

PRINCIPAL EFFECTIVENESS AND PRINCIPAL TURNOVER

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Abstract

Research demonstrates the importance of principal effectiveness for school performance and the potentially negative effects of principal turnover. However, we have limited understanding of the factors that lead principals to leave their schools or about the relative effectiveness of those who stay and those who turn over. We investigate the association between principal effectiveness and principal turnover using longitudinal data from Tennessee, a state that has invested in multiple measures of principal performance through its educator evaluation system. Using three measures of principal performance, we show that less-effective principals are more likely to turn over, on average, though we find some evidence that the most effective principals have elevated turnover rates as well. Moreover, we demonstrate the importance of differentiating pathways out of the principalship, which vary substantially by effectiveness. Low performers are more likely to exit the education system and to be demoted to other school-level positions, whereas high performers are more likely to exit and to be promoted to central office positions. The link between performance and turnover suggests that prioritizing hiring or placing effective principals in schools with large numbers of low-income or low-achieving students can serve to lower principal turnover rates in high-needs environments.

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1. INTRODUCTION

A growing body of policy research documents the importance of the school principal for school success (e.g., Branch, Hanushek, and Rivkin 2012; Coelli and Green 2012; Grissom, Kalogrides, and Loeb 2015). Although principals have little direct influence on student learning, they influence school-level factors, such as climate and human capital decisions, that indirectly affect achievement (Sebastian and Allensworth 2012; Kraft, Marinell, and Yee 2016; Burkhauser 2017; Cannata et al. 2017). Evidence also suggests that turnover in the principal's office can disrupt these processes. Several recent studies find that principal turnover is associated with both higher rates of teacher turnover and lower student achievement gains in subsequent years, and may have even more negative effects in schools with larger numbers of low-income and low-achieving students (Béteille, Kalogrides, and Loeb 2012; Miller 2013; Wills 2016).

The link between principal turnover and negative school outcomes suggests that understanding principal turnover is critical for education research and policy. However, studies in this area are surprisingly scarce, particularly in comparison to the voluminous literature on teacher turnover (Guarino, Santibañez, and Daley 2006; Grissom, Viano, and Selin 2016). Researchers' incomplete understanding of the leadership labor market means that we have little guidance to offer policy makers interested in addressing leadership instability in schools.

There are at least two contributions this study makes in pushing forward our understanding of the principal labor market. First, we address an omission in studies of the factors that predict principal turnover—the role of a principal's effectiveness on the job. Existing studies leave open the question of whether turnover is concentrated among low or high performers. Although principal turnover likely negatively affects school performance in the short-term (e.g., Miller 2013), it does not follow that all principal turnover is detrimental; high turnover rates among low performers may actually promote school performance in subsequent years. In contrast, if turnover is highest among high performers, we may even be underestimating the costs of principal turnover, suggesting that policy makers should make addressing principal turnover even more of a policy priority, and perhaps implement policies targeted at retaining high performers.

Second, we move beyond dichotomous turnover measures to investigate how different factors predict different pathways out of a school leadership position, including moves to another principal position in the district, moves to other districts, exits from education altogether, and—as a particularly novel aspect of our approach—moves “downward” to assistant principal or classroom positions. Modeling these pathways is important because of the complexity of administrators' career behavior, particularly with respect to the agency of that behavior (Farley-Ripple, Solano, and McDuffie 2012). In contrast to studies of the teacher labor market, where turnover usually is discussed as teacher-driven because involuntary moves or exits are relatively rare, agency for principals is less clear. Principals are “middle managers” in the district bureaucracy (Morris et al. 1982), and have fewer job protections; thus, they are likely to be more at risk of being moved by the district than are teachers. In the absence of data on whether a move is principal- or district-initiated (data that are typically unavailable), providing insight on this agency is difficult. Using measures of principal effectiveness to predict different job outcomes can provide some suggestive evidence on this point. For example, a finding that less-effective principals are more likely to move to assistant principal

positions would be consistent with districts demoting low performers. In contrast, a finding that high performance predicts moves to other districts may be evidence that districts compete to attract more effective principals.

To be specific, we seek to answer two main research questions. First, to what extent are more-effective principals more or less likely to turn over, and does the association between effectiveness and turnover vary with how effectiveness is measured? Second, how are measures of effectiveness associated with different types of principal turnover, such as moves within and across districts, exits from the education system, and demotions to non-principal positions?

Our examination of the association between principal turnover and principal effectiveness utilizes data from Tennessee, which is a useful context for this study not only because the state maintains robust administrative data on a large number of principals and schools, but also because we can access multiple measures of principal effectiveness. First, we utilize high-stakes ratings given by principals' supervisors as part of the state's administrator evaluation system, which has been in place since the 2011–12 school year. These ratings, which make up half of principals' overall evaluation scores, are based on a rubric that defines effective principal practice. Second, we use data from a statewide survey of teachers in which respondents were asked to assess the quality of leadership in the school. In contrast to the evaluation ratings, these survey responses are low-stakes and never observed by the principal or district. Third, we incorporate scores from school value-added models of student achievement. Although research suggests that school value added is not a valid measure of a principal's effectiveness (Grissom, Kalogrides, and Loeb 2015; Chiang, Lipscomb, and Gill 2016), we include these scores because of the emphasis Tennessee places on them as a performance measure in the administrator evaluation system and as a component of the accountability system more generally. The use of multiple measures provides a more robust examination of the effectiveness–turnover relationship. Moreover, testing the predictive power of two measures of effectiveness used in the state evaluation system is useful given the growth of rigorous principal evaluations systems in many states in recent years (Superville 2014).

Our results show that principals rated more effective by their supervisors and teachers and who lead schools with higher test score growth are significantly less likely to leave their schools, on average, conditional on a large set of principal and school characteristics and district fixed effects. The supervisor evaluation rating results are robust to the inclusion of school fixed effects. Looking beyond a binary measure of leadership turnover, we find that higher rates of turnover among low performers are driven primarily by exits from the educational system and demotions to other school positions. This latter form of turnover, overlooked in prior studies, is substantial, constituting approximately one-fifth of all leadership turnover in the state, and suggests that school districts consider job performance in determining who serves in school leadership positions. Moreover, we find some evidence that the turnover-performance relationship may be nonlinear, with an uptick in turnover due to exits and promotions to central office associated with the highest evaluation ratings.

We proceed first by reviewing the existing literature on principal turnover and educator labor markets more generally, which provides a framework for our analysis. We then describe the data, measures, and methods. Next, we describe the turnover results,

first for a binary measure of turnover then for a multinomial measure. The final section concludes with the implications of the study for policy and practice and suggestions for future research.

2. LINKING PRINCIPAL EFFECTIVENESS TO PRINCIPAL TURNOVER

Research suggests that principal turnover has negative impacts on both teachers and students. For example, Miller (2013) finds that student achievement declines prior to a principal departure and continues to fall for several years after the new principal enters the school. Compared with periods of stability within the same school, the average student scores 0.021 standard deviation (SD) lower on standardized tests in the first year of a new principal, which constitutes a substantive decrease when aggregated across an entire school. This drop in achievement is concurrent with higher teacher turnover rates, suggesting a mechanism whereby principal turnover can indirectly result in lower student outcomes.¹ Wills (2016), using data from South Africa, finds similar negative short-term impacts on student outcomes, with effects concentrated among schools whose principals leave the education system. Finally, Béteille, Kalogrides, and Loeb (2012) find that students in low-achievement schools score 0.04 to 0.06 SD lower on math and reading assessments when they have a new-to-school principal. Additionally, they find the average teacher is 10 percent more likely to leave that year, with suggestive evidence that the relationship is stronger for teachers with higher value added.

These negative effects help drive concerns that principal turnover in the United States is too high (School Leaders Network 2014). In a summary of estimates from different states and districts, Béteille, Kalogrides, and Loeb (2012) report annual principal turnover rates of between 14 percent and 36 percent, with variation that depends on both data source and method of calculation. Recent estimates from the National Center for Educational Statistics place principal turnover rates at 23 percent nationally² (Snyder, de Brey, and Dillow 2016), which is about 7 percentage points higher than rates reported for teachers. These rates are even higher in schools with large numbers of traditionally disadvantaged students. For example, schools with fewer than a quarter of students qualifying for free or reduced-price lunch (FRPL) have an annual turnover rate of 18 percent, compared with a turnover rate of 26 percent in schools where more than three quarters of students qualify.

3. CONCEPTUALIZING THE RELATIONSHIP BETWEEN EFFECTIVENESS AND TURNOVER

A large literature examines educator turnover. The overwhelming majority of these studies focus on teachers, though a handful of studies have examined school leaders (e.g., Gates et al. 2006; Papa 2007; Loeb, Kalogrides, and Hornig 2010; Ni, Sun, and Rorrer 2014; Cullen et al. 2016; Sun and Ni 2016) and district leaders (e.g., Grissom and Andersen 2012; Grissom and Mitani 2016). Although not always made explicit, the

1. Miller notes that the increase in teacher turnover is relatively small, with the typical school losing one extra teacher from a staff of forty teachers in the first year of a new principal.
2. This estimate comes from the 2011–12 Schools and Staffing Survey (SASS). The principal turnover rate was slightly lower in the 2007–08 SASS (21 percent), which was the first iteration of the survey that included a turnover estimate.

underlying framework for many turnover studies is an economic model that conceives of educators as participants in an educator labor market. We adopt this perspective as well.

In a simple labor market, employees' turnover outcomes result from a two-sided decision-making process in which both the employee (the supply side) and the employer (the demand side) weigh the costs and benefits of an employee's continued employment in a position, relative to the costs and benefits of alternatives. Principals weigh the benefits and costs of remaining as the principal in their current school against the (perceived) benefits and costs of available alternatives, which might include moving to another school in the district, moving to a school in another district, or exiting the public school workforce for retirement or other employment. These benefits and costs are both pecuniary and nonpecuniary—that is, related to both monetary compensation and working conditions. When the comparison of the “bundle” of pecuniary and nonpecuniary costs and benefits is less favorable in the current position than in a viable alternative, the principal turns over; thus, lower compensation and factors associated with less desirable working conditions, such as less support from the school's community, are likely predictors of principal turnover. Research on principal turnover supports this hypothesis. For example, both Papa (2007) and Baker, Punswick, and Belt (2010) find that higher salaries are associated with lower principal turnover rates, and Loeb, Kalogrides, and Horng (2010) and Sun and Ni (2016) document the expressed and revealed preferences of principals to work in schools serving more advantaged student populations, which other studies show tend to be correlated with better working conditions (Loeb, Darling-Hammond, and Luczak 2005; Grissom 2011; Simon and Johnson 2015).

Most teacher and leader turnover research focuses on the educator side of the decision process, considering turnover decisions to be primarily voluntary and thus driven by the factors that influence the teacher or principal's assessment of current and alternative job possibilities. In an era of high-stakes accountability and educator evaluation, however, consideration of decisions on the employer (or labor demand) side has become increasingly important. Further, demand-side considerations likely are even more important for school leaders than for teachers, given principals' position as middle managers whose employment opportunities within the district are more directly controlled by district leaders (Morris et al. 1982). Analogous to the decision-making process of the principal to stay or leave, school district leaders weigh the costs and benefits of retaining a principal in his or her current position against alternatives, such as moving the principal to another school and finding a replacement. Thus, factors that make continued employment of a principal in his or her school less attractive to the district will be associated with higher turnover.

A principal's effectiveness likely is an integral component of the benefit–cost calculation on both the supply and demand side. All else equal, workers are more satisfied in jobs they perform at a high level (Judge et al. 2001), suggesting that principals are more likely to want to stay in their schools when they are more effective. At the same time, more effective principals may have more attractive outside options, including other principal positions or work outside of public schools. The relative attractiveness of alternative positions increases the opportunity cost of staying in the current position, which may increase the probability that the principal leaves. On the district side,

a principal's job performance is a factor in the benefit–cost equation as well. Districts may provide benefits or incentives to high performers to encourage them to stay, and presumably are more likely to remove principals from school leadership positions who they assess to be ineffective. Yet a district may also perceive benefits to moving an effective principal—for example, if they believe sending a high performer across town to lead a persistently struggling school would increase overall district performance.

In short, predictions about the association between principal effectiveness and binary turnover are ambiguous. Here, it is useful to deepen the analysis by expanding beyond simple binary measures, as there are numerous pathways out of a principal position. Principals can stay in the same role (i.e., in a principal position) but move to another school within the same district or in another district. As discussed, effectiveness could have either a positive or negative association with these moves. Importantly, principals can also change roles, regardless of whether or not they change districts. We emphasize two types of role changes. The first is a move to a central office leadership position, which we call *promotions*. The second is a move into another school role, such as assistant principal or teacher, which we call *demotions*. For promotions, districts may wish to elevate a high-performing principal to a central office position if such promotions are rewards or if they think the district overall would benefit from having a high-performing leader in a more centralized role. Alternatively, districts may be less likely to promote high-performing principals if their perceived value is greatest at the school level—particularly germane if possible replacements for the principal are less effective. Promotion may also be a means to remove an ineffective principal from a school position. In contrast, we expect that the prediction for demotions is unambiguous: less effective principals will be more likely to be moved “down” to assistant principal or non-leadership positions.

Examination of the predictors of these various pathways out of the current principal position is an important contribution of this study. To our knowledge, no quantitative principal turnover studies have differentiated promotions and demotions from within- and across-district moves and exits, though scholars have pointed out the importance of this differentiation (Farley-Ripple, Solano, and McDuffie 2012; Miller 2013).

Additionally, our use of multiple measures of principal effectiveness improves upon previous research. The extant research is far from conclusive about the behaviors and strategies that define effective school leadership, with studies linking principal effectiveness variously to instructional leadership (Robinson, Lloyd, and Rowe 2008; Grissom, Loeb, and Master 2013), positive school or learning climates (Sebastian and Allensworth 2012; Burkhauser 2017), strategic management of human capital (Milanowski and Kimball 2010; Grissom and Bartanen, 2019), and broad organizational management skills (Grissom and Loeb 2011), among others. Various approaches to measuring principal effectiveness in different turnover studies reflect this lack of consensus about how best to conceptualize it. For example, Sun and Ni (2016) use the 2007–08 Schools and Staffing Survey to create an indirect measure they call “principal leadership quality” from teacher responses regarding leadership practices, but this set of items is small and may capture only some facets of principal leadership. Other studies (e.g., Cullen et al. 2016) do not measure leadership behaviors or practices but instead use school-level value-added scores, which states and districts may value but are likely poor proxies for principal effectiveness (Grissom, Kalogrides, and Loeb 2015; Chiang,

Lipscomb, and Gill 2016). We use both types of measures (teacher survey-based measures and school value added) but augment them with principals' practice ratings given by principals' supervisors using a rubric based on state standards for effective leadership. These evaluation ratings potentially provide a more direct measure of principal effectiveness linked to a broader set of leadership behaviors. In addition, because practice ratings and value added contribute to districts' official assessments of leadership quality, we expect that they may provide different signals about principal career moves than teachers' survey-based assessments.

4. DATA AND MEASURES

We make use of longitudinal administrative data files including information on all public education personnel in Tennessee from the 2011–12 to 2014–15 school years, provided by the Tennessee Department of Education (TDOE) via the Tennessee Education Research Alliance at Vanderbilt University. These files contain information about employees' personal and professional characteristics, including job positions, gender, race and ethnicity, years of experience, and highest degree earned. We used these files to construct additional experience measures, such as years employed in their current school. We then merged these data with information on the characteristics of the schools and districts in which principals currently work from annual student demographic and enrollment data from TDOE and the National Center for Education Statistics' Common Core of Data files.

School and District Characteristics

Prior research finds that school contextual factors are important predictors of principal turnover. Tennessee's data system includes many characteristics of the schools in which the principals work. In addition to enrollment size and level (i.e., elementary, middle, high, or other), we use information on student composition, including the proportion of the school's students who are black, Hispanic/Latino, FRPL-eligible, diagnosed with a disability, and classified as gifted. We also construct a standardized achievement index, which measures a school's average student score across standardized assessments administered in that school as part of the Tennessee Comprehensive Assessment Program.³ Descriptive statistics for each of these measures are provided in Appendix table A.1.⁴

Additionally, in some models we include the following district characteristics: locale type (urban, suburban, town, or rural), the proportion of students who are black or Hispanic/Latino, and the number of schools operated by the district—all of which come from the Common Core of Data—as well as the proportion of school-aged children living in poverty within the district boundaries, which we obtained from the U.S. Census

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3. Students in grades 3–8 take yearly assessments in reading, language arts, mathematics, science, and social studies. High school students take end-of-course assessments in Algebra I, Algebra II, English I, English II, English III, Biology, Chemistry, and U.S. History. We construct the achievement index by standardizing student-level scores within grade and year (subject and year for end-of-course tests), then computing weighted school-level mean scores.
 4. Tables are available in a separate online appendix that can be accessed on *Education Finance and Policy's* Web site at www.mitpressjournals.org/doi/suppl/10.1162/edfp_a_00256.

Bureau's Small Area Income and Poverty Estimates. The summary of these characteristics in table A.1 illustrates the wide variation in district contexts in Tennessee. For instance, there are approximately equal numbers of urban and rural districts (30 percent and 32 percent, respectively), with the smallest districts operating only one school and the largest district operating 290 schools.

Principal Characteristics

We incorporate several principal characteristics from the personnel files: total salary, gender, race (whether the principal is black or white),⁵ and age. Appendix table A.1 shows that 55 percent of Tennessee principals are women, 19 percent are black, and the average age is 49.6 years. The average yearly salary is approximately \$81,000. We also use data on three measures of principal qualifications—tenure in the current school, years of principal experience, and highest degree earned (i.e., bachelor's, master's, educational specialist, or doctoral degree). Because Tennessee's longitudinal administrative files are only available starting in 2003–04, we top-code length of tenure and prior principal experience at eight years. As shown in table A.1, only 17 percent of principals have worked at their school for at least eight years, and 28 percent have eight or more total years of prior principal experience. Approximately half of Tennessee's principals have been in their current school for fewer than three years, and more than half have fewer than five years of principal experience. We combine principals whose highest degree is a bachelor's or master's degree into a single category, which constitutes approximately 56 percent of principals. Of the principals with more advanced degrees, 30 percent have an education specialist degree and 13 percent have a doctorate.⁶

Measuring Principal Turnover

Turnover variables are constructed using the longitudinal job history file, which provides a yearly snapshot of every educator in Tennessee's K–12 public school system. For each year, we observe an employee's job information, including title and school placement. From these files, we create binary and categorical turnover variables. The binary variable takes a value of 1 if a principal in school j in year t is not the principal in school j in year $t + 1$, and zero otherwise.⁷ The categorical indicator expands to five turnover types (not including principals who stay in their school): principals who move to another principal position in the same district (*within-district move*)⁸; principals who move to another principal position in a different district (*across-district move*); principals

5. More than 99 percent of principals in Tennessee in 2011–12 through 2014–15 were black or white. We dropped a total of twenty-eight nonblack, nonwhite principal-by-year observations from the analysis.
6. In our regression models, we combine education specialist and doctorate into a single category. Results do not change when these degrees are categorized separately.
7. Under this definition, principals may have multiple turnover events within the observation period. Of the 2,400 unique principals we observe in the data, 42 percent have one turnover event; only 2 percent have multiple turnover events. In cases of a school closure (i.e., we observe a school in the data in year t but not in year $t + 1$), we drop from the analysis the principal in that school in its final year. We observe roughly ten school closures per year.
8. Charter schools are included in our data files and are considered part of the district in which they are located. Moves to charter schools, then, are typically coded as within-district moves, rather than exits.

Table 1. Principal Turnover Rates by Year

	Pooled	2012	2013	2014	2015
Principal turnover	17.0%	20.2%	16.0%	16.4%	15.2%
Within-district move	3.3	5.1	2.8	2.8	2.4
Across-district move	0.6	0.7	0.2	1.2	0.4
Exit	6.8	8.1	6.7	6.4	6.2
Demoted	3.0	3.1	3.0	3.1	2.9
Promoted	3.2	3.3	3.3	3.0	3.2
<i>N</i>	6,532	1,655	1,653	1,621	1,603

who leave the Tennessee education system (*exit*)⁹; principals promoted to central office positions (*promoted*); and principals demoted to school-level positions (*demoted*).¹⁰

Table 1 shows the principal turnover rates for the 2011–12 through 2014–15 school years. The average yearly turnover rate is 17 percent. Among principals who leave their position, 40% exit the Tennessee education system altogether. Thirty-six percent of turnover cases are principals who change positions in year $t + 1$, with a roughly even split between promoted and demoted principals. Principals who change schools (23 percent of turnover cases) are far more likely to move within a district than across districts.¹¹

Measuring Principal Effectiveness

Our measures of principal effectiveness encompass three distinct views of job performance: ratings from supervisors, scores derived from student achievement data, and assessments provided by teachers. First, TDOE provided us with principal evaluation information from the Tennessee Educator Acceleration Model (TEAM) for the 2011–12 through 2014–15 school years. TEAM is the statewide educator evaluation system that TDOE created as part of its Race to the Top education reforms.¹² For principals, TEAM evaluations are composed of two portions, each accounting for 50 percent of the final evaluation score. The first portion comes from supervisor ratings of principal

9. Our definition of *exit* at time t only makes use of data from time $t + 1$, raising the concern that we label principals as exiting when they leave only for a short time and later reenter the principalship, a relatively frequent phenomenon for teachers (Grissom and Reiningger 2012). However, pooling across all available years of turnover data, less than 1 percent of principals coded as “exitors” later return to the principalship. Also, the data do not record layoffs as a special category, so this category will contain principals who leave the Tennessee education system as the result of a layoff.
10. We do not distinguish between within-district and across-district position changes (i.e., demotions and promotions) because of the very small number of across-district position changes. Specifically, 81 percent of promoted principals and 83 percent of demoted principals remain in the same district.
11. Because of missing data regarding assignment in the staff files, there are a small number of principals in each year for whom we cannot reliably determine a turnover classification. These principals are dropped from the analysis.
12. A small number of Tennessee districts elected to use alternative evaluation systems. Because we have incomplete data on the principal practice ratings principals are given in those alternative systems, we exclude those ratings from our main analyses. We reestimated the main models using data from all school systems in the state, and the results were largely unaffected. In addition, a small number of principals in TEAM districts do not have TEAM ratings. Some of these missing cases may be due to within-year turnover; the turnover rate is 30 percent for principals with missing cases, compared with 14.5 percent for non-missing cases. Overall, our main analytic dataset represents approximately 80 percent of principal-year observations over the timeframe of the data. Sixty percent of missing cases come from just three districts (Shelby, Hamilton, and Knox).

performance on a rubric derived from the Tennessee Instructional Leadership Standards.¹³ As of 2014–15, the rubric defines principal leadership across seventeen indicators in four domains, such as Instructional Leadership for Continuous Improvement and Culture for Teaching and Learning. Principal ratings are based on formal observations typically conducted by the principal's supervisor, the superintendent, or another central office leader. Because not all principals received mid-year observations in the initial years of TEAM implementation, we use the end-of-year summative rating for all principals. Prior research shows that principals' scores across indicators are so highly intercorrelated that they can be reduced to a single underlying performance score using factor analysis (Grissom, Blissett, and Mitani 2018). In this analysis, we take the predicted score from this factor model to be the supervisor's rubric-based assessment of the principal's effectiveness; we refer to this measure as a principal's *TEAM rating*.¹⁴

The second component of the evaluation system, which we also use as a potential effectiveness measure, comes from value-added estimates calculated from student achievement data collected via the Tennessee Value-Added Assessment System (TVAAS). For 2012–13 through 2014–15, TDOE provided us with composite school-level value-added scores from TVAAS, which combine performance across all tested classrooms, subjects, and tests administered in a given school into a single index. Essentially, the TVAAS measure represents the difference between a school's expected growth (per the TVAAS formula) and actual growth on statewide standardized tests.

We also create a measure of principal effectiveness from a statewide survey of teachers conducted by researchers from 2011–12 to 2013–14 as part of the evaluation of reforms under Tennessee's First to the Top (FTTT) legislation, which was associated with the state's Race to the Top award. Across years, teacher response rates ranged from 25 percent to 40 percent. As part of the FTTT Survey, teachers were randomly assigned to respond to different modules, one of which contained a battery of questions specifically designed to assess their principal's leadership.¹⁵ These items ask, for example, whether the school's principal consistently monitors student academic progress, communicates a clear vision for the school, or sets high standards for teaching. Using factor analysis, we again found that responses measured one underlying latent construct, which we take to be *teachers' perceptions of principal effectiveness*. To obtain a principal-level score, which we refer to as the principal's FTTT score, we averaged the teacher-level factor scores at each principal's school.

In addition to capturing distinct aspects of principal performance, these measures differ in their usefulness to district leaders for informing principal retention and mobility decisions. The rubric scores used to construct the TEAM rating are the most readily available, timely, and likely relevant measures, because those who assign the scores (e.g., superintendents or principal supervisors) typically also oversee management and placement of principals. School value-added measures are publicly available and valued for accountability purposes by district and state leaders, but educators may discount

13. For more information about TEAM, see <http://team-tn.org/evaluation/administrator-evaluation/>.

14. The average across items is correlated with the factor score at 0.97.

15. Because response rates were relatively low and only a random subset of responding teachers received the leadership module, 27 percent of principal-year observations are missing the FTTT score due to nonresponse for the three school years in which the survey was implemented. For more information about the FTTT survey, see https://peabody.vanderbilt.edu/TERA/Tennessee_Educator_Survey.php.

their accuracy, and often they are not made available until late summer or during the fall of the next school year, which may limit their usefulness to district leaders for retention decisions (see Goldring et al. 2015). The final measure, constructed from teacher survey responses, are researcher-collected and not observed by school districts, making them not directly relevant to district decision making, though district leaders may have access to proxies to teachers' responses, such as feedback from local surveys or informal reports from teachers in the principal's school.

5. METHODS

Our first research question is: To what extent are more effective principals more or less likely to turn over? For this question, we begin by examining bivariate relationships between turnover and school and principal factors via simple *t*-tests for differences in mean turnover rates by these characteristics. For the multivariate analysis, we run linear probability models of the following form:

$$\Pr(\text{Principal turnover})_{ijt} = f(E_{it}, P_{it}, S_{it}, \alpha_j, \tau_t, \varepsilon_{ijt}). \quad (1)$$

Equation 1 models the probability that a principal leaves her position after this school year as a function of principal effectiveness *E*, a vector of principal characteristics *P*, a vector of school characteristics *S*, a district fixed effect α_j , a year fixed effect τ_t , and a random error term ε . Some previous studies of principal turnover have utilized a discrete-time hazard model by including binary indicators for each year a principal has "survived" in her school; we instead control for a categorical measure of tenure, which provides a more readily-interpretable set of coefficients.¹⁶ We estimate equation 1 using ordinary least squares (OLS) for ease of interpretation and because OLS allows for straightforward inclusion of district fixed effects to account for time-invariant characteristics of school districts that may affect both principal effectiveness and the likelihood of turnover. By isolating variation within school districts, we account for some potential sources of bias, such as more effective principals selecting into districts with lower average turnover rates.

Next, we ask: To what degree does the relationship between principal effectiveness and principal turnover change for different types of principal turnover, including moves to other schools/districts, attrition from the education system, promotions, and demotions? For this question, we tweak equation 1 to correspond to the multinomial case, and we predict the relative probability of falling into the set *{stay, move within district, move across district, exit the system, promoted to central office position, demoted to school-based position}* in the following year as a function of the same covariates used in equation 1. Again to accommodate fixed effects, we use OLS rather than a multinomial model, such as multinomial logit or probit, estimating separate models for each turnover category relative to the same base outcome (stays as principal in current school).¹⁷ Because we estimate models pooled across years, individual principals have multiple observations

16. How we operationalize length of spell has virtually no effect on our estimates of the relationship between the performance measures and turnover.

17. The results are qualitatively similar across all turnover types when using a multinomial logistic regression model. These results are shown in online Appendix tables A.4 and A.5.

in the dataset. To account for repeated observations of the same principal across years, we cluster standard errors at the principal level for all models.

In online Appendix figure A.1, we show the percentage of districts and schools who experienced at least one turnover event from the 2011–12 to 2014–15 school years. Nearly all districts had at least one principal turn over during the time period of the data, suggesting substantial variation for estimating models with district fixed effects. In contrast, only approximately half of *schools* had at least one principal turn over during this time period, suggesting a much smaller effective sample would be used if we used school fixed effects instead. This consideration becomes even more important when looking at specific types of turnover. For example, 68 percent of districts had at least one principal who was promoted to a central office position, compared with only 11 percent of schools. For this reason—although later we estimate school fixed effects models as a check on robustness—district fixed effects models are the focus of our analysis.

6. PATTERNS IN PRINCIPAL TURNOVER ACROSS SCHOOL AND PRINCIPAL CHARACTERISTICS

We begin our analysis of principal turnover by examining bivariate relationships between yearly turnover and school and principal characteristics, including measures of effectiveness. Mean turnover rates by the values of these variables are shown in table 2, with asterisks indicating the result of a two-sided *t*-test for the difference between the mean turnover rate for each row and the *first row* in each group.

School characteristics are shown to the left. The first takeaway is that schools with smaller numbers of traditionally disadvantaged students have lower principal turnover. In particular, schools with the lowest percentages of students who are FRPL-eligible (0–19 percent FRPL) have the lowest principal turnover rates (13 percent); turnover rates in schools with a majority of FRPL students are much higher (about 18 percent). Similarly, schools with the highest average achievement level have the lowest turnover, with annual turnover rates in schools more than 1.5 SD above the mean achievement level of only 12 percent, compared with 24 percent in schools more than 1.5 SD below the mean.

For average school-level growth (TVAAS), the patterns are similar—low-growth schools have significantly higher principal turnover rates than high-growth schools. Schools with the highest growth have turnover rates of only 8 percent, compared with 25 percent in the lowest-growth schools. We also see that middle school principals are significantly more likely to turn over than elementary school principals (19 percent versus 16 percent). There are no significant differences by locale.

The right column of table 2 shows yearly principal turnover rates broken down by various principal characteristics, including effectiveness. Unsurprisingly, principals aged 60 years and older, who are more likely to be eligible for retirement, have much higher turnover rates than other principals (26 percent to 15 percent, respectively), whereas there is no difference in turnover rates among the other age ranges. Principals in their first year at a school (0 years tenure in school) are the least likely to turn over (12 percent turnover rate), with turnover rates ranging from 17 percent to 19 percent for other tenure lengths. Similarly, principals with no prior principal experience (i.e., principals in their first year as a principal) are significantly less likely to turn over

Table 2. Principal Turnover Rates by Selected Principal and School Characteristics

School Characteristics		Principal Characteristics	
Percent FRPL-eligible students		Principal age	
0–19	0.13	Under 40 years	0.16
20–39	0.17	40–49 years	0.15
40–59	0.15	50–59 years	0.15
60–79	0.18*	60 years and above	0.26***
80–100	0.19**		
Achievement index		Principal tenure in school	
Below –1.50	0.24	0 years	0.12
–1.50 to –0.50	0.19	1 year	0.16***
–0.49 to 0.50	0.17***	2 years	0.18***
0.51 to 1.50	0.15***	3–4 years	0.19***
Above 1.50	0.12***	5–7 years	0.19***
		8+ years	0.18***
TVAAS 1-year index		Prior principal experience	
Below –1.50	0.25	0 years	0.10
–1.50 to –0.50	0.17***	1–2 years	0.17***
–0.49 to 0.50	0.16***	3–4 years	0.18***
0.51 to 1.50	0.17***	5–7 years	0.19***
Above 1.50	0.08***	8+ years	0.18***
School level		TEAM rating	
Elementary	0.16	Below –1.50	0.30
Middle	0.19**	–1.50 to –0.50	0.14***
High	0.16	–0.49 to 0.50	0.13***
Other	0.17	0.51 to 1.50	0.13***
		Above 1.50	0.16***
Locale		FITT score	
Urban	0.18	Below –1.00	0.22
Suburban	0.16	–1.00 to –0.01	0.19
Town	0.15	0.00 to 1.00	0.17**
Rural	0.18	Above 1.00	0.15***

Notes: Asterisks indicate significance in a t-test for a difference in means between that row and the first row in the category. FRPL = free or reduced-price lunch; FITT = First to the Top; TEAM = Tennessee Educator Acceleration Model; TVAAS = Tennessee Value-Added Assessment System.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

than principals in other years. This finding stands somewhat in contrast to research on teacher turnover, which typically finds the highest turnover rates among first-year teachers.

The final entries in table 2 show the yearly principal turnover rate across two measures of principal effectiveness: rubric-based ratings from supervisors (TEAM rating) and survey ratings from teachers working in the school (FITT score¹⁸). Each measure is expressed in terms of standard deviations from the mean. In both cases, the turnover

18. The distribution of FITT scores has a negative skew compared with TEAM and TVAAS, which is why we have fewer groups with smaller score ranges.

rate is highest for the least effective principals, providing initial descriptive evidence that higher-performing principals are less likely to turn over. In particular, 30 percent of principals with a TEAM rating below -1.50 leave their position each year, compared with only 16 percent of principals with a TEAM rating above 1.50 ($p < 0.01$). Likewise, 22 percent of principals with an FTTT score below -1 leave their position, compared with 15 percent of principals above 1 ($p < 0.01$).

7. PREDICTING THE PROBABILITY OF TURNOVER

The patterns in table 2 show that principals who receive lower effectiveness ratings, regardless of the measure, are more likely to leave their positions. Additionally, principals in less advantaged school contexts (e.g., with lower levels of student achievement) are also more likely to turn over. These descriptive facts help frame the remainder of our analysis. First, similar to prior research, we investigate correlates of principal turnover without measures of effectiveness. We then examine whether the associations between principal effectiveness and turnover seen in table 2 hold once conditioning on the characteristics of the districts and schools in which they work. Finally, we account for the complexity of principal career paths by differentiating among specific types of turnover and demonstrating how effectiveness relates to these different outcomes, conditional on district and school characteristics.

Estimating a Baseline Turnover Model

We begin our multivariate analysis by estimating versions of equation 1 without any of the effectiveness measures to provide a comparison to earlier studies. Because the dependent variable is binary (*turnover* or *stay*) and the model is estimated via OLS; coefficients represent the marginal change in the probability that a principal leaves his position in a given year associated with each variable.

Table 3 shows the results of this baseline model. Column 1 includes principal characteristics, school characteristics, and district characteristics (for parsimony, not all coefficients are shown¹⁹). Columns 2 through 4 use district fixed effects instead of district characteristics. These models include different combinations of the school achievement index and the percentage of students qualifying for FRPL, which are highly correlated ($r = -0.75$). Importantly, principal turnover is substantially lower in higher-achieving schools, regardless of whether or not we control for the fraction of students who are FRPL-eligible (columns 2 and 4). A 1-SD decrease in the achievement index increases the probability of principal turnover by 4.2 percentage points ($p < 0.01$), a policy-relevant finding in light of research suggesting that the negative effects of principal turnover may be larger in schools with larger numbers of low-income and low-achieving students (Béteille, Kalogrides, and Loeb 2012; Wills 2016). Column 3 shows that when omitting the achievement index, principals working in schools serving large numbers of students qualifying for FRPL are more likely to leave their positions.

19. The table omits principal experience, the proportion of students with disabilities, the proportion of students classified as gifted, and all district characteristics. None of these coefficients was statistically significant in any specifications. The full results are shown in online Appendix table A.2. We also ran models that included district and principal characteristics only, as well as district and school characteristics only. These results are very similar to those in column 1.

Table 3. Predicting the Probability of Principal Turnover (Base Model)

	(1)	(2)	(3)	(4)
Principal characteristics				
Total salary (log)	-0.044 (0.049)	-0.055 (0.072)	-0.065 (0.069)	-0.055 (0.072)
Female	0.006 (0.011)	0.004 (0.011)	0.008 (0.011)	0.006 (0.011)
Age (tens)	0.022*** (0.007)	0.023*** (0.008)	0.021*** (0.007)	0.022*** (0.008)
Age (tens squared)	0.035*** (0.007)	0.033*** (0.006)	0.032*** (0.006)	0.033*** (0.006)
Education specialist or doctorate	-0.005 (0.011)	-0.015 (0.012)	-0.018 (0.011)	-0.014 (0.012)
Black	0.009 (0.021)	0.023 (0.020)	0.022 (0.020)	0.026 (0.020)
Tenure in School				
0 years	-0.038 (0.026)	-0.077*** (0.027)	-0.078*** (0.026)	-0.084*** (0.027)
1 year	-0.056** (0.024)	-0.079*** (0.023)	-0.075*** (0.023)	-0.080*** (0.023)
2 years	-0.016 (0.024)	-0.037 (0.023)	-0.035 (0.023)	-0.038 (0.023)
5–7 years	-0.003 (0.022)	-0.000 (0.021)	-0.004 (0.021)	-0.002 (0.021)
8+ years	-0.049** (0.024)	-0.032 (0.024)	-0.039* (0.023)	-0.034 (0.024)
School characteristics				
Achievement index	-0.045*** (0.010)	-0.040*** (0.009)		-0.042*** (0.011)
Enrollment (100s)	-0.003** (0.002)	-0.003* (0.002)	-0.002 (0.002)	-0.003 (0.002)
Proportion black	-0.014 (0.051)	-0.027 (0.050)	0.006 (0.052)	-0.029 (0.055)
Proportion Hispanic/Latino	-0.103 (0.088)	-0.118 (0.081)	-0.105 (0.085)	-0.117 (0.091)
Proportion FRPL	-0.022 (0.052)		0.087* (0.047)	-0.013 (0.058)
Middle school	0.043*** (0.014)	0.051*** (0.015)	0.053*** (0.015)	0.053*** (0.015)
High school	0.019 (0.017)	0.020 (0.018)	0.021 (0.018)	0.021 (0.019)
Other school	0.028 (0.028)	0.009 (0.030)	-0.012 (0.025)	0.009 (0.030)
District fixed effects		✓	✓	✓
Observations	4,838	4,994	5,146	4,949
R ²	0.038	0.082	0.078	0.082

Notes: Individual-level clustered standard errors in parentheses. The dependent variable is a binary indicator for whether a principal left his position in the following year. Models estimated via ordinary least squares. Models also control for prior principal experience, proportion of students with disabilities, and proportion classified as gifted. Column 1 controls for district characteristics. All models include year fixed effects. FRPL = free or reduced-price lunch.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

However, once we control for achievement in column 4, there is no statistical relationship between student poverty and principal turnover.

Across models, the estimated coefficients for other factors are fairly stable. We focus our discussion on the preferred specification in column 4, which contains full school

and principal characteristics, and includes district and year fixed effects. Among principal characteristics, age and tenure in the school are significant predictors of turnover. Age (in tens of years) and its squared term are significant and positive, indicating that older principals are more likely to leave their position, and that the relationship is non-linear; the association between age and turnover results primarily from high turnover levels among much older principals, which we would expect if retirement is a primary driver of turnover. This mirrors the finding in table 2 that principals aged 60 years and above leave their positions at significantly higher rates than principals under the age of 60 years. We also find that turnover is lowest at the beginning of a principal's stint in leadership or in his school. Principals in their first or second year at a school have a predicted turnover rate roughly 8 percentage points lower than principals with three or four years of experience in their school ($p < 0.01$). This pattern could reflect a general preference of district leaders to avoid churn in school leadership or principals' commitments to remain in a new school for at least a few years.

Column 4 finds no differences in turnover by principals' gender, race, or level of education. Additionally, although the point estimate of total salary is consistently negative (which would indicate that higher-paid principals are less likely to leave their positions), the standard errors are large and the estimated relationships are not statistically significant. One potential explanation for this null finding is that, conditional on other covariates and district fixed effects, there is insufficient variation in principal salary to precisely estimate its relationship with turnover. Indeed, when estimating salary prediction models for individual districts, we find that principal characteristics (e.g., years of experience, education level) and school level explain 90 percent of the variation in principal salaries, on average. Among school characteristics other than achievement and student poverty, school level stands out. Compared with elementary principals, the predicted probability of turnover among middle school principals is 5.3 percentage points higher ($p < 0.01$), with no significant differences for high school or "other category" principals.

Principal Effectiveness and Turnover

Next, we consider whether principal effectiveness predicts turnover, accounting for other individual, school, and district factors. Table 4 shows the results of models that include principals' subjective evaluation ratings from their supervisors (TEAM). Before turning to the main results, we note that patterns for the principal covariates are very similar to those shown in table 3; we have omitted them for brevity.²⁰ Additionally, even conditional on effectiveness, middle school principals have higher average turnover rates.²¹

20. See online Appendix table A.3 for full results. Age and tenure in school remain significant predictors of principal turnover, even after accounting for principal effectiveness. The coefficient on total salary is similar in magnitude to the base models and statistically insignificant. One potential concern with controlling for salary is that it may mediate the relationship between effectiveness and turnover. However, models that omit salary produce nearly identical results as those in table 4.

21. Given the substantially higher turnover rates for middle school principals, we ran separate models by school level to investigate whether elementary, middle, and high school principals were differentially responsive to evaluation ratings. We did not find substantively meaningful differences in the TEAM rating coefficients across these models.

Table 4. The Association between Principal Effectiveness (TEAM) and Principal Turnover

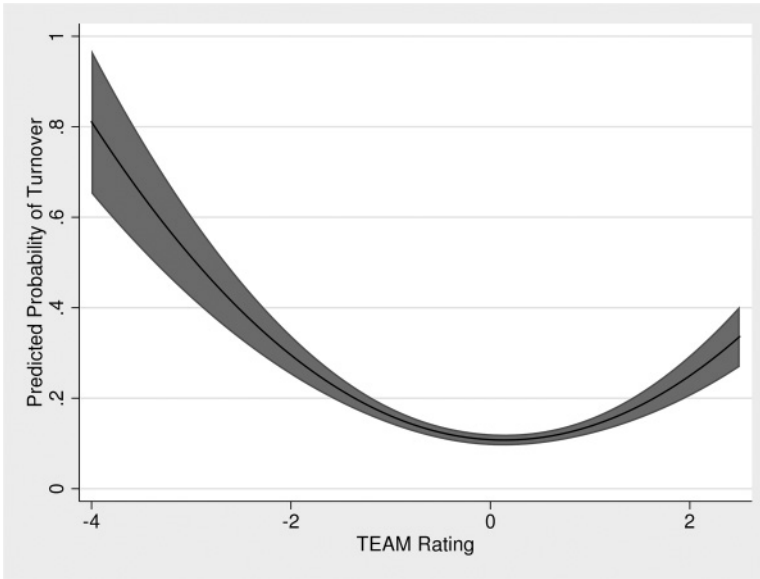
	(1)	(2)	(3)	(4)	(5)
Principal effectiveness					
TEAM rating	-0.024*** (0.008)	-0.020** (0.008)	-0.011 (0.007)		
TEAM rating (squared)			0.041*** (0.005)		
TEAM rating below -1.50				0.170*** (0.031)	0.178*** (0.031)
TEAM rating -1.50 to -0.51				0.021 (0.013)	0.017 (0.014)
TEAM rating 0.51 to 1.50				0.018 (0.013)	0.025* (0.014)
TEAM rating above 1.50				0.058** (0.025)	0.070*** (0.026)
School characteristics					
Achievement index		-0.038*** (0.011)	-0.041*** (0.011)		-0.040*** (0.011)
Enrollment (100s)	-0.002 (0.002)	-0.003 (0.002)	-0.003* (0.002)	-0.002 (0.002)	-0.003* (0.002)
Proportion black	0.008 (0.052)	-0.022 (0.055)	-0.029 (0.054)	0.004 (0.052)	-0.025 (0.055)
Proportion Hispanic/Latino	-0.108 (0.085)	-0.114 (0.091)	-0.112 (0.090)	-0.120 (0.086)	-0.125 (0.090)
Proportion FRPL	0.072 (0.047)	-0.015 (0.058)	-0.020 (0.056)	0.082* (0.047)	-0.013 (0.057)
Middle school	0.049*** (0.015)	0.050*** (0.015)	0.050*** (0.015)	0.051*** (0.015)	0.051*** (0.015)
High school	0.020 (0.018)	0.021 (0.019)	0.024 (0.018)	0.021 (0.018)	0.022 (0.018)
Other school	-0.013 (0.025)	0.009 (0.030)	0.005 (0.030)	-0.011 (0.024)	0.009 (0.029)
Principal characteristics	✓	✓	✓	✓	✓
District fixed effects	✓	✓	✓	✓	✓
Observations	5146	4949	4949	5146	4949
R ²	0.081	0.084	0.098	0.087	0.093

Notes: Individual-level clustered standard errors in parentheses. The dependent variable is a binary indicator for whether a principal left her position in the following year. Models estimated via ordinary least squares. In addition to principal characteristics and district fixed effects, models also control for proportion of students in the school with disabilities and proportion classified as gifted. All models include year fixed effects. FRPL = free or reduced-price lunch; TEAM = Tennessee Educator Acceleration Model. In columns 4 and 5, the omitted category for TEAM rating is -0.50 to 0.50.

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

Column 1 includes the TEAM rating, first without controlling for the school's achievement index. The estimated coefficient shows a negative relationship between effectiveness and turnover. A 1-SD increase in TEAM rating predicts a 2.4 percentage point (14 percent of the base turnover rate) decrease in the probability of turnover ($p < 0.01$)—more effective principals are less likely to leave their positions.

One potential concern is that principals' TEAM ratings proxy for the average achievement level of the school, rather than an underlying construct of principal effectiveness. While the TEAM rating and achievement index are positively correlated ($r = 0.29$), column 2 shows that adding the achievement index to the model does not greatly affect the estimated association between TEAM rating and principal turnover. The TEAM rating coefficient drops slightly (-0.024 to -0.020), but remains



Notes: Figure reflects the estimates from table 4, column 3. Shaded region indicates the 95% confidence interval.

Figure 1. TEAM Ratings Predict Principal Turnover

statistically significant ($p < 0.05$), suggesting that a school's average level of achievement explains only a portion of the association between a principal's TEAM rating and their likelihood of turnover. Similarly, school achievement remains an important predictor of turnover, meaning that differences in principal turnover by school achievement are not fully accounted for by principal effectiveness.

Column 3 tests for a nonlinear relationship between effectiveness and turnover by including a squared term of the TEAM rating. This squared term is large, positive, and statistically significant, and improves model fit in comparison to column 2. Figure 1 graphs this nonlinear association, showing that principals with performance scores close to the average are the least likely to leave their positions, whereas both low-performing *and* high-performing principals are more likely to leave, though the highest turnover rates are among the lowest performers. Prior work has documented a similar U-shaped relationship for teachers. For example, Feng and Sass (2017) find that Florida teachers in the highest and lowest quartiles of value added are more likely to leave the public school system than average value-added teachers.

To confirm this relationship, we reestimate the model using categorical indicators for TEAM rating, with and without controlling for the school's achievement index. The results in columns 4 and 5 map clearly onto the pattern in figure 1. In the full model, very low-performing principals (TEAM rating below -1.50) have a predicted turnover rate 17.8 percentage points greater than average-performing principals (TEAM rating -0.49 to 0.50), and the highest performers (TEAM rating above 1.50) have rates that are 7.0 percentage points higher than for average principals. One explanation for the U-shaped relationship between effectiveness and turnover is that the binary turnover outcome conflates different kinds of career behavior, a possibility we investigate more fully below by estimating multinomial turnover models.

Table 5. First to the Top (FTTP) Scores, School Value Added, and Principal Turnover

	(1)	(2)	(3)	(4)	(5)	(6)
Principal effectiveness						
FTTT score	-0.020*** (0.007)	-0.019*** (0.007)	-0.022*** (0.008)			
FTTT score (squared)			-0.004 (0.005)			
TVAAS 1-year index				-0.023*** (0.006)	-0.023*** (0.007)	-0.023*** (0.007)
TVAAS 1-year index (squared)						0.001 (0.004)
Achievement index		✓	✓		✓	✓
Principal and school controls	✓	✓	✓	✓	✓	✓
District fixed effects	✓	✓	✓	✓	✓	✓
Observations	3,528	3,426	3,426	4,161	4,111	4,111
R ²	0.081	0.083	0.083	0.089	0.087	0.087

Notes: Individual-level clustered standard errors in parentheses. The dependent variable is a binary indicator for whether a principal left his position in the following year. Models estimated via ordinary least squares. All models include year fixed effects. TVAAS = Tennessee Value-Added Assessment System.

*** $p < 0.01$.

Next, we shift from TEAM ratings as measures of principal effectiveness to FTTT scores, which are constructed from teachers' survey responses regarding school leadership, and TVAAS scores, which are school-level value-added measures. Table 5 shows the focal coefficients from the same model specifications as in table 4, replacing TEAM ratings with these measures.

Column 1 shows a negative and statistically significant relationship between FTTT scores and the binary measure of principal turnover. A 1-SD increase in a principal's FTTT score is associated with a 2.0 percentage point decrease in the likelihood of turnover ($p < 0.05$). As with the TEAM results, controlling for the school's achievement index (column 2) does not explain much of the relationship between FTTT and turnover. Additionally, column 3 shows no evidence of a nonlinear relationship.

Column 4 shows a negative relationship between TVAAS and turnover. A 1-SD increase in the school's TVAAS score predicts a 2.3 percentage point decrease in the probability that the principal leaves his position ($p < 0.01$). Again, controlling for the school's average level of student achievement leaves the magnitude of the TVAAS coefficient unaffected. Also, as with FTTT, there is no evidence of a nonlinear relationship between TVAAS and principal turnover.²²

Together, these results provide consistent evidence of a relationship between a principal's effectiveness and his likelihood of turnover. As Appendix table A.4 shows, these

22. Because of concerns that TVAAS fails to separate principal impacts on test score growth from the impact of the school overall, we also explored models that substitute a measure of principal value added in these models, measuring principal value added as the coefficient on principal fixed effects for each principal in a student growth model that also includes school fixed effects. However, separating principal effects from school effects in this way requires principals to work in multiple schools, which presents a selection problem from associating these measures with turnover. Specifically, because of the relatively short data frame, principal value added can only be estimated for the subset of principals who experience a turnover event. Because these principals tend to be lower performing on average, models that include principal value added systemically exclude higher-performing principals. Because of these limitations, we chose not to include these results.

Table 6. Relative Predictive Power of Different Measures of Principal Effectiveness

	(1)	(2)	(3)	(4)
Principal Effectiveness				
TEAM Rating	-0.022** (0.011)	-0.028*** (0.010)		-0.031** (0.014)
FTTT Score	-0.018** (0.007)		-0.015* (0.008)	-0.019** (0.009)
TVAAS 1-Year Index		-0.011 (0.007)	-0.008 (0.010)	0.002 (0.010)
Observations	2894	3439	2217	1922
R ²	0.095	0.099	0.120	0.125

Notes: Individual-level clustered standard errors in parentheses. All models include year and district fixed effects, and the full set of principal and school controls. The dependent variable is a binary indicator for whether a principal left her position in the following year. Models estimated via ordinary least squares. TEAM = Tennessee Educator Acceleration Model; FTTT = First to the Top; TVAAS = Tennessee Value-Added Assessment System.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

three effectiveness measures are positively but not highly intercorrelated, suggesting that each captures a somewhat different aspect of principal job performance. To more directly examine this possibility, we estimate a series of models that include two or more of the effectiveness measures simultaneously. Table 6 shows these results. Column 1 demonstrates that even conditional on one another, higher TEAM ratings and FTTT scores both remain associated with a lower probability of principal turnover. One interpretation of this result is that, even conditional on teacher ratings of effectiveness, supervisors' ratings predict turnover, suggesting that official evaluation ratings inform principal career moves beyond what we would expect if we included only the kinds of survey-based measures used in some prior research (e.g., Sun and Ni 2016).²³ Column 2, which replaces FTTT with TVAAS, yields the opposite result: Controlling for a principal's effectiveness in the form of supervisor ratings, school-level value added is not predictive of principal turnover, which we might expect if supervisor ratings implicitly incorporate information on school test score growth (Grissom, Blissett, and Mitani 2017). Similarly, controlling for FTTT scores (column 3) attenuates the relationship between TVAAS and turnover such that TVAAS is no longer statistically significant. Once controlling for both TEAM rating and FTTT score (column 4), there is effectively no relationship between TVAAS and turnover, while both TEAM and FTTT remain negative and statistically significant.

To guard against the possibility that unobserved school-level heterogeneity may bias estimates of the association between principal effectiveness and turnover, we also estimated models with school fixed effects. The disadvantage of these models is that they are estimated only from schools that have at least one turnover event over a short time period. Appendix table A.5 shows the results. The estimated relationship between

23. We also explored combining the TEAM and FTTT measures by creating groups of principals for each combination of high (above 75th percentile), medium (25th to 75th percentile), and low (below 25th percentile) ratings. These results were consistent with the patterns in table 6. For example, the lowest-scoring principals (i.e., below 25th percentile in TEAM and FTTT) were the most likely to leave their positions. These results are available upon request.

TEAM and turnover is similar to the district fixed effects estimate, though larger standard errors associated with the smaller effective number of observations means that the uptick in turnover among very effective principals is no longer statistically significant at conventional levels. We conclude that there is little evidence our main models are biased by school-level heterogeneity within school districts.

8. MULTINOMIAL RESULTS

In our analysis using a binary turnover outcome, we find that both very high-performing and very low-performing principals (as measured by TEAM ratings) are more likely to leave their positions. A potential explanation for this finding is that a binary measure of turnover masks patterns between effectiveness and specific types of turnover; turnover among high-performers and low-performers may be associated with different paths out of the principalship. Additionally, different effectiveness measures may be more highly predictive of specific types of turnover outcomes.

To better understand these dynamics, we estimate models that differentiate among types of turnover: moving across districts, moving to a different school in the same district, promotion to a central office position, demotion to a school-based position, and exiting the education system.²⁴ Table 7 (panel A) displays the results of our multinomial linear probability models using the TEAM measure.²⁵ For each model, the base category is a principal staying in her school. Coefficients estimate the marginal change in the probability of the given turnover category (e.g., exiting the system in column 1) relative to staying in her school. In table 4, we showed that principals with the highest and lowest TEAM ratings were more likely to leave their positions. Here, we see that the increased probability of turnover among low performers is split between principals who exit the education system, principals who are demoted to school-level positions, and, to a lesser extent, principals who move to a principal position in a different district. In comparison with those of average performance, principals with TEAM ratings below -1.50 are 9.5 percentage points more likely to exit the education system ($p < 0.01$), 11.4 percentage points more likely to be demoted ($p < 0.01$), and 2.5 percentage points more likely to move to another district ($p < 0.05$).²⁶ These patterns are consistent with school districts identifying and removing low performers from school leadership positions in their systems, though the high rates of exits and across-district moves may also reflect voluntary decisions to leave among principals who receive low ratings.

For high-performing principals, the somewhat increased likelihood of turnover in the binary turnover model is explained by an increased likelihood of promotion to a central office leadership position and a higher likelihood of leaving the education system.

24. Online Appendix tables A.6 and A.7 show base multinomial models without district fixed effects, with and without the principal effectiveness measures.

25. For brevity, we omit the principal and school characteristics from the table. The full results are shown in Appendix table A.8. Unsurprisingly, age predicts exits (presumably due to retirement) and a slightly decreased likelihood of moving within or across districts. Except for an increased likelihood among female principals to exit the education system, we find no strong evidence of associations between specific types of turnover and a principal's gender, race, or level of education. Among school characteristics, the strong relationship between achievement index and the binary turnover measure is explained by patterns of exits and demotions. Even after controlling for effectiveness, we find that principals working in schools with low average achievement are more likely to leave the education system or to be demoted from their position.

26. Across-district moves for principals in Tennessee are relatively rare (approximately ten per year), so caution is warranted in interpreting these results.

Table 7. Multinomial Results Predicting Principal Career Paths with TEAM Ratings

Panel A: TEAM	Exit	Promoted	Demoted	Within-District	Across-District
TEAM rating below -1.50	0.095*** (0.027)	0.006 (0.012)	0.114*** (0.025)	0.008 (0.019)	0.025** (0.012)
TEAM rating -1.50 to -0.51	0.006 (0.010)	0.001 (0.007)	0.016** (0.007)	-0.005 (0.008)	0.004 (0.003)
TEAM rating 0.51 to 1.50	0.014 (0.010)	0.013* (0.007)	0.002 (0.006)	0.008 (0.008)	-0.003 (0.003)
TEAM rating above 1.50	0.043** (0.021)	0.030** (0.015)	-0.004 (0.006)	0.011 (0.014)	0.010 (0.007)
Observations	4,527	4,359	4,343	4,395	4,257
R ²	0.104	0.056	0.077	0.066	0.067
Panel B: FITT	Exit	Promoted	Demoted	Within-District	Across-District
FITT score	-0.012** (0.005)	0.002 (0.004)	-0.015*** (0.004)	0.000 (0.004)	-0.002 (0.002)
Observations	3,054	2,934	2,909	2,948	2,838
R ²	0.110	0.074	0.098	0.073	0.078
Panel C: TVAAS	Exit	Promoted	Demoted	Within-District	Across-District
TVAAS 1-year index	-0.014*** (0.005)	-0.003 (0.004)	-0.008** (0.004)	-0.001 (0.004)	-0.002 (0.002)
Observations	3,715	3,589	3,574	3,562	3,475
R ²	0.103	0.078	0.074	0.067	0.092

Notes: Individual-level clustered standard errors in parentheses. All models include year and district fixed effects, and the full set of principal and school controls. Each model estimated in reference to principals who remained in their position in the following year. Models estimated via ordinary least squares. TEAM = Tennessee Educator Acceleration Model; FITT = First to the Top; TVAAS = Tennessee Value-Added Assessment System. In Panel A, the omitted category for TEAM rating is -0.50 to 0.50.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Compared with average-scoring principals, principals with TEAM ratings above 1.50 are 3 percentage points more likely to be promoted ($p < 0.05$), with a 1.3 percentage point increase for principals scoring 0.51 to 1.50 ($p < 0.10$). Similarly, these high-scoring principals are 4.3 percentage points more likely to leave the education system ($p < 0.05$), which could reflect opportunities for high performers in leadership in the private school sector or outside education, neither of which we can observe in our data.²⁷

Panels B and C show the results of multinomial models for FITT and TVAAS. Similar to TEAM, increased FITT and TVAAS scores are associated with a decreased probability of demotion and exit. However, we find no evidence of an association with the probability of promotion or across-district transfer.²⁸

27. We also investigated interactions between the TEAM rating and whether the principal is female or black to assess whether the role of effectiveness in turnover may vary for these groups due to bias or other factors. In general, we did not find consistent evidence of important differences. Results for gender reveal few differences for men and women, with the exception that highly rated women may be less likely to move within the district while highly rated men may be more likely. Results for race suggest that the greater propensity for highly rated principals to be promoted is concentrated among white principals. These results are available upon request.
28. We also estimated multinomial models with school fixed effects (see online Appendix table A.9). Results for TEAM (panel A) are qualitatively similar to the district fixed effects results. The main difference is that there is no longer a statistically significant relationship between high TEAM ratings and promotion to central office. For FITT and TVAAS, there is attenuation of the coefficients—perhaps reflecting a substantial fixed school-level component of these measures—and nearly a twofold increase in the standard errors. None of the coefficients is statistically significant.

9. DISCUSSION AND CONCLUSIONS

Leveraging longitudinal administrative data from Tennessee, this study makes several contributions to our understanding of principal turnover. First, we demonstrate the importance of examining pathways out of the principalship. Exits from Tennessee schools altogether are about 40 percent of turnover, and we find that many exiters are older, more experienced principals, who presumably are exiting for retirement. The remaining 60 percent of turnover cases are moves of leaders within the education system. Among these moves, we show that within-district transfers, promotions to central office, and demotions are roughly equally likely; nearly all of the latter two kinds of moves occur within school districts, suggesting that adjusting school districts' decisions about personnel placement can have a great impact on principal turnover. In particular, we show that demotions to other school-level positions—which prior studies have ignored—constitute nearly one fifth of principal turnover in our sample.

Second, we replicate the finding from some prior studies that turnover is higher in schools with larger numbers of low-income students and lower average achievement. We also show that turnover is particularly high among middle school principals. Policy makers seeking to reduce principal turnover might focus attention specifically on these school contexts.

Third, utilizing multiple measures of principal effectiveness, we supply the new finding that principal job performance predicts turnover. In the binary case, we find that low-performing principals are more likely to leave their current positions. However, in examining supervisors' evaluation ratings, we also find higher turnover among the highest performers. Examining different pathways out of a principal's position helps explain this finding. Low-performing principals (across measures) are substantially more likely to be demoted to a lower school-level position (e.g., assistant principal) or leave the education system entirely, whereas high-scoring principals are more likely to be promoted to a central office position. The fact that demotions and exits are concentrated among low performers points toward greater care in hiring effective principals as a useful strategy for stemming principal turnover in subsequent years. The finding that higher-rated principals are more likely to be promoted to central office suggests that district leaders should consider the potential costs of moving effective leaders out of schools alongside the (presumed) benefits of having those leaders assume district leadership positions.

Our results point to a number of additional areas for inquiry. Among principals who are demoted, for example, what are the future trajectories in job opportunities and job performance? What factors drive principal turnover in low-achieving schools and middle schools? What mechanisms link job performance with principal turnover outcomes?

There are several potential answers to this last question, and they likely vary by pathway out. For instance, demotions likely are involuntary—that is, we expect that ineffective principals are moved into other school-level positions by district office leaders to make way for higher performers. How job performance drives other job outcomes is less clear. For example, when we show that principals who receive low TEAM ratings are substantially more likely to leave the education system, we do not know whether they are forced out by the district (e.g., through contract nonrenewal) or whether they choose to leave (e.g., to retire or pursue another career) because they are unhappy in a

job in which they are ineffective. Closer examination of these processes qualitatively or with additional administrative data would be valuable.

On this latter hypothesis that some ineffective principals may leave because ineffectiveness correlates with less enjoyment of the job, we can provide some partial evidence. As part of the FTTT Survey, principals responded to a battery of questions about their job satisfaction. Using factor analysis, we identified a single factor from these items, which we used to create predicted scores for each principal, then standardized.²⁹ We regressed this measure on the principal effectiveness measures (TEAM rating, FTTT score, and TVAAS), with a full set of covariates and district and year fixed effects. We find that both higher TEAM ratings and FTTT scores predict significantly higher job satisfaction; TVAAS scores are not correlated (Appendix table A.10). Next, we estimate turnover models that include different combinations of effectiveness and job satisfaction to explore job satisfaction as a mediator of the effectiveness–turnover relationship (Baron and Kenny 1986). The results for binomial and multinomial models are displayed in Appendix table A.11. Unsurprisingly, the results show that increased principal satisfaction predicts a lower probability of turnover; a 1-SD increase in satisfaction is associated with a 4.8 percentage point decrease in the likelihood that a principal leaves her position (panel A, column 1). The remaining columns in panel A suggest that satisfaction may partially mediate the relationship between principal effectiveness and turnover.³⁰ Panels B through F show parallel results for multinomial linear probability models.³¹ Looking across these panels, the only suggestive evidence that job satisfaction mediates the effectiveness–turnover relationship is for principals who exit the education system; satisfaction does not appear to be a mediator for the other turnover pathways.³² An implication of the exits finding is that improving job satisfaction by addressing difficult principal working conditions often found in high-turnover schools may promote leadership stability in such environments.

Our findings are limited by our reliance on data from a single state, and one with a particularly strong principal evaluation context, which may limit the generalizability of our results. In addition, although we provide suggestive evidence through our analysis of demotions and our supplemental investigation of principal job satisfaction, agency in principals' turnover decisions largely remains a black box. Whether a principal leaves his or her position can be a function of principal preferences, district preferences, or a combination of both. Studies with more detailed information about principals' work preferences from job applications, for example, may allow researchers to further disentangle these factors.

More generally, the large unexplained variation in our turnover models highlights how much more remains to be learned about the drivers of principal turnover. Future

29. A limitation of the FTTT data is the low response rate for principals. The response rate was 25 percent, 38 percent, and 41 percent in 2011–2, 2012–13, and 2013–14, respectively.

30. The magnitude of the TEAM and FTTT coefficients decreases with the inclusion of the satisfaction factor, and the prior table showed the strong association between TEAM/FTTT and job satisfaction.

31. Results for panels C and E correspond to earlier findings, but only for the principals with satisfaction data.

32. Panel B shows that job satisfaction is significantly associated with decreased likelihood of exit, demotion, and within-district transfer. Using both TEAM and FTTT, there are small decreases in the magnitude of the effectiveness coefficient in the exits models when controlling for a principal's self-reported job satisfaction. In contrast, including satisfaction does not affect the relationship between TEAM/FTTT and other turnover measures.

studies might explore the role of principal job attitudes and more direct measures of principal working conditions, for example, for which student demographics and other basic school characteristics may serve as poor proxies.

Still, some results here are potentially promising. School districts are relatively successful at turning over low-performing principals, on average, and generally are not moving them to other schools in the same system. To the extent that they can replace those low performers with more effective leaders, these higher turnover rates may benefit school performance. Future work might investigate this possibility directly by linking turnover to school performance in future years (see Miller 2013) but differentiating by principal effectiveness. It might also investigate whether the impact of principal turnover on student outcomes depends on the type of turnover. Exploring pathways in and out of assistant principal positions by effectiveness measures would be another useful extension of this work.

From a policy standpoint, higher rates of turnover in low-achieving and high-poverty schools highlight the apparent need for interventions to curb administrator turnover in these schools. A consistent pattern has arisen in the literature that student characteristics are among the most important predictors of principal turnover. Given research linking leadership turnover to negative impacts on student performance, policy attention to strategies aimed at keeping effective principals in high-need environments may yield large dividends. Salary increases for effective principals are one obvious potential policy lever. In exploratory analysis not shown, we find that higher-performing principals who stay in their schools receive slightly higher salaries the next year than less effective principals, suggesting that some Tennessee schools may be using strategic compensation to reward or retain effective leaders. Because we cannot observe the salaries (or offered salaries) of those who exit the education system, we cannot speak directly to whether offering bonuses to high performers induces lower rates of exit. Further analysis of strategic compensation of school leaders and impacts on school leader turnover would be valuable for both research and policy.

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