

Tax and Expenditure Limitations, Salary Reductions, and Public Employee Turnover

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Abstract

This study examines the relationship between salary and employee turnover behavior by analyzing a natural experiment created by the New Jersey Superintendent Salary Cap (NJSSC), which caused salary reductions for 25% of NJ superintendents in the initial year. I find that an additional \$10,000 reduction in base salary due to the NJSSC corresponds to a 16% increase in the likelihood of superintendent turnover. This suggests salary expenditures are important public policy levers to retain employees. This study also contributes to prior research on tax and expenditure limitations (TEs) by documenting one of the first TEs placed directly on public employees.

Keywords: New Jersey, Salary Cap, Superintendents, Natural Experiment, Education Finance

INTRODUCTION

It is vital that policymakers and practitioners understand the factors that influence public employee turnover, especially since previous research suggests there is link between turnover and organizational performance (Kim, 2002; Meier & Hicklin, 2007; Pitts, 2005; Ronfeldt, Loeb, & Wyckoff, 2013; Shaw, Gupta, & Gupta, 2005). Additionally, employee turnover, even healthy turnover, has significant financial costs on organizations (e.g. Meier & Hicklin, 2007; Park & Shaw, 2013). Salary is a potentially important determinate of employee turnover, and salary expenditures are important public policy levers to retain employees.

Previous public administration research finds that higher salaries are associated with lower rates of turnover intention (Grissom, Viano, & Selin, 2016; Bertelli, 2007; Boylan, 2004; Lee & Whitford, 2008; Pitts, Marvel, & Fernandez, 2011). There are at least two current gaps in this literature. First, due to data availability challenges, most of these studies rely on survey data on employee turnover intention, instead of using data on actual employee turnover. This is problematic because turnover intention and actual turnover are distinct concepts and are not necessarily correlated with each other (Cohen, Blake, & Goodman, 2015).

Second, only a limited number of prior studies have attempted to estimate the strength of the relationship between salary and public employee turnover, and the vast majority of these studies are outside of the field of public administration (e.g. Clotfelter, Ladd, & Vigdor, 2011; Grissom & Anderson, 2012; Grissom & Mitani, 2016; Hendricks, 2014). Both of these gaps in the literature are important to address. For example, while it appears that there is a negative relationship between salary and turnover, it is unclear if this relationship is strong or weak because most prior studies do not observe actual turnover, or do not have an identification strategy to estimate the effect of salary changes on public employee turnover.

The current study attempts to fill these two gaps by estimating the effect of salary reductions on the likelihood of actual employee turnover. Specifically, the current study exploits a natural experiment in New Jersey where a salary cap was placed on new superintendent contracts. Starting in February 2011, New Jersey set maximum salary limits for all new superintendent contracts based on student enrollment. Table 1 reports the exact salary cap for school districts by enrollment. For example, the maximum base salary under the NJSSC for a school district with an enrollment between 751 and 1,500 students is \$145,000. During the school year before the implementation of NJSSC, the average NJ superintendent in this enrollment category earned roughly \$160,500. In other words, the average superintendent in one of these school districts would take a 10% pay cut if they were to remain in their school district following the NJSSC. Table 1 shows the largest reductions are for school districts with enrollments between 1,501 and 3,000 students.

A large reduction in base salary makes it challenging for local school boards to retain their superintendent. Additionally, school boards within and outside of New Jersey may have responded by poaching superintendents away from vulnerable school districts. For example, a 55-year-old Hunterdon County superintendent took a superintendent position in the state of New York paying \$225,000 following the 2010-11 school year in lieu of staying at her current position because she would have taken a \$40,000 pay cut (Star-Ledger, 2011). According to a 2014 survey conducted by the New Jersey School Boards Association (NJSBA), almost 45 percent of surveyed school districts cite the NJSSC as the main reason why superintendents left their school districts in the years following the implementation of NJSSC (Jahn, 2014).

The current study estimates the effect of salary reductions on superintendent turnover by taking advantage of the variation in how NJSSC affected different types of NJ school districts.

