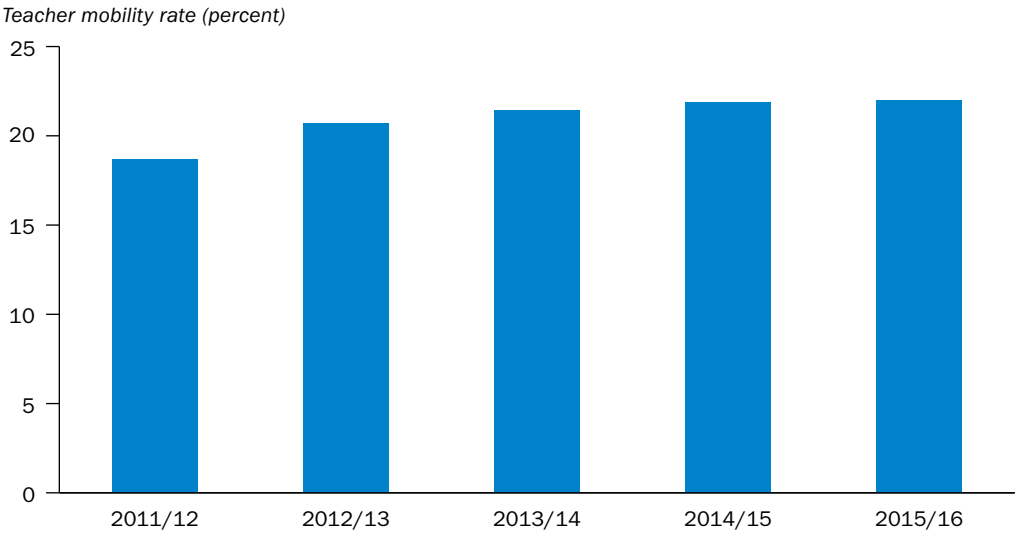
This section presents the findings for teacher mobility during the 2011/12–2015/16 school years. The study found that teacher mobility increased in Texas from 2011/12 to 2015/16. Teacher mobility varied by administrative region of Texas public schools. Teachers leaving Texas public schools accounted for most of the mobility, while teachers moving between districts accounted for most of the increase in mobility over the period. Teachers' demographic characteristics, type of certification, and length of experience teaching were all associated with mobility, as were school-level student demographic characteristics and students' academic achievement. A school's average ratings on a pilot teacher evaluation rubric were also associated with teacher mobility.

The teacher mobility rate in Texas rose from close to 19 percent in 2011/12 to 22 percent in 2015/16

Over the 2011/12–2015/16 school years the average teacher mobility rate was 20.9 percent. The mobility rate rose from 18.7 percent in 2011/12 to 22.0 percent in 2015/16, an increase of 3.3 percentage points (figure 1; see tables B1–B5 in appendix B for the annual mobility rates and destination proportions at the state and regional levels). The largest increase in mobility rates, 2 percentage points, was in 2012/13.

Texas employed approximately 345,000 teachers annually during the study period, ranging from 341,673 in 2013/14 to 355,958 in 2015/16. The average teacher mobility rate of 20.9 percent represents more than 72,500 teachers moving between or leaving Texas public schools each year. The 3.3 percentage point increase in teacher mobility corresponds to approximately 14,000 more teachers who were mobile in 2015/16 than in 2011/12.

Figure 1. Annual teacher mobility rates increased for Texas public schools from 2011/12 to 2015/16



Source: Authors' analysis based on Texas Public Education Information Management System data, 2010/11–2015/16.

The average teacher mobility rate in Texas rose from 18.7 percent in 2011/12 to 22.0 percent in 2015/16, an increase of 3.3 percentage points

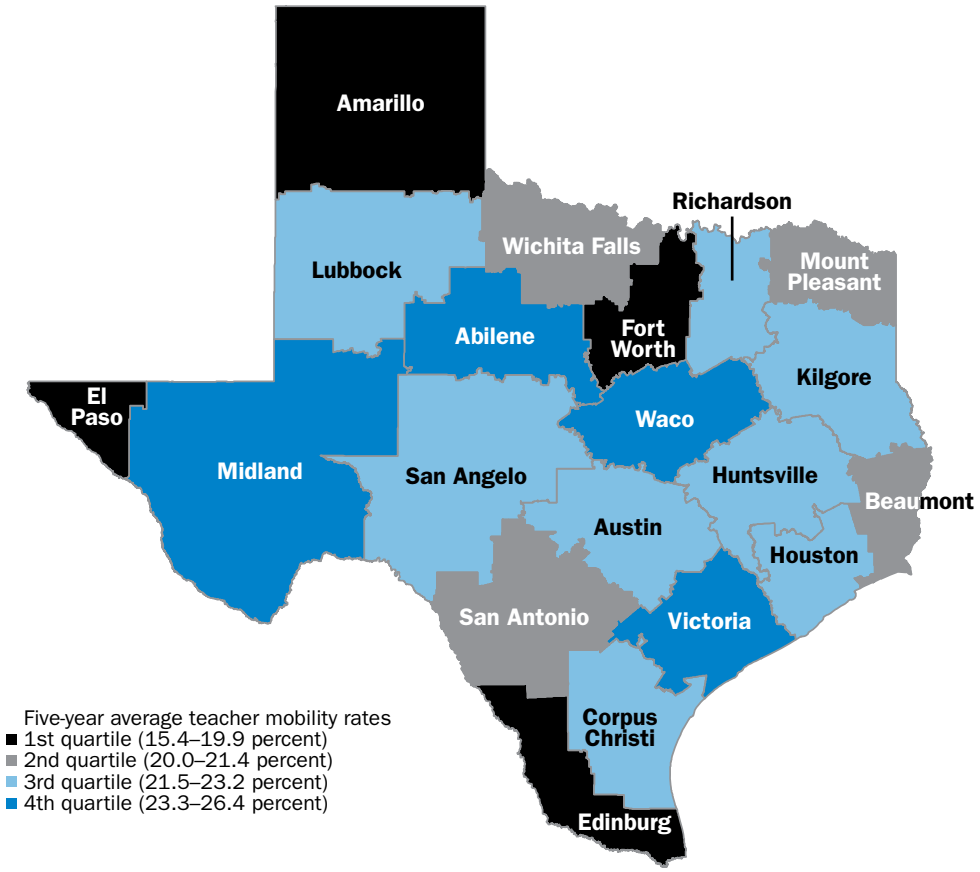
Teacher mobility rates differed by region

Teacher mobility rates at the regional level fluctuated but increased on average across the five-year period (see table B2 in appendix B). For this analysis regions were divided into quartiles according to their five-year average (map 1). Four regions (Edinburg, Fort Worth, Amarillo, and El Paso) had the lowest average mobility rates, all below 20 percent. Of these Edinburg and El Paso had consistently low mobility rates across all study years and five-year averages below 16 percent. Four regions (Victoria, Waco, Abilene, and Midland) had the highest average mobility rates, all 23.3 percent or higher. Of these, Abilene and Midland had consistently high mobility rates across all study years and five-year averages above 24 percent.

While teachers leaving Texas public schools consistently accounted for the largest share of teacher mobility over the period, teachers moving between districts accounted for most of the increase in mobility rates

More than half of teacher mobility in each school year was due to teachers leaving Texas public schools (55 percent average across five school years; figure 2). Over that period,

Map 1. Five-year average teacher mobility rates for Texas public schools varied across regions, 2011/12–2015/16

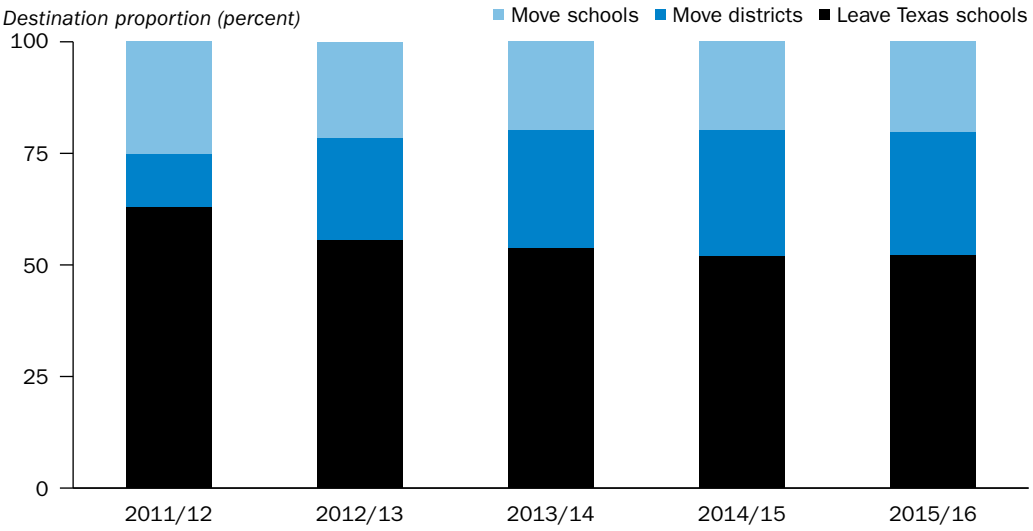


Edinburg and El Paso had consistently low mobility rates across all study years and five-year averages below 16 percent, while Victoria, Abilene, Waco, and Midland had the highest rates

Note: Five-year state average teacher mobility rate = 20.9 percent.

Source: Authors' analysis based on Texas Public Education Information Management System data, 2010/11–2015/16.

Figure 2. More than half of teacher mobility was due to teachers leaving Texas public schools, while most of the growth in mobility came from teachers moving between districts, 2011/12–2015/16



Source: Authors' analysis based on Texas Public Education Information Management System data, 2010/11–2015/16.

however, the proportion of mobility due to teachers moving between districts more than doubled, from 12 percent in 2011/12 (7,765 teachers) to 27 percent by 2015/16 (21,505 teachers).

Teachers' demographic characteristics were significantly correlated with rates of staying in, moving between, and leaving Texas public schools

Teachers' demographic characteristics, including race/ethnicity, educational attainment, experience, certification field, and type of teaching certification, were correlated with their rates of staying in the same school, moving between schools in Texas, and leaving Texas public schools (see tables B6–B8 in appendix B for cross-tabulations of mobility categories by teachers' demographic characteristics for all school years).

Hispanic teachers stayed in their school at higher rates and left Texas public schools at lower rates than White and Black teachers

Teacher race/ethnicity. Hispanic teachers stayed in their school at higher rates and left Texas public schools at lower rates than White and Black teachers (table 1). Black teachers were less likely to stay and more likely to move than other teachers.

Teacher educational attainment. Teachers with advanced degrees (master's and beyond) left Texas public schools at higher rates and stayed in their school at lower rates than teachers with bachelor's degrees (see tables B6 and B8 in appendix B). There were no substantial differences in the rates of moving between schools by teachers' educational attainment (see table B7).

Teacher experience. Teachers with more experience, especially those with more than 8 and fewer than 30 years of experience, were more likely to stay in their school than their counterparts (figure 3). Teachers with fewer than 8 years of experience and teachers with more than 30 years stayed in their school at similar rates (less than 77 percent) but had

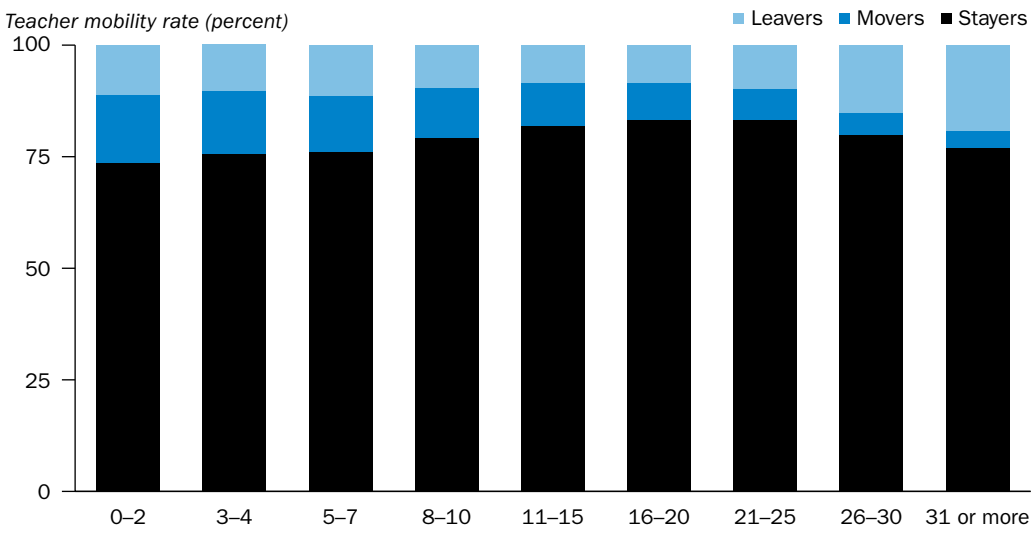
Table 1. Average teacher mobility in Texas public schools by teacher race/ethnicity, 2011/12–2015/16 (percent)

Teacher race/ethnicity	Stayers	Movers	Leavers
Overall Texas average	77.8	10.0	12.2
Black	73.1	12.6	14.3
Hispanic	80.1	9.7	10.2
White	77.7	9.7	12.6
Other	76.6	10.1	13.3

Note: Stayers are teachers who remained at the same school from one school year to the next. Movers are teachers who moved between schools within a district or between districts within Texas public schools from one school year to the next. Leavers are teachers who taught in Texas public schools in one year but not in the following year. See tables B6–B8 in appendix B for cross-tabulation of mobility classification by teachers' race/ethnicity for all years.

Source: Authors' analysis based on Texas Public Education Information Management System data, 2010/11–2015/16.

Figure 3. Teachers with different amounts of experience had different rates of staying at schools, moving between schools, and leaving Texas public schools in 2015/16



Note: See tables B6–B8 in appendix B for cross-tabulation of mobility by teacher experience for all years.

Source: Authors' analysis based on Texas Public Education Information Management System data, 2014/15 and 2015/16.

different rates of moving between Texas schools and leaving Texas public schools. Teachers with 15 or fewer years of experience moved between schools at higher rates than they left Texas public schools, while teachers with more years of experience left Texas public schools at higher rates than they moved between schools, possibly due to retirement.

Teacher certification field. The Texas Public Education Information Management System data contained 12 categories of teacher certification by subject area, such as bilingual or special education. The only substantive difference in the rates of teachers who stayed, moved, or left by certification field was for teachers with special education certifications. On average from 2011/12 through 2015/16, 19 percent of teachers with special education certification left

Texas public schools each year compared with 12 percent of teachers with other certifications (see table B8 in appendix B). Teachers with special education certification moved between schools at rates similar to their counterparts (see table B7 in appendix B).

Teacher certification type. Texas has both standard certification and emergency certification for teachers (see box 1 for definitions). On average, across 2011/12–2015/16, 78 percent of teachers with standard certifications stayed in their school, while 65 percent of teachers with emergency certifications stayed (see table B6 in appendix B). On average across 2011/12–2015/16, 10 percent of teachers with standard certifications moved between schools within or across districts, and 20 percent of teachers with emergency certifications moved (see table B7 in appendix B).

Both school-level teacher mobility rates and destination proportions were significantly correlated with school-level student characteristics

Average teacher mobility rates were lower in schools with higher enrollment, higher student–teacher ratios, higher proportions of English learner students, higher proportions of students classified as gifted and talented, and higher proportions of students passing STAAR assessments

Teacher mobility rates calculated at the school level were significantly correlated with school characteristics, including student enrollment; student–teacher ratio; proportions of students identified as English learners, economically disadvantaged, gifted and talented, or in special education programs; students who passed the state academic achievement assessment; and students' race/ethnicity (table 2). School-level teacher destination proportions were significantly correlated with the student–teacher ratio; proportions of students who were English learners, economically disadvantaged, gifted and talented, or in special education programs; and student racial/ethnic makeup. (See table B9 in appendix B for correlations of school/student characteristics with teacher mobility rates and tables B10–B12 for correlations with destination proportions.)

Student enrollment. Student enrollment was negatively correlated with school-level teacher mobility rates over 2011/12–2015/16, meaning that average teacher mobility rates were lower in schools with higher enrollment.

Student–teacher ratio. Student–teacher ratios were negatively correlated with school-level teacher mobility rates over 2011/12–2015/16, meaning that average teacher mobility rates were lower in schools with higher student–teacher ratios. Student–teacher ratios were positively correlated with the proportion of teachers moving within a district and negatively correlated with the proportion of teachers moving between districts, meaning that the proportion of teachers moving within a district was higher in schools with higher student–teacher ratios, while the proportion of teachers moving between districts was lower in schools with higher student–teacher ratios.

English learner students. The proportion of students classified as English learner students was negatively correlated with school-level teacher mobility rates, meaning that average teacher mobility rates were lower in schools with higher proportions of English learner students. The proportion of English learner students was positively correlated with the proportions of teachers moving within districts and leaving Texas public schools, and negatively correlated with the proportion of teachers moving between districts. These findings mean that the proportions of teachers moving within districts or leaving Texas public schools were higher in schools with higher proportions of English learner students, while the proportion of teachers moving between districts was lower in schools with higher proportions of English learner students.

Table 2. School characteristics with significant positive or negative correlations with school-level teacher mobility rates and destination proportions, 2010/11–2015/16

Teacher mobility rates and destination proportions	School characteristics with significant positive correlations	School characteristics with significant negative correlations
School-level teacher mobility rates		
	• Proportion of economically disadvantaged students • Proportion of students in special education programs • Proportion of Black students	• Student enrollment • Student–teacher ratio • Proportion of English learner students • Proportion of gifted/talented students • Proportion of students passing STAAR assessments • Proportion of Asian students • Proportion of White students
Destination proportions		
Moving within a district	• Student–teacher ratio • Proportion of English learner students • Proportion of gifted/talented students	• Proportion of students in special education programs
Moving between districts	• Proportion of economically disadvantaged students	• Student–teacher ratio • Proportion of English learner students
Leaving Texas public schools	• Proportion of English learner students • Proportion of economically disadvantaged students • Proportion of Black students	• Proportion of gifted/talented students • Proportion of White students

STAAR is the State of Texas Assessments of Academic Readiness, the standardized assessments of student academic achievement in Texas.

Note: See tables B9–B12 in appendix B for correlations.

Source: Authors' analysis based on Texas Public Education Information Management System data, 2010/11–2015/16, and Texas Academic Performance Report data, 2010/11–2014/15.

Average teacher mobility rates were higher in schools with a higher proportion of economically disadvantaged students, a higher proportion of students in special education programs, and higher proportions of Black students

Economically disadvantaged students. The proportion of students who were economically disadvantaged was positively correlated with school-level teacher mobility rates, meaning that average teacher mobility rates were higher in schools with a higher proportion of economically disadvantaged students. The proportion of students who were economically disadvantaged was positively correlated with the proportions of teachers moving between districts and teachers leaving Texas public schools.

Gifted and talented students. The proportion of students classified as gifted and talented was negatively correlated with school-level teacher mobility rates, meaning that average teacher mobility rates were lower in schools with higher proportions of students classified as gifted and talented. The proportion of gifted and talented students was positively correlated with the proportion of teachers moving within a district and negatively correlated with the proportion of teachers leaving Texas public schools.

Students in special education programs. The proportion of students in special education programs was positively correlated with school-level teacher mobility rates, meaning that average mobility rates were higher in schools with a higher proportion of students in

special education programs. The proportion of students in special education programs was negatively correlated with the proportion of teachers moving within a district.

Student academic achievement. The proportion of students passing the State of Texas Assessments of Academic Readiness (STAAR) was negatively correlated with school-level teacher mobility rates, meaning that average mobility rates were lower in schools with higher proportions of students passing STAAR assessments. Student academic achievement was not consistently correlated with teacher destination proportions.

Student race/ethnicity. The proportion of students who were Black was positively correlated with school-level teacher mobility rates, while the proportions of students who were Asian or White were negatively correlated with school-level mobility rates. These results mean that the average teacher mobility rate was higher in schools with higher proportions of Black students and lower in schools with higher proportions of Asian or White students. The proportion of students who were Black was positively correlated with the proportion of teachers leaving Texas public schools, while the proportion of students who were White was negatively correlated with the proportion of teachers leaving Texas public schools. These findings mean that the proportion of teachers leaving Texas public schools was higher in schools with a higher proportion of Black students and lower in schools with a higher proportion of White students.

Schools with higher average teacher evaluation ratings on the Texas Teacher Evaluation and Support System had lower school-level teacher mobility rates

Average school-level teacher mobility rates were lower in schools with higher school average teacher evaluation ratings, but the correlations were small, and only a few were statistically significant

Texas Teacher Evaluation and Support System (T-TESS) ratings at the overall, domain, and dimension levels showed consistent negative correlations with school-level teacher mobility rates (table 3), meaning that, on average, school-level teacher mobility rates were lower in schools with higher school average teacher evaluation ratings. However, the correlations were small, and only a few were statistically significant.

The largest (in magnitude) statistically significant correlation (–0.185) was between the overall T-TESS rating and teacher mobility rates. Domain rating correlations were generally smaller, and only the correlations between the planning and the professional practices and responsibilities domains and teacher mobility rates were statistically significant. At the dimension level, only correlations between teacher mobility rates and the differentiation dimension and monitor and adjust dimension of the instruction domain and the demeanor and ethics dimension and goal setting dimension of the professional practices and responsibilities domain were statistically significant. (See table C1 in appendix C for the full description of the rubric.)

After school characteristics were controlled for, the learning environment domain of the Texas Teacher Evaluation and Support System rubric had a positive relationship with school-level mobility rates

Regression analysis was used to examine the relationships between school-average teacher T-TESS rubric ratings and school-level mobility rates while select school characteristics were controlled for. Two models were estimated. Model 1 used the school-average teacher overall rubric ratings as the independent variable, and model 2 used the four school-average teacher domain rubric ratings as the independent variable. All observed school characteristics were included as covariates to allow for comparison among schools with

Table 3. Correlations between school-level average Texas Teacher Evaluation and Support System ratings in the 2014/15 pilot and school-level teacher mobility rates

Texas Teacher Evaluation and Support System rubric	Correlation coefficient
Overall	–0.185**
1. Planning	–0.152*
1.1: Standards alignment	–0.114
1.2: Data assessment	–0.078
1.3: Knowledge of students	–0.077
1.4: Activities	–0.116
2. Instruction	–0.125
2.1: Achieving expectations	–0.116
2.2: Content knowledge	–0.014
2.3: Communication	–0.036
2.4: Differentiation	–0.151*
2.5: Monitor and adjust	–0.167*
3. Learning environment	–0.074
3.1: Classroom environment	–0.093
3.2: Student behavior	–0.107
3.3: Classroom culture	–0.091
4. Professional practices and responsibilities	–0.137*
4.1: Demeanor and ethics	–0.143*
4.2: Goal setting	–0.145*
4.3: Professional development	–0.063
4.4: Community involvement	–0.098

* Significant at $p < .05$; ** significant at $p < .01$.

Source: Authors' analysis based on observation data from the Texas Teacher Evaluation and Support System pilot, 2014/15, and Texas Public Education Information Management System data, 2012/13–2015/16.

similar characteristics. At the overall level, rubric ratings did not have a statistically significant association with mobility rates (model 1, table 4).

At the domain level, the learning environment domain had a positive association with mobility rates (model 2, table 4). After school characteristics were controlled for, a 1 point increase in the school average learning environment rating was associated with a 4.6 percentage point increase in the school-level teacher mobility rate. School-average ratings on the other three domains did not have a statistically significant association with school-level mobility rate.[3] The combination of school characteristics and teacher ratings together explained approximately 37 percent of the variation in school-level mobility ratings.

In regression analyses the combination of school characteristics and teacher ratings together explained approximately 37 percent of the variation in school-level mobility ratings

Regression analyses were also used to explore the association of school characteristics and teacher mobility rates in the T-TESS sample of schools, after school-average teacher rubric ratings were controlled for. Those results were consistent with the results for the larger population of Texas schools described previously. For example, the proportion of inexperienced teachers and the proportion of economically disadvantaged students at a school were positively correlated with the average teacher mobility rate, while school enrollment and the proportion of English learner students were negatively correlated with the mobility rate.

Table 4. Regression coefficients showing relationships between school-average Texas Teacher Evaluation and Support System ratings in the 2014/15 pilot and school-level teacher mobility rates

Texas Teacher Evaluation and Support System rubric	Regression coefficients for overall ratings (model 1)	Regression coefficients for domain ratings (model 2)
Overall score	–0.022	
Domain 1: Planning		–0.008
Domain 2: Instruction		–0.009
Domain 3: Learning environment		0.046*
Domain 4: Professional practices and responsibilities		–0.046

* Significant at $p < .05$.

Note: School characteristics were included in all regression models as covariates.

Source: Authors' analysis based on observation data from the Texas Teacher Evaluation and Support System pilot, 2014/15; Texas Academic Performance Report data, 2014/15; and Texas Public Education Information Management System data, 2012/13–2015/16.

Implications of the study findings

This study identified patterns and trends in teacher mobility in Texas statewide and in each of the state's 20 education service center regions. It identified disparities in teacher mobility across regions. The study also explored how mobility was linked to teacher and school characteristics and to teacher ratings on a 2014/15 pilot of the T-TESS. This study can help stakeholders address disparities in teacher mobility in the state by using current information to expand on previous studies of teacher mobility in Texas.

The study findings have several implications for school policies and further research. First, the study showed that, on average, approximately 20 percent of Texas public school teachers (more than 72,000 teachers) moved between or left Texas public schools each year. However, some regions (Edinburg and El Paso) had substantially lower mobility rates. Further investigation into the practices and policies as well as the teacher and school characteristics of these regions is warranted.

Policies and practices targeting mobility could differentiate between teachers who move between schools and those who leave Texas public schools, as their motivations likely differ

Second, the study found that most teacher mobility is due to teachers leaving Texas public schools, though teachers moving between districts accounted for a growing proportion of mobility from 2011/12 through 2015/16. The mobility rates examined were disaggregated in novel ways to provide insight into which mobility behaviors—moving within a district, moving between districts, and leaving Texas public schools—contributed to overall mobility rates. This disaggregation showed that more than half of all mobility was due to teachers leaving Texas public schools over 2011/12–2015/16 and that an increasing percentage of mobility was due to teachers moving across districts. Policies and practices targeting mobility could differentiate between teachers who move between schools and those who leave Texas public schools, as their motivations likely differ. Deeper investigation is also warranted into what motivates movement between districts—perhaps differences in salary and benefits packages.

Third, the findings from this study highlight links between teacher mobility and teacher characteristics. Teachers with special education certifications were nearly twice as likely as other teachers to leave Texas public schools. Similarly, teachers with emergency

certifications were more than twice as likely as teachers with standard certifications to move to a different school. Efforts to increase teacher retention might benefit from focusing on teachers with special education and emergency certifications.

Fourth, the findings reveal important links between school characteristics and mobility rates and may help guide Texas's efforts to reduce inequities in the distribution of teachers. The proportion of students in special education programs and the proportions of economically disadvantaged, low-performing, and racial/ethnic minority students showed significant positive correlations with school-level teacher mobility rates. In contrast, the proportions of English learner students were negatively correlated with school-level teacher mobility rates. When this finding is combined with those on lower teacher mobility rates in the Edinburg and El Paso regions, which have high Hispanic populations, a pattern of lower teacher mobility rates in areas and schools with higher English learner student populations emerges that is worth investigating further.

The findings reveal important links between school characteristics and mobility rates and may help guide Texas's efforts to reduce inequities in the distribution of teachers

Fifth, correlational analyses indicated that schools with higher overall teacher ratings on the T-TESS tended to have lower teacher mobility rates. Among the T-TESS domains, higher ratings on the planning and professional practices and responsibilities domains were associated with lower teacher mobility rates. These findings may lead to future research on aspects of teacher effectiveness that are related to teacher retention.

Deeper exploration of teacher effectiveness began with this study's regression results for the subset of schools that participated in the T-TESS pilot. The regression analyses found that school-level average ratings on the T-TESS learning environment domain were positively associated with school-level teacher mobility rates. The learning environment domain consists of dimensions that capture teachers' ability to maintain a focus on learning and order in the classroom. One potential explanation for this finding is the high demand for these teaching skills, particularly in schools with challenging environments. Teachers at schools where, on average, teachers are more effective in managing the learning environment may be heavily recruited by schools needing effective teachers of this kind, raising the school-level mobility rate. (Because the study examined only school-level average teacher T-TESS ratings, it did not address whether individual teachers with higher learning environment ratings were more likely to leave schools.)

And Texas districts and teacher preparation programs may also use information from the study in exploring the regional causes of teacher mobility and in formulating policies to address local challenges. This report, like reports on teacher mobility in Minnesota (Podgursky, Ehlert, Lindsay, & Wan, 2016) and West Virginia (Lochmiller, et al, 2016), represents local efforts to understand teacher mobility. Findings are best interpreted in a context of state-level regional and contextual factors but may be relevant to other states with similar characteristics and may help states develop their own inquiries into teacher mobility.

Limitations of the study

The study has several limitations. First, the research objectives were limited to documenting teacher mobility from one year to the next rather than tracking teachers throughout the five study years. Thus, these analyses do not provide a longitudinal analysis of teachers who may have moved into and out of Texas public schools multiple times during the

five study years or experienced teachers who reentered after a break in teaching. And the study's classification of teachers who leave Texas public schools should not be equated with leaving teaching altogether: teachers leaving Texas public schools may have returned in subsequent years, moved to private schools, moved across state lines, or moved into administrative positions.

These analyses examined recent trends in teacher mobility in Texas but did not address the causes of mobility and thus cannot provide insight into why teachers moved between schools or left teaching. The findings cannot distinguish between mobility due to teachers choosing to leave, teachers being terminated for cause, and teaching positions being eliminated due to budget constraints.

The analyses examined recent trends in teacher mobility in Texas but did not address the causes of mobility and thus cannot provide insight into why teachers moved between schools or left teaching

The study classified teacher mobility based on assignment to a single school for each school year. But some teachers were assigned to multiple schools within a school year (in which case their school assignment was identified as the school with the majority of their classroom assignments), and if the balance of assignments across schools shifted from year to year they could be misclassified as mobile, resulting in overestimation of the teacher mobility rate.

The study benefited greatly from using school-level average T-TESS ratings. The sample available in the T-TESS pilot was relatively small and limited—51 districts representing about 5 percent of districts. The sample size limited the generalizability of the study findings, although the number of schools and districts was large enough to obtain reasonably precise estimates. In addition, the T-TESS data were available only for the 2014/15 school year, when implementation and data collection processes were still emerging and evolving, so the findings were affected by factors specific to that year. Future research with multiple years of T-TESS data may be able to single out persistent, idiosyncratic school effects to improve the accuracy of estimates.[4] Analyses of T-TESS data were restricted to the school level rather than the teacher level. Future analyses may link individual teacher evaluation scores with mobility behaviors. Continuing analyses of data from the T-TESS 2014/15 pilot (Lazarev, Newman, Nguyen, Lin, & Zachman, 2017) may be useful to future investigations of teacher mobility.

Appendix A. Data, samples, and methodology

This appendix provides a description of the data, samples, and methodology used in this study.

Data

The study team analyzed data collected by the Texas Education Agency (TEA) and Texas Higher Education Coordinating Board. These data include the following publicly available and restricted-access data and reports from the 2011/12–2015/16 school years, with data from the 2010/11 school year serving as a baseline.

Texas Academic Performance Report. This performance report for every public school and district in Texas provided school- and district-level data on student enrollment, student–teacher ratios, student demographic characteristics, and State of Texas Assessments of Academic Readiness (STAAR) achievement results (table A1).

Table A1. Texas Academic Performance Report school data, 2010/11–2015/16

School characteristic	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
Campus identifier	✔	✔	✔	✔	✔	✔
District identifier	✔	✔	✔	✔	✔	✔
Number of students enrolled	✔	✔	✔	✔	✔	✔
Student–teacher ratio	✔	✔	✔	✔	✔	✔
School-level percentage of:						
English learner students	✔	✔	✔	✔	✔	✔
Economically disadvantaged students (eligible for the federal school lunch program)	✔	✔	✔	✔	✔	✔
Gifted and talented students	✔	✔	✔	✔	✔	✔
Students in special education programs	✔	✔	✔	✔	✔	✔
Students passing English language arts STAAR	✔	✔	✔	✔	✔	✔
Students passing math STAAR	✔	✔	✔	✔	✔	✔
Asian students	✔	✔	✔	✔	✔	✔
American Indian, Alaska Native students	✔	✔	✔	✔	✔	✔
Black students	✔	✔	✔	✔	✔	✔
Native Hawaiian, Pacific Islander students	✔	✔	✔	✔	✔	✔
Hispanic students	✔	✔	✔	✔	✔	✔
White students	✔	✔	✔	✔	✔	✔

STAAR is State of Texas Assessments of Academic Readiness test.

Source: Authors' compilation from Texas Academic Performance Report data, 2010/11–2015/16.

Public Education Information Management System (PEIMS). PEIMS provided restricted-access data on teachers and included race/ethnicity, sex, educational attainment, and years of experience. These data were used to track teacher assignments across school years (table A2).

Table A2. Public Education Information Management System teacher data, 2010/11–2015/16

Teacher characteristic	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
Campus identifier	✔	✔	✔	✔	✔	✔
Teacher identifier	✔	✔	✔	✔	✔	✔
Race/ethnicity (percent)						
Asian	✔	✔	✔	✔	✔	✔
American Indian, Alaska Native	✔	✔	✔	✔	✔	✔
Black	✔	✔	✔	✔	✔	✔
Native Hawaiian, Pacific Islander	✔	✔	✔	✔	✔	✔
Hispanic	✔	✔	✔	✔	✔	✔
White	✔	✔	✔	✔	✔	✔
Sex	✔	✔	✔	✔	✔	✔
Educational attainment	✔	✔	✔	✔	✔	✔
Years of experience	✔	✔	✔	✔	✔	✔

Source: Authors' compilation from Texas Public Education Information Management System data, 2010/11–2015/16.

Texas PK–16 Public Education Information Resource. This source provided teacher certification data (table A3).

Table A3. Texas PK–16 Public Education Information Resource teacher certification data, 2010/11–2015/16

Teacher certification	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
Teacher identifier	✔	✔	✔	✔	✔	✔
Certification field	✔	✔	✔	✔	✔	✔
Certification type (standard, probationary, emergency)	✔	✔	✔	✔	✔	✔
Certification program option (special education, bilingual)	✔	✔	✔	✔	✔	✔

Source: Authors' compilation from Texas PK–16 Public Education Information Resource data, 2010/11–2015/16.

Texas Teacher Evaluation and Support System 2014/15 pilot data. The Texas Teacher Evaluation and Support System (T-TESS) includes performance metrics based on ratings on four domains—planning, instruction, learning environment, and professional practice and responsibilities—collected in a 2014/15 pilot in 251 schools in 57 districts with observations for 8,255 teachers (which represented 3.0 percent of schools, 4.8 percent of districts, and 2.3 percent of teachers in Texas; table A4).

Table A4. Texas Teacher Evaluation and Support System 2014/15 pilot data

T-TESS data	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
Campus identifier					✔	
Ratings (dimension, domain, and overall level)					✔	

T-TESS is Texas Teacher Evaluation and Support System.

Source: Authors' compilation from observation data from the the Texas Teacher Evaluation and Support System pilot, 2014/15.

The analytic data set for research question 4 consisted of average teacher T-TESS ratings, together with the mobility and school characteristic data used in research questions 1–3 for just the schools that participated in the T-TESS pilot. The T-TESS ratings were not identifiable by teacher and therefore could not be linked to the teacher-level mobility data from PEIMS. Because the study team was not able to look at the relationship between teacher-level ratings and mobility, they instead calculated school averages of observation scores and used campus identifiers to merge those data with school-level teacher mobility rate and school characteristics.

Sample

For research questions 1–3 the analytic sample for each school year consisted of school personnel who taught at least one class during the previous school year according to the PEIMS data file, which was created in the fall of each school year and which links teachers to schools. For each school year each teacher was assigned to the school with the majority of his or her classroom assignments in the previous (baseline) school year. For example, to calculate the mobility rates for 2011/12, each teacher who had taught in the baseline 2010/11 school year was linked to the single school where he or she taught the most classes in 2010/11. Then the teacher's baseline school assignment was compared with the school assignment for the following school year (2011/12). Substitute teachers were excluded from the sample. Table B1 in appendix B presents the count of all teachers in the baseline school year and mobile teachers in the subsequent school year.

The analytic sample for research question 4 consisted of schools that participated in the T-TESS pilot. As noted earlier, this was a school-level, not teacher-level analysis. Of the 251 T-TESS pilot schools, two schools could not be linked to the PEIMS mobility data, and four were new schools at some point during the 2012/13 and 2014/15 school years, reducing the number of schools to 245 (table A5). Of the 245 schools, one did not have any Texas Academic Performance Report data, and one was missing most of the T-TESS ratings. Additionally, six schools had all mobility metrics masked to comply with regulations for protecting individuals' personally identifiable information from disclosure (certain data in

Table A5. Schools excluded from the Texas Teacher Evaluation and Support System sample

Schools	Number of schools
Schools in the Texas Teacher Evaluation and Support System (T-TESS) pilot dataset	251
Schools that were excluded due to the following issues:	
Identification information could not be linked to the Public Education Information Management System mobility data	2
Mobility data were not accurate because school was new at some point during the 2012/13 and 2014/15 school years	4
Had no Texas Academic Performance Report data for school characteristics	1
Had all mobility metrics (percentage of teachers who left the school, left Texas public schools, moved to another school, moved to another district) masked	6
Missing most T-TESS ratings	1
Schools in the analytic dataset for this study	237

Source: Authors' compilation from the Texas Teacher Evaluation Support System pilot, 2014/15; Texas Academic Performance Report data, 2014/15.

cells with fewer than five individuals had to be masked or excluded prior to public release; University of Texas at Austin Texas Education Research Center, 2015). These exclusions left 237 schools across 51 districts in the analytic sample.

Because masking resulted in a significant amount of nonrandom missing data, the study team pooled school-level mobility metrics for the 2013/14, 2014/15, and 2015/16 school years, using 2012/13, 2013/14, and 2014/15 as the baseline years.[5] Despite the pooling, three metrics had to be excluded from the analysis: the destination proportion of teachers who moved to another school, moved to another district, or left Texas public schools altogether. The metric that was retained for research question 4 was mobility rates.

Methodology

Teachers' mobility behaviors were classified by comparing school assignments across school year pairs and categorizing movement into the following groups: stayed in the same school, moved to a different school in the same district, moved to a different school in a different district, entered Texas public schools, and left Texas public schools. For example, teachers' school assignments in 2010/11 were compared with school assignments in 2011/12. For the mobility rate, teachers who moved schools or left teaching in 2011/12 were included in the numerator, and all teachers in the 2010/11 school year were included in the denominator. Three destination proportions were calculated for teachers who moved: the proportion moving within a district, the proportion moving between Texas districts, and the proportion leaving Texas public schools. These proportions sum to 100 and represent how teacher movements contributed to overall mobility rates within schools, regions, and overall for the state. Two mobility metrics—mobility rate and destination proportions—were computed for each school year and were used in analyses for research questions 1, 3, and 4.

The analyses for research question 1 focused on describing the annual mobility rates and destination proportions at the state and regional levels. Trends across the five school years also were analyzed to identify change over time. Finally, mobility rates and destination proportions were averaged across the five school years.

For research question 2, teacher school assignments were collapsed into three categories: stayers (staying in the same school), movers (moving to a different school in the same district or moving to a school in a different district), and leavers (leaving Texas public schools). Cross-tabulations examined the rates of teachers who were classified as stayers, movers, or leavers by demographic characteristics, including gender, race/ethnicity, educational attainment, experience, and teacher certification. A difference of 2 percentage points was set as the threshold for determining and presenting substantive differences between stayers, movers, and leavers. A similar method was used in Lochmiller et al.'s (2016, p. 4) study of teacher mobility in West Virginia, which stated that although the threshold was arbitrary, it was "selected on the basis that it would yield the most policy-relevant information."

Research question 3 examined the correlations between school-level mobility rates and destination proportions with corresponding school-level student characteristics. Student characteristics included school-level proportions of students by race/ethnicity, of students in special education, of gifted and talented students, of English learner students, and of economically disadvantaged students (students eligible for the federal school lunch program) and student achievement (percentage of students passing math and English language arts standardized assessments).

Research question 4 examined the relationship between school-level mobility metrics and school-average rubric ratings from the T-TESS pilot in the 2014/15 school year (Lazarev et al., 2017). The study team first conducted descriptive analyses to identify the basic nature of the data (see appendix C) and then calculated correlations and established whether there was a positive association, a negative association, or no association between school-average teacher rubric ratings (overall, domain, and dimension levels) and school-level mobility rates. To examine these relationships in greater detail, the study team ran a series of ordinary least-squares regressions, with school-level teacher mobility rates as the dependent variable, school-average teacher evaluation ratings as the main independent variable, and school characteristics as covariates (the same set used to answer research question 3), with clustering by district.

Appendix B. Supporting tables and figures

The tables in this appendix show the complete results of analyses for each research question.

Table B1 describes the total number of teachers in Texas public schools and the number of teachers who moved to other schools within a district, moved between districts, or left Texas public schools in each school year studied.

Teacher mobility rates and destination proportions are presented for each school year and as a five-year average for the state overall and by Texas state education service center region (tables B2–B5; see box 1 in the main report for definitions).

Table B1. Number of teachers and number of mobile teachers, by types of mobility in Texas public schools, 2011/12–2015/16

Teacher mobility	2011/12	2012/13	2013/14	2014/15	2015/16
Teachers in baseline year	343,967	344,725	341,673	347,540	355,958
Total number of mobile teachers	64,174	71,195	73,166	75,967	78,462
Moved within district	16,120	15,484	14,458	15,029	15,985
Moved between districts	7,765	16,301	19,441	21,576	21,505
Left Texas public schools	40,289	39,410	39,267	39,362	40,972

Source: Authors' analysis based on Public Education Information Management System data, 2010/11– 2015/16.

Table B2. Teacher mobility rates in Texas public schools, by state and region, 2011/12–2015/16 (percent)

Region	2011/12	2012/13	2013/14	2014/15	2015/16	2011/12–2015/16 average
Texas	18.7	20.7	21.4	21.9	22.0	20.9
1: Edinburg	15.8	16.6	16.3	16.1	14.6	15.9
2: Corpus Christi	20.7	20.9	22.5	22.8	22.5	21.9
3: Victoria	20.8	23.9	23.9	24.9	23.5	23.4
4: Houston	19.9	21.2	23.0	22.7	22.3	21.8
5: Beaumont	21.4	18.9	18.3	21.3	22.0	20.4
6: Huntsville	18.6	21.9	23.6	24.0	24.2	22.4
7: Kilgore	20.1	20.3	21.9	22.9	23.3	21.7
8: Mount Pleasant	19.4	18.1	20.2	22.2	23.5	20.7
9: Wichita Falls	17.0	17.9	21.5	23.8	20.4	20.1
10: Richardson	17.8	21.9	22.4	23.6	26.0	22.3
11: Fort Worth	17.7	19.7	20.6	20.3	19.9	19.6
12: Waco	20.9	22.7	22.7	26.9	23.2	23.3
13: Austin	18.7	21.3	21.7	22.9	23.1	21.5
14: Abilene	23.1	24.2	23.5	21.9	27.2	24.0
15: San Angelo	20.0	22.1	20.0	22.2	22.9	21.4
16: Amarillo	18.8	19.0	20.0	20.1	19.2	19.4
17: Lubbock	21.9	20.5	25.4	24.4	23.4	23.1
18: Midland	24.1	28.3	25.2	26.0	28.3	26.4
19: El Paso	13.2	17.3	14.2	15.4	17.0	15.4
20: San Antonio	17.6	20.4	21.3	20.2	20.6	20.0

Source: Authors' analysis based on Public Education Information Management System data, 2010/11–2015/16.

Table B3. Destination proportion of moving teachers who moved within districts in Texas public schools, by state and region, 2011/12–2015/16 (percent)

Region	2011/12	2012/13	2013/14	2014/15	2015/16	2011/12–2015/16 average
Texas	25.1	21.8	19.8	19.8	20.4	21.4
1: Edinburg	32.9	30.3	30.9	29.2	30.0	30.7
2: Corpus Christi	23.2	20.3	19.5	18.8	21.5	20.7
3: Victoria	24.7	16.9	17.9	16.3	16.6	18.5
4: Houston	23.9	20.9	19.4	19.6	20.7	20.9
5: Beaumont	33.9	20.7	17.8	18.1	14.9	21.1
6: Huntsville	20.3	17.3	15.0	16.6	16.6	17.2
7: Kilgore	22.9	17.0	15.1	15.9	15.3	17.2
8: Mount Pleasant	19.1	23.0	18.5	15.9	17.1	18.7
9: Wichita Falls	21.0	17.7	20.2	29.4	19.9	21.6
10: Richardson	28.1	25.1	19.5	19.4	22.0	22.8
11: Fort Worth	25.0	22.8	19.2	20.3	19.1	21.3
12: Waco	21.3	20.4	19.8	20.4	18.8	20.1
13: Austin	22.6	19.8	16.9	17.4	15.6	18.6
14: Abilene	26.3	23.5	20.2	15.8	17.0	20.6
15: San Angelo	24.3	19.8	19.5	15.4	14.6	18.7
16: Amarillo	13.5	15.7	14.9	13.9	17.7	15.2
17: Lubbock	24.5	16.3	23.1	17.1	15.1	19.2
18: Midland	23.7	19.9	22.8	18.4	31.4	23.2
19: El Paso	36.0	30.4	31.7	31.9	28.0	31.6
20: San Antonio	24.4	18.0	17.9	20.0	21.6	20.4

Source: Authors' analysis based on Public Education Information Management System data, 2010/11–2015/16.

Table B4. Destination proportion of moving teachers who moved between districts in Texas public schools, by state and region, 2011/12–2015/16 (percent)

Region	2011/12	2012/13	2013/14	2014/15	2015/16	2011/12–2015/16 average
Texas	12.1	22.9	26.6	28.4	27.4	23.5
1: Edinburg	9.1	16.7	19.0	20.1	19.4	16.9
2: Corpus Christi	14.5	25.7	26.0	27.8	25.9	24.0
3: Victoria	13.4	28.8	29.7	31.9	29.3	26.7
4: Houston	9.1	21.1	26.8	26.5	26.7	22.1
5: Beaumont	11.1	24.4	25.0	24.9	31.5	23.4
6: Huntsville	14.6	29.7	31.5	34.3	33.6	28.7
7: Kilgore	15.6	30.4	32.1	34.0	34.1	29.2
8: Mount Pleasant	15.2	20.3	27.8	29.9	32.9	25.2
9: Wichita Falls	14.3	22.3	21.7	25.2	24.0	21.5
10: Richardson	12.3	22.6	27.9	31.0	30.1	24.8
11: Fort Worth	14.2	24.2	29.6	29.6	29.6	25.4
12: Waco	16.0	25.1	27.9	33.5	27.8	26.1
13: Austin	12.7	26.4	27.6	29.1	25.3	24.2
14: Abilene	13.7	26.6	26.9	32.8	30.0	26.0
15: San Angelo	18.7	27.8	26.8	29.0	32.7	27.0
16: Amarillo	12.8	25.5	24.4	25.4	23.9	22.4
17: Lubbock	16.6	24.7	24.9	32.0	29.9	25.6
18: Midland	14.9	22.9	24.1	25.9	19.8	21.5
19: El Paso	5.8	8.3	11.0	11.9	13.4	10.1
20: San Antonio	11.1	21.5	24.5	28.4	25.1	22.1

Source: Authors' analysis based on Public Education Information Management System data, 2010/11–2015/16.

Table B5. Destination proportion of moving teachers who left Texas public schools, by state and region, 2011/12—2015/16 (percent)

Region	2011/ 12	2012/13	2013/14	2014/15	2015/16	2011/12 2015/16 average
Texas	62.8	55.4	53.7	51.8	52.2	55.2
1: Edinburg	58.0	53.0	50.1	50.6	50.6	52.5
2: Corpus Christi	62.3	54.0	54.5	53.4	52.6	55.3
3: Victoria	61.9	54.2	52.3	51.7	54.1	54.8
4: Houston	67.0	58.0	53.7	53.9	52.6	57.0
5: Beaumont	55.0	54.9	57.1	57.0	53.6	55.5
6: Huntsville	65.0	53.0	53.5	49.0	49.8	54.1
7: Kilgore	61.5	52.6	52.8	50.1	50.6	53.5
8: Mount Pleasant	65.7	56.7	53.6	54.3	50.0	56.0
9: Wichita Falls	64.8	59.9	58.2	45.3	56.0	56.8
10: Richardson	59.5	52.3	52.6	49.6	47.9	52.4
11: Fort Worth	60.8	53.0	51.2	50.1	51.3	53.3
12: Waco	62.6	54.5	52.2	46.0	53.4	53.8
13: Austin	64.7	53.8	55.6	53.5	59.1	57.3
14: Abilene	60.0	49.8	52.8	51.3	52.9	53.4
15: San Angelo	57.0	52.4	53.7	55.6	52.7	54.3
16: Amarillo	73.7	58.8	60.6	60.6	58.4	62.4
17: Lubbock	58.9	58.9	52.0	50.8	55.0	55.1
18: Midland	61.4	57.2	53.1	55.6	48.8	55.2
19: El Paso	58.2	61.3	57.3	56.2	58.6	58.3
20: San Antonio	64.5	60.5	57.5	51.7	53.2	57.5

Source: Authors' analysis based on Public Education Information Management System data, 2010/11–2015/16.

Cross-tabulations of teacher-level data compare teacher characteristics by classification as a stayer, mover, or leaver for each school year (tables B6–B8; see box 1 in the main report for definitions).

Table B6. Percentage of teachers who were stayers in Texas public schools, by teacher characteristics, 2011/12–2015/16

Teacher characteristic	2011/12	2012/13	2013/14	2014/15	2015/16	2011/12–2015/16 average
Texas	80.5	77.7	77.3	77.0	76.9	77.9
Race/ethnicity						
Black	76.1	74.1	72.2	72.2	71.3	73.1
Hispanic	82.9	79.8	79.5	79.5	79.3	80.2
White	80.3	77.5	77.2	76.7	76.8	77.7
Other	79.2	76.3	75.4	77.2	75.3	76.7
Sex						
Male	79.5	75.7	76.4	76.2	76.5	76.9
Female	80.8	78.4	77.6	77.2	77.0	78.2
Educational attainment						
Bachelor's degree	80.9	78.4	78.2	77.8	77.6	78.6
Advanced degree	79.2	75.6	74.5	74.5	74.7	75.6
Experience						
0–2 years	73.0	68.8	73.5	75.9	73.6	73.2
3–4 years	79.9	74.2	73.5	74.1	75.6	75.7
5–7 years	83.4	77.9	76.6	76.2	76.0	78.1
8–10 years	84.3	80.6	79.4	79.2	79.3	80.5
11–15 years	86.2	82.7	82.3	81.4	81.3	82.8
16–20 years	86.3	83.9	83.9	83.5	83.3	84.2
21–25 years	84.1	84.0	83.7	83.4	83.3	83.7
26–30 years	80.3	80.0	79.4	79.3	80.0	79.8
31 or more years	74.1	75.7	75.8	76.8	76.9	75.8
Teaching certification area						
Bilingual education	83.7	80.5	79.7	78.6	78.4	80.1
Vocational education	78.7	78.9	77.1	80.2	79.3	78.9
Computer science	80.9	79.8	79.2	77.9	78.8	79.3
English language arts	82.8	80.1	79.0	78.4	78.2	79.8
Fine arts	80.8	79.3	79.1	78.7	78.2	79.2
General	81.9	79.6	78.7	77.8	77.4	79.1
Physical education	80.9	77.2	78.1	77.2	78.1	78.3
Languages	80.7	77.8	77.6	77.7	78.3	78.4
Math	81.7	78.3	79.0	78.0	78.3	79.1
Science	81.9	77.6	78.8	78.3	78.8	79.1
Social studies	81.4	77.4	77.6	77.2	78.1	78.4
Special education	72.3	69.1	70.1	69.7	70.9	70.4
Teaching certification type						
Emergency certification	66.0	64.2	65.3	66.9	60.9	64.8
Standard certification	80.6	77.8	77.3	77.0	77.0	77.9

Source: Authors' analysis based on Public Education Information Management System data, 2010/11–2015/16, and Texas PK–16 Public Education Information Resource data, 2010/11–2014/15.

Table B7. Percentage of teachers who were movers in Texas public schools, by teacher characteristics, 2011/12–2015/16

Teacher characteristic	2011/12	2012/13	2013/14	2014/15	2015/16	2011/12–2015/16 average
Texas	7.3	9.9	10.5	11.1	11.0	10.0
Race/ethnicity						
Black	9.1	12.1	13.3	13.9	14.3	12.6
Hispanic	7.2	9.8	10.4	10.4	10.4	9.7
White	7.0	9.7	10.2	10.9	10.8	9.7
Other	7.2	10.1	10.3	11.2	11.5	10.1
Sex						
Male	9.1	12.7	12.5	12.9	12.7	12.0
Female	6.7	9.1	10.0	10.6	10.6	9.4
Educational attainment						
Bachelor's degree	7.4	10.1	10.6	11.1	11.1	10.1
Advanced degree	6.7	9.6	10.4	10.9	10.9	9.7
Experience						
0–2 years	12.0	15.8	15.1	14.7	15.1	14.6
3–4 years	8.8	13.4	13.9	14.0	14.1	12.6
5–7 years	7.5	11.3	12.4	12.5	12.6	11.2
8–10 years	6.7	9.8	10.7	11.1	11.1	10.0
11–15 years	6.2	8.5	8.8	9.7	9.7	8.6
16–20 years	5.5	7.3	7.2	8.1	8.1	7.3
21–25 years	5.1	5.8	5.9	6.6	6.9	6.1
26–30 years	4.1	4.8	4.7	5.2	5.0	4.7
31 or more years	3.4	3.3	3.2	3.6	3.8	3.4
Teaching certification area						
Bilingual education	6.8	9.4	10.6	11.3	10.9	9.9
Vocational education	9.7	10.6	12.0	11.0	11.0	10.9
Computer science	8.1	10.0	9.4	11.0	10.6	9.8
English language arts	5.7	8.0	9.2	9.6	9.6	8.4
Fine arts	9.5	11.4	12.1	12.3	12.5	11.5
General	6.7	8.9	9.9	10.9	10.9	9.5
Physical education	9.3	13.2	12.5	13.4	12.9	12.2
Languages	7.5	10.1	11.4	11.0	10.4	10.0
Math	7.5	10.8	10.3	11.0	10.8	10.1
Science	6.9	10.7	9.9	10.3	10.1	9.6
Social studies	6.9	10.7	10.8	11.1	10.8	10.0
Special education	8.7	11.3	11.4	12.5	11.7	11.2
Teaching certification type						
Emergency certification	16.6	21.1	21.6	20.5	20.7	20.1
Standard certification	7.2	9.9	10.5	11.0	11.0	9.9

Source: Authors' analysis based on Public Education Information Management System data, 2010/11–2015/16, and Texas PK–16 Public Education Information Resource data, 2010/11–2014/15.

Table B8. Percentage of teachers who were leavers of Texas public schools, by teacher characteristics, 2011/12–2015/16

Teacher characteristic	2011/12	2012/13	2013/14	2014/15	2015/16	2011/12–2015/16 average
Texas	12.2	12.3	12.2	11.9	12.1	12.1
Race/ethnicity						
Black	14.8	13.9	14.5	13.8	14.4	14.3
Hispanic	10.0	10.4	10.1	10.1	10.3	10.2
White	12.7	12.8	12.6	12.4	12.4	12.6
Other	13.6	13.6	14.3	11.6	13.2	13.2
Sex						
Male	11.4	11.6	11.1	10.8	10.8	11.1
Female	12.5	12.5	12.5	12.2	12.4	12.4
Educational attainment						
Bachelor's degree	11.7	11.5	11.2	11.1	11.3	11.4
Advanced degree	14.1	14.9	15.2	14.6	14.4	14.6
Experience						
0–2 years	15.0	15.5	11.4	9.4	11.3	12.3
3–4 years	11.3	12.5	12.6	11.9	10.3	11.7
5–7 years	9.1	10.7	11.1	11.3	11.4	10.7
8–10 years	9.0	9.7	9.9	9.7	9.6	9.6
11–15 years	7.7	8.8	8.8	8.9	8.5	8.5
16–20 years	8.2	8.8	8.9	8.4	8.6	8.6
21–25 years	10.8	10.3	10.5	10.1	9.8	10.3
26–30 years	15.6	15.2	15.9	15.5	15.1	15.5
31 or more years	22.5	21.0	21.1	19.7	19.3	20.8
Teaching certification area						
Bilingual education	9.5	10.1	9.8	10.2	10.7	10.1
Vocational education	11.6	10.4	10.9	8.8	9.7	10.3
Computer science	11.0	10.3	11.4	11.2	10.6	10.9
English language arts	11.4	11.9	11.9	11.9	12.2	11.8
Fine arts	9.7	9.4	8.9	9.1	9.4	9.3
General	11.4	11.5	11.4	11.3	11.7	11.5
Physical education	9.8	9.6	9.4	9.4	9.1	9.5
Languages	11.9	12.2	11.1	11.3	11.3	11.6
Math	10.8	10.9	10.7	11.1	10.9	10.9
Science	11.2	11.7	11.2	11.4	11.1	11.3
Social studies	11.7	11.9	11.6	11.7	11.1	11.6
Special education	19.0	19.7	18.5	17.9	17.4	18.5
Teaching certification type						
Emergency certification	17.5	14.8	13.1	12.7	18.4	15.1
Standard certification	12.2	12.3	12.2	11.9	12.0	12.1

Source: Authors' analysis based on Public Education Information Management System data, 2010/11–2015/16, and Texas PK–16 Public Education Information Resource data, 2010/11–2014/15.

Correlations between school-level teacher mobility rates and destination proportions and school-level student demographic characteristics were calculated for each school year (tables B9–B12).

Table B9. Correlations of school-level teacher mobility rates and student demographic characteristics in Texas public schools, 2011/12–2015/16

Variable	2011/12	2012/13	2013/14	2014/15	2015/16
Student enrollment	–0.159***	–0.127***	–0.139***	–0.147***	–0.163***
Student–teacher ratio	–0.087***	–0.044***	–0.039***	–0.043***	–0.055***
Percentage of English learner students	–0.079***	–0.089***	–0.080***	–0.068***	–0.083***
Percentage of economically disadvantaged students	0.065***	0.033**	0.031**	0.055***	0.055***
Percentage of gifted and talented students	–0.070***	–0.052***	–0.066***	–0.067***	–0.092***
Percentage of students in special education programs	0.062***	0.110***	0.048***	0.076***	0.044***
Percentage of students passing all STAAR assessments	–0.103***	–0.171***	–0.168***	–0.182***	–0.166***
Percentage of students by race/ethnicity					
Asian	–0.047***	–0.051***	–0.045***	–0.075***	–0.062***
Black	0.146***	0.121***	0.130***	0.174***	0.150***
Hispanic	–0.018	–0.010	–0.042***	–0.038***	–0.038***
Other race/ethnicity	–0.022*	–0.007	–0.026*	–0.034**	–0.003
White	–0.057***	–0.050***	–0.021	–0.044***	–0.033**

* Significant at $p < .05$; ** significant at $p < .01$; *** significant at $p < .001$.

STAAR is State of Texas Assessments of Academic Readiness.

Note: The table values are Pearson product moment correlations.

Source: Authors' analysis based on Public Education Information Management System data, 2010/11–2015/16, and Texas Academic Performance Report data, 2010/11–2014/15.

Table B10. Correlations of destination proportion of moving teachers who moved within districts and student demographic characteristics in Texas public schools, 2011/12–2015/16

Variable	2011/12	2012/13	2013/14	2014/15	2015/16
Student enrollment	–0.010	–0.005	–0.007	0.002	0.005
Student–teacher ratio	0.080***	0.109***	0.064***	0.080***	0.062***
Percentage of English learner students	0.051***	0.117***	0.083***	0.122***	0.092***
Percentage of economically disadvantaged students	0.013	0.052***	0.054***	0.061***	0.082***
Percentage of gifted and talented students	0.096***	0.081***	0.093***	0.102***	0.108***
Percentage of students in special education programs	–0.038***	–0.059***	–0.05***	–0.036**	–0.024*
Percentage of students passing all STAAR assessments	0.022	0.046***	0.033**	0.020	–0.016
Percentage of students by race/ethnicity					
Asian	0.003	0.020	0.003	0.011	–0.002
Black	–0.036**	–0.003	–0.018	–0.021	–0.005
Hispanic	0.080***	0.103***	0.105***	0.129***	0.133***
Other race/ethnicity	–0.040***	–0.061***	–0.045***	–0.045***	–0.060***
White	–0.061***	–0.110***	–0.099***	–0.126***	–0.135***

* Significant at $p < .05$; ** significant at $p < .01$; *** significant at $p < .001$.

STAAR is State of Texas Assessments of Academic Readiness.

Note: The table values are Pearson product moment correlations.

Source: Authors' analysis based on Public Education Information Management System data, 2010/11–2015/16, and Texas Academic Performance Report data, 2010/11–2014/15.

Table B11. Correlations of destination proportion of moving teachers who moved between districts and student demographic characteristics in Texas public schools, 2011/12–2015/16

Variable	2011/12	2012/13	2013/14	2014/15	2015/16
Student enrollment	–0.039***	0.000	0.015	0.003	0.014
Student–teacher ratio	–0.154***	–0.114***	–0.068***	–0.086***	–0.075***
Percentage of English learner students	–0.162***	–0.181***	–0.117***	–0.143***	–0.162***
Percentage of economically disadvantaged students	–0.090***	–0.142***	–0.129***	–0.117***	–0.131***
Percentage of gifted and talented students	–0.015	0.010	–0.008	–0.015	–0.006
Percentage of students in special education programs	0.025*	–0.018	–0.023*	–0.042***	–0.046***
Percentage of students passing all STAAR assessments	–0.067***	–0.037**	0.008	0.046***	0.065***
Percentage of students by race/ethnicity					
Asian	–0.052***	–0.046***	–0.020	–0.034**	–0.044***
Black	–0.021	–0.061***	–0.029*	–0.011	–0.023*
Hispanic	–0.123***	–0.165***	–0.167***	–0.179***	–0.197***
Other race/ethnicity	0.024*	0.017	0.044***	0.049***	0.057***
White	0.151***	0.220***	0.198***	0.203***	0.232***

* Significant at $p < .05$; ** significant at $p < .01$; *** significant at $p < .001$.

STAAR is State of Texas Assessments of Academic Readiness.

Note: The table values are Pearson product moment correlations.

Source: Authors' analysis based on Public Education Information Management System data, 2010/11–2015/16, and Texas Academic Performance Report data, 2010/11–2014/15.

Table B12. Correlations of destination proportion of moving teachers who left Texas public schools and student characteristics in Texas public schools, 2011/12–2015/16

Variable	2011/12	2012/13	2013/14	2014/15	2015/16
Student enrollment	0.035**	0.004	–0.008	–0.005	–0.018
Student–teacher ratio	0.026*	0.001	0.005	0.010	0.015
Percentage of English learner students	0.059***	0.052***	0.033**	0.026*	0.068***
Percentage of economically disadvantaged students	0.047***	0.077***	0.068***	0.055***	0.047***
Percentage of gifted and talented students	–0.080***	–0.081***	–0.074***	–0.075***	–0.088***
Percentage of students in special education programs	0.019	0.068***	0.064***	0.071***	0.063***
Percentage of students passing all STAAR assessments	0.024	–0.009	–0.035**	–0.060***	–0.046***
Percentage of students by race/ethnicity					
Asian	0.032**	0.021	0.016	0.021	0.041***
Black	0.047***	0.056***	0.041***	0.028*	0.025*
Hispanic	0.006	0.051***	0.059***	0.053***	0.063***
Other race/ethnicity	0.022	0.041***	0.000	–0.006	0.000
White	–0.042***	–0.093***	–0.091***	–0.079***	–0.093***

* Significant at $p < .05$; ** significant at $p < .01$; *** significant at $p < .001$.

STAAR is State of Texas Assessments of Academic Readiness.

Note: The table values are Pearson product moment correlations.

Source: Authors' analysis based on Public Education Information Management System data, 2010/11–2015/16, and Texas Academic Performance Report data, 2010/11–2014/15.

The results of regression analyses show the associations between school-level average ratings for the 2014/15 pilot implementation of the Texas Teacher Evaluation and Support System and mobility rates (table B13).

Table B13. Regression coefficients of the relationships between school-level average evaluation ratings from the 2014/15 pilot of the Texas Teacher Evaluation and Support System and school-level mobility rate

Variable	Mobility rate	
	Overall ratings (model 1)	Domain ratings (model 2)
Intercept	0.225*	0.173
Texas Teacher Evaluation and Support System overall score	–0.022	—
Planning	—	–0.008
Instruction	—	–0.009
Learning environment	—	0.046*
Professional practices and responsibilities	—	–0.046
Suburb	–0.004	–0.009
Town	–0.006	–0.007
Rural	0.003	0.003
Percentage of students receiving at least proficient on STAAR Reading	–0.001	–0.000
Percentage of teachers with fewer than 6 years of experience	0.001*	0.001**
Percentage of White students	0.000	0.000
Middle school	0.026*	0.026*
Secondary school	0.047**	0.054**
All students (in 1,000s)	–0.027*	–0.030*
Percentage of English learner students	–0.001	–0.001
Percentage of students in special education programs	0.001	0.000
Percentage of economically disadvantaged students	0.001	0.001*
Percentage of teachers with a master's or doctoral degree	0.000	0.000
Sample size (number of schools)	213	207
Number of districts	48	47
R squared	0.365	0.374
Akaike Information Criterion[a]	–404	–374

* Significant at $p < .05$; ** significant at $p < .01$.

STAAR is State of Texas Assessments of Academic Readiness.

a. A statistic that allows fit comparisons across models.

Source: Authors' analysis based on observation data from the Texas Teacher Evaluation and Support System pilot, 2014/15; Texas Academic Performance Report data, 2014/15; and Public Education Information Management System data, 2013/14–2015/16.

Appendix C. Texas Teacher Evaluation and Support System rubric and 2014/15 pilot sample

The primary focus of the Texas Teacher Evaluation and Support System (T-TESS) is to improve teaching practices and improve student outcomes by providing continuous formative feedback to teachers (Teach for Texas, n.d.). The instruments used to measure teacher effectiveness during the 2014/15 pilot comprised a rubric and student growth measures. This analysis employed only ratings based on the T-TESS rubric because student growth measures derived from the value-added measures (VAM) scores from the 2014/15 pilot were not available to the study team in time for this analysis, and the study team did not have access to VAM ratings from any other year.

The T-TESS rubric comprises 16 dimensions across four domains: planning, instruction, learning environment, and professional practices and responsibilities (table C1). For each dimension, a teacher is assigned a rating: improvement needed, developing, proficient, accomplished, or distinguished. For the data used in this study for each teacher the Texas Education Agency averaged dimension ratings to obtain a domain rating and averaged domain ratings to obtain an overall rating. Dimension, domain, and overall ratings were provided to the study team as ordinal values. The study team used the data as they were provided without recalculating any domain ratings on the basis of dimension ratings or overall ratings on the basis of domain ratings.[6]

Table C1. Texas Teacher Evaluation and Support System rubric from the 2014/15 pilot

Domain and dimension	Description
Domain 1: Planning	
Dimension 1.1: Standards and alignment	The teacher designs clear, well-organized sequential lessons that reflect best practice, align with standards, and are appropriate for diverse learners.
Dimension 1.2: Data and assessment	The teacher uses formal and informal methods to measure student progress, then manages and analyzes student data to inform instruction.
Dimension 1.3: Knowledge of students	Through knowledge of students and proven practices, the teacher ensures high levels of learning, social-emotional development, and achievement for all students.
Dimension 1.4: Activities	The teacher plans engaging, flexible lessons that encourage higher-order thinking, persistence, and achievement.
Domain 2: Instruction	
Dimension 2.1: Achieving expectations	The teacher supports all learners in their pursuit of high levels of academics and social-emotional success.
Dimension 2.2: Content knowledge and expertise	The teacher uses content and pedagogical expertise to design and execute lessons aligned with state standards, related content, and student needs.
Dimension 2.3: Communication	The teacher clearly and accurately communicates to support persistence, deeper learning, and effective effort.
Dimension 2.4: Differentiation	The teacher differentiates instruction, aligning methods and techniques to diverse student needs.
Dimension 2.5: Monitor and adjust	The teacher formally and informally collects, analyzes, and uses student progress data, and makes needed lesson adjustments.
Domain 3: Learning environment	
Dimension 3.1: Classroom environment, routines, and procedures	The teacher organizes a safe, accessible, and efficient classroom.
Dimension 3.2: Managing student behavior	The teacher establishes, communicates, and maintains clear expectations for student behavior.
Dimension 3.3: Classroom culture	The teacher leads a mutually respectful and collaborative class of actively engaged learners.
Domain 4: Professional practices and responsibilities	
Dimension 4.1: Professional demeanor and ethics	The teacher meets district expectations for attendance, professional appearance, and decorum as well as procedural, ethical, legal, and statutory responsibilities.
Dimension 4.2: Goal setting	The teacher reflects on his/her practice.
Dimension 4.3: Professional development	The teacher enhances the professional community.
Dimension 4.4: School community involvement	The teacher demonstrates leadership with students, colleagues, and community members in the school, district, and community through effective communication and outreach.

Source: Texas Education Agency, n.d.

The analytic sample for the 2014/15 T-TESS pilot comprised 237 schools. Descriptive statistics of school-level student demographic characteristics were calculated for the 2014/15 T-TESS pilot sample (table C2).

Table C2. Descriptive statistics of school-level student demographic characteristics for the Texas Teacher Evaluation and Support System, 2014/15 pilot sample

Variable	Minimum	Maximum	Mean	Median	Standard deviation
Student enrollment	27.0	3,361.0	641.0	545.0	479.0
Percentage of English learner students	0.0	96.8	15.8	7.7	17.9
Percentage of economically disadvantaged students	0.0	100.0	65.4	69.3	20.2
Percentage of students in special education programs	0.0	81.4	9.1	8.4	5.6
Percentage of students by race/ethnicity					
American Indian	0.0	8.2	0.4	0.2	0.8
Asian	0.0	14.1	1.5	0.5	2.6
Black	0.0	86.9	13.4	4.5	20.4
Native Hawaiian, Pacific Islander	0.0	0.9	0.1	0.0	0.1
Hispanic	4.3	99.8	52.3	48.2	29.8
White	0.1	92.3	30.8	20.2	28.4
Two or more races/ethnicities	0.0	7.7	1.5	1.4	1.4
Summed grades 3–11, proportion of students receiving at least proficient on STAAR Reading	30.0	98.0	76.4	76.0	11.6

Source: Authors' analysis based on Texas Academic Performance Report data, 2014/15.

The descriptive statistics for the school-level teacher demographic characteristics were calculated for the 2014/15 T-TESS pilot sample (table C3).

Table C3. School-level teacher demographic characteristics for the Texas Teacher Evaluation and Support System, 2014/15 pilot sample

Variable	Minimum	Maximum	Mean	Median	Standard deviation
Bilingual program teachers, full-time equivalent, percent	0.0	89.3	5.7	0.6	13.0
Female teachers, full-time equivalent, percent	35.3	100.0	79.2	85.1	17.5
Teacher–student ratio	3.5	24.6	14.9	15.3	2.9
Teacher tenure average	0.3	17.1	7.3	7.2	2.9
Percentage of beginning teachers, full-time equivalent, percent	0.0	71.4	9.9	7.8	10.8
Percentage of teachers with 1–5 years of experience, full-time equivalent	0.0	52.7	25.8	24.7	11.4
Percentage of teachers with 6–10 years of experience, full-time equivalent	0.0	48.1	20.9	20.9	8.8
Percentage of teachers with 11–20 years of experience, full-time equivalent	0.0	68.2	27.1	27.0	11.3
Percentage of teachers with more than 20 years of experience, full-time equivalent	0.0	43.8	16.3	15.3	9.7
Teacher experience average (years)	0.3	18.7	11.0	11.2	3.3
Percentage of teachers with a bachelor's degree, full-time equivalent	27.5	100.0	81.1	82.5	10.7
Percentage of teachers with master's degree, full-time equivalent	0.0	72.1	17.7	16.4	9.9
Percentage of teachers with a doctoral degree, full-time equivalent	0.0	9.3	0.4	0.0	1.2
Percentage of teachers with no degree, full-time equivalent	0.0	41.1	0.8	0.0	3.1

Source: Authors' analysis based on Texas Academic Performance Report data, 2014/15.

Several key findings from the REL Southwest study, *The Texas Teacher Evaluation and Support System Rubric: Properties and Association with School Characteristics,* about the rubric's properties and associations with school characteristics provided a helpful point of departure for this analysis (Lazarev et al., 2017). That study found that on the five-point scale of the T-TESS rubric, 1.6 percent of teachers received the lowest overall rating (improvement needed) and 24.9 percent received the second to lowest rating (developing). In contrast, 1.5 percent of teachers received the highest rating (distinguished) and 3.7 percent received the second highest rating (accomplished). A majority of teachers (68.3 percent) received the middle rating of proficient. At the domain level the study found that, on average, teachers received the highest rating for the learning environment domain (sample mean score of 3.2), followed closely by the professional practices and responsibilities (3.1), planning (3.0), and instruction (2.9) domains.

For the T-TESS pilot sample of schools, the annual teacher mobility rate averaged approximately 23 percent across the three school years 2013/14–2015/16. Among those who left a school, more than half, on average, left the Texas public school system altogether, which is only a few percentage points less than the percentage who left Texas public schools in the full mobility sample (table C4).

Table C4. Descriptive statistics for teacher mobility metrics in Texas public schools for the Texas Teacher Evaluation and Support System, 2014/15 pilot sample

Variable	Number of schools	Minimum	Maximum	Mean	Median	Standard deviation
Total number of teachers from previous year	237.0	9.0	570.0	128.8	110.0	86.5
Mobility rate	237.0	5.0	65.0	23.0	22.0	0.09
Number of teachers who moved within district	98.0	5.0	58.0	10.0	8.0	8.1
Number of teachers who moved between districts	73.0	5.0	46.0	14.0	12.0	8.9
Number of teachers who left Texas public schools	188.0	5.0	58.0	15.8	13.0	10.2
Total number of teachers who moved and left	237.0	5.0	143.0	23.0	23.0	20.6
Proportion of teachers who moved within district	98.0	9.8	60.0	26.8	23.8	0.1
Proportion of teachers who moved between districts	73.0	9.4	51.5	30.0	30.1	0.1
Proportion of teachers who left Texas public schools	188.0	22.2	86.3	52.3	51.7	0.1

Source: Authors' analysis based on Public Education Information Management System data, 2012/13–2015/16.

Appendix D. Supplemental analysis: Relationships between mobility rates and Texas Teacher Evaluation and Support System factor scores

This study leveraged results of an exploratory factor analysis of evaluation ratings that was conducted in the REL Southwest analysis of the Texas Teacher Evaluation and Support System (T-TESS) rubric's properties and associations with school characteristics (Lazarev et al. 2017). For exploratory factor analysis (EFA), the maximum likelihood estimator method and varimax rotation were performed to analyze uniqueness values and to identify clusters of T-TESS dimensions that may be measuring the same latent constructs of teacher effectiveness. The study found three factors, which included dimensions from the instruction and planning domains (factor 1), the professional practices and responsibilities domain (factor 2), and the learning environment domain (factor 3). These factors were closely aligned with the domain designations. Although the factor analysis largely validated the descriptive clusters of dimensions designated as domains, having the factor scores provides a parallel analysis.

This supplemental regression analysis employed the mobility rate as the dependent variable, the factor scores as the main independent variables, and all observed school characteristics as covariates, with clustering by district. The analysis revealed that factor 3, which was associated primarily with the learning environment domain, was significantly and positively associated with mobility rates. That is, when all other school characteristics are held constant, an increase in factor 3 scores is associated with higher mobility rates. In contrast, factor 2, which was heavily influenced by dimensions such as school community involvement and professional development, showed a significant negative association with mobility rates (table D1). This finding was consistent with the study team's expectations that schools scoring high on these dimensions would have lower teacher turnover.

Table D1. Regression coefficients showing relationships between factor scores from the 2014/15 pilot of the Texas Teacher Evaluation and Support System and school-level mobility rates

Variable	Mobility rate; factors of item scores
Intercept	0.134
Factor 1 (planning and instruction)	0.003
Factor 2 (professional practices and responsibilities)	–0.026*
Factor 3 (learning environment)	0.032*
Suburb	–0.012
Town	–0.011
Rural	–0.002
Percentage of students receiving at least proficient on STAAR Reading	–0.000
Percentage of teachers with fewer than 6 years of experience	0.001**
Percentage of White students	0.000
Middle school	0.027*
Secondary school	0.057**
All students (in 1,000s)	–0.033**
Percentage of English learner students	–0.001*
Percentage of economically disadvantaged students	0.001*
Percentage of students in special education programs	0.000
Percentage of teachers with master's or doctoral degree	0.000
Sample size (number of schools)	207
Number of districts	47
R squared	0.379
Akaike Information Criterion[a]	–376

* Significant at $p < .05$; ** significant at $p < .01$.

STAAR is State of Texas Assessments of Academic Readiness.

a. A statistic that allows fit comparisons across models.

Source: Authors' analysis based on observation data from the Texas Teacher Evaluation and Support System pilot, 2014/15; Texas Academic Performance Report data, 2014/15; and Public Education Information Management System data, 2013/14–2015/16.

Notes

1. The REL Southwest Education Effectiveness Research Alliance includes a diverse body of approximately 44 stakeholders, including teachers, administrators, researchers, and district and state policymakers. Institutions represented in the alliance comprise local and state teacher associations, postsecondary institutions, the Texas Education Agency, and other state and district agencies (Regional Educational Laboratory Southwest, n.d.).
2. The pilot was conducted in 251 schools in 57 districts. The final analytic sample had 237 schools in 51 districts.
3. These results were validated by a linear regression analysis that regressed school-level mobility rates on factor scores obtained through a factor analysis of rubric ratings from the 2014/15 T-TESS pilot (see appendix D).
4. The pilot data (2014/15) were collected and managed by one entity. For the refinement phase (2015/16) and statewide rollout, districts can use their own systems, which makes research beyond the pilot more difficult.
5. To pool the data, the study team used the following formula:
$$(M_y + M_{y+1} + M_{y+2}) / (T_{y-1} + T_y + T_{y+1}),$$
where M is the number of teachers who moved, T is the total number of teachers at the school, and y is the year 2013/14.
6. In Texas, employment decisions and career recommendations for teachers are made at the local level by school districts based on consecutive appraisals for more than one year, if available (Texas Education Code, Title 2, Subtitle D, Chapter 21, Subchapter H). The study team did not have comprehensive information on whether each district that participated in the pilot used the pilot year's results for employment decisions. About 2 percent of the overall and domain ratings were not simple averages of the underlying ratings. Districts were not required to convert ordinal ratings into numeric values when providing feedback to teachers.

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