For example, in the short run, school districts most vulnerable to experiencing superintendent turnover following the 2010-11 school year were those with both an expiring superintendent contract in 2010-11 and those that paid their superintendent a salary above the cap. In fact, a non-trivial proportion of NJ school districts were not directly affected by NJSSC, at least in the short-run, because they either did not have an expiring superintendent contract in 2010-11 school year, or did not pay their current superintendent a base salary above their cap. The current study uses an interaction regression model that takes advantage of this short-term, differential effect of NJSSC on school districts. Using self-compiled district-level data on superintendent contracts, I find that an additional \$10,000 reduction in base salary due to NJSSC corresponds to a 16% increase in the likelihood of superintendent turnover.

In addition to filling a gap in the public administration literature, this study adds to the growing body of research on the effects of tax and expenditure limitations (TEs) on public employees (Author citation; Figlio & Reuben, 2001). Most research on TEs examine the effect of TEs on government fiscal decisions (Author citation; Dye & McGuire, 1997; Figlio & O'Sullivan, 2001; Kioko, 2011; Kioko & Martell, 2012; Maher & Deller, 2013; Stallmann et al., 2017). However, less is known about how TEs impact public employees because most TEs are designed to impact government actions, not to directly influence governmental employees' decisions. The NJSSC is a unique case study of a TEL because it is a spending cap placed directly on public employees. The current study fills this gap in the TEL literature by examining how a unique TEL impacted public employee turnover decisions.

In the next section, I provide background information on the NJSSC, a review of previous relevant studies, and present the current study's main hypothesis. The third and fourth sections of this paper describe the data sources and methodology used to test the main hypothesis. The last

two sections present the main findings and conclude with a discussion of possible policy and management lessons.

BACKGROUND AND LITERATURE REVIEW

Tax and Expenditure Limitations (TELS)

TELS are laws that set limits on how much government spending and revenue collections can grow over time (Joyce & Mullins, 1991). Stallmann et al. (2017) provides a thorough literature review of the effects of TELS, for both state-level and local-level TELS. Previous studies on TELS often find evidence that the most restrictive TELS are associated with lower property tax revenues (e.g. Dye & McGuire, 1997; Figlio & O’Sullivan, 2001; Maher & Deller, 2013). Additionally, there is evidence that governments tend to find methods to circumvent these TELS over time by seeking alternative sources of revenue like state aid and user fees (e.g. Author citation, Kioko, 2011; Kioko & Martell, 2012; Skidmore, 1999; Sun, 2014).

Most TELS are imposed on state and local governments. Therefore, there is less research on how TELS impact public employees because most TELS are not necessarily designed to directly impact public employees. However, there are at least two prior studies that examine how TELS impact public employees. First, Figlio and Reuben (2001) find evidence that TELS placed on school districts negatively impact teacher quality. Second, Davis, Vedder, and Stone (2016) suggest that TELS reduce student performance, primarily due to the fact that TELS disrupt the ability of local school districts to plan and budget. The current study adds to prior research on TELS by examining how TELS influence the likelihood of public employee turnover.

Background on the New Jersey Superintendent Salary Cap (NJSSC)

Prior to 2011, the state of NJ enacted various TELs designed to limit growth in government spending and property tax revenue. In 2004, an expenditure cap was placed on NJ school districts which restricted the annual growth in school administration expenditures to only 2.5 percent or less. In 2007, the state capped growth in local property tax levies at 4% per year. Unlike previous TELs focused on a particular expenditure or revenue source, the NJSSC targets a particular group of local public managers.

The push for the NJSSC started in the summer of 2010 when the Governor of NJ at the time announced plans for reforming superintendent compensation with the goal to “ensure the maximum amount of education funding stays in the classroom” (Jahn, 2014). On February 7, 2011, the NJSSC went into effect. There are four important aspects of NJSSC for the current study. First, the final proposal set a maximum salary based on student enrollment. Table 1 summarizes the maximum salaries for each enrollment category. Second, superintendents could receive an additional \$2,500 per year above the cap if the school district contains at least one high school. Third, NJSSC allows superintendents to receive merit bonuses if they meet pre-determined district performance goals. However, the largest bonus could only be 3.33 percent of the base salary. In the vast majority of cases, merit bonuses would not be able to offset reductions in base salaries from NJSSC.

Lastly, the NJSSC only affects new superintendent contracts after February 7, 2011. In other words, a school district may continue to pay a salary above the cap until it’s pre-NJSSC contract expires. This aspect of the NJSSC is important because it creates a natural experiment to estimate the effect of NJSSC on superintendent turnover. Specifically, the current study compares school districts with expiring contracts with those school districts without expiring

contracts. The former set of school districts are expected to be impacted by NJSSC immediately in the first year of the NJSSC, whereas the latter set of school districts are not.

Previous Studies on Public Employee Turnover

Prior studies on public sector employee turnover suggest various factors that likely influence employee turnover decisions. For a more thorough review from the public management and education policy literatures, see Grissom, Viano, & Selin (2016), Guarino, Santibanez, & Daley (2006), Moynihan & Pandey (2008), and Pitts, Marvel, & Fernandez (2011). To summarize these prior literature reviews, previous studies find that employees with more years of experience, female employees, and less educated employees are more likely to remain in their organization compared to their respective counterpart. Additionally, organizations that offer better compensation and opportunities for career advancement have lower levels of employee turnover intention (Lee & Whitford, 2008; Selden & Moynihan, 2000). Likewise, organizations with better working conditions tend to have lower levels of employee turnover (Grissom and Anderson, 2012; Ingersoll, 2001; Hanushek, Kain, & Rivkin, 2004). Lastly, public employees that are supervised by more effective public managers are less likely to leave their organization (Grissom, 2011; Kim, 2002; Kim, 2005; Pitts, Marvel, & Fernandez, 2011).

Interestingly, only a limited number of previous studies attempt to estimate the effect of salary on public employee turnover, and the vast majority of this research comes from the field of economics of education (e.g. Cho and Lewis, 2012; Clotfelter, Ladd, & Vigdor, 2011; Grissom & Anderson, 2012; Grissom & Mitani, 2016; Hendricks, 2014). For example, Hendricks (2014) exploits variation in teacher salary schedules across school districts over time to estimate that a one percent increase in teacher salary results in almost a 0.4 percent increase in the likelihood of retaining the teacher. The current study contributes to this body of research by

attempting to estimate the effect of a large salary reduction on the likelihood of superintendent turnover.

Grissom and Mitani (2016) is the only other study that examines the causal effect of salary on superintendent turnover. Using administrative data on Missouri superintendents over 15 years, Grissom and Mitani (2016) exploit variation in superintendent salaries over time using superintendent fixed effects, and they find a \$10,000 increase in annual salary results in a 3 percentage point reduction in superintendent turnover. The current study builds on Grissom and Mitani (2016) by testing this research question in the context of the NJSSC. The NJSSC offers an important alternative context for at least two reasons. First, this study tests the robustness of Grissom and Mitani (2016) results using data on superintendents from another state. Second, unlike Grissom and Mitani (2016) that relies on potentially expected changes in superintendent pay over time, the NJSSC offers a unique natural experiment to study because the NJSSC caused a sudden, unexpected salary reduction for a subset of NJ superintendents during the first year of its implementation.

Main Hypothesis

Below I explain the likely short-term effects of the NJSSC on superintendent turnover. The NJSSC likely increased the probability of superintendent turnover for all NJ school districts following the 2010-11 school year. The magnitude of this effect on superintendent turnover likely varies across school districts and can be explained by at least two factors. First, school districts with expiring superintendent contracts at the end of the 2010-11 school year relative to those without expiring superintendent contracts are more likely to experience superintendent turnover after the 2010-11 school year. As explained above, the NJSSC only affects new superintendent contracts beginning after February 2011. School districts with an existing

superintendent contract that is not set to expire at the end of the 2010-11 school year can pay their superintendent a base salary above the cap in the 2011-12 school year. In fact, the school district can continue to pay its superintendent above the cap until its pre-NJSSC superintendent contract expires.

Second, school districts that pay superintendent base salaries above the cap are more likely to experience superintendent turnover after the 2010-11 school year compared to school districts that do not. Market demand for talented superintendents likely increases the opportunity for superintendents to find alternative positions in school districts within and outside of NJ (Grissom & Andersen, 2012). For example, there have been many local newspaper stories about school districts in Delaware, Pennsylvania, and New York poaching away NJ superintendents after the implementation of NJSSC (Star-Ledger, 2011; Brody, 2014).

Based on these two factors, the current study assumes that there are four different types of school districts immediately following the implementation of NJSSC. The first type of school district is one without an expiring contract and not currently paying a superintendent base salary above the cap. This type of school district is the least affected by the NJSSC in the short run because there is neither an immediate nor a direct effect of NJSSC on superintendent turnover in these school districts.

The second type of school district is one without an expiring contract, but the school district is currently paying a superintendent base salary above the cap. Similar to the first type of school district, the second type of school district is only indirectly impacted by NJSSC in the short-term. However, the second type of school district is more likely to experience turnover following the 2010-11 school year relative to the first type because any future contract will result in a reduction in the superintendent's base salary. While superintendents in the second type of

school district might hold off leaving their districts until their contracts expire, a few of these superintendents might be encouraged to move to another school district immediately. For example, they be motivated by uncertainty about whether other good job opportunities will be available at the time their contract expires.

The third type of school district is one with an expiring contract, but the school district is not currently paying a superintendent base salary above the cap. This type of school district is more likely to experience superintendent turnover following the 2010-11 compared to the first type of school district for at least two reasons. First, generally, a superintendent is more likely to leave a school district at the end of their contract than before the end of the contract. For example, unrelated to the NJSSC, a superintendent might retire or leave the profession because he or she only committed to one term. Second, unlike the first type of school district, school districts with expiring superintendent contracts will have to immediately respond to potential poaching attempts by other school districts, especially if their current superintendent can earn a higher salary at another school district.

The last type of school district is one with both an expiring contract and currently paying a superintendent base salary above the cap. Unlike the three previous types of school districts, the immediate and direct impact of NJSSC is only present for the fourth type of school district. For example, unlike the third type of school districts, the expected reduction in base salary for any new contract starting the 2011-12 school year makes the fourth type of school district most vulnerable losing their superintendents. Most importantly, the degree to which these school districts are vulnerable to poaching is likely conditional to the size of the expected salary reduction caused by the NJSSC. A larger difference between the current base salary and the

salary cap will make it more likely that the school district will experience superintendent turnover. Based on this conceptual model, the current study will test the following hypothesis:

H₁: A larger expected reduction in the superintendent base salary due to NJSSC increases the likelihood of superintendent turnover after the 2010-11 school year for school districts with expiring superintendent contracts compared to those without expiring contracts.

DATA

Data Source for Superintendent Turnover

The current study relies on self-compiled, superintendent contract information published by the NJ Department of Education (DOE). The NJ DOE reports annual data on salaries for superintendents, principals, and other administrative officials. These data files contain information on approximately 3,850 district employees each year and include the following relevant information: job title, employee name, base salary, and contract start/end dates. This data is available online for all fiscal years between 2009 and 2016.²

It is common in the data files for a school district to report old contract information for a particular year. For example, the contract for a new superintendent starting in 2011-12 might not be reported in the data until the 2013 data file. Therefore, the current study must use all files between the 2009 and 2013 years to identify turnover following the 2010-11 school year. Fortunately, the current study's method only requires a cross-sectional dataset because the analysis compares the likelihood of superintendent turnover between school districts with an

² For more information about the NJ DOE superintendent salary data, please see <http://www.state.nj.us/education/finance/fp/ufb/index.shtml#salary>.

expiring superintendent contract and school districts without an expiring superintendent across expected salary reductions. More details about the current study's methodology are discussed later.

The final analytical dataset includes information on 416 NJ school districts during the 2010-11 school year, including superintendent turnover status following the 2010-11 school year. The analytical sample includes all school districts with a full-time, non-shared superintendent with no missing information on the superintendent's name, base salary, contract state/end dates, or any other control variable mentioned below. I drop shared superintendents because they work for multiple school districts. The analytical sample excludes 12 school districts with enrollments above 10,000 students because those districts could apply for a waiver exempting them from the NJSSC.³ The analytical sample includes approximately 71% of all operating, non-charter NJ school districts in 2010-11, which closely resembles the total population of all 590 non-charter, locally operated NJ school districts.⁴

Outcome of Interest

The outcome of interest is whether the school district experienced superintendent turnover following the 2010-11 school year. To detect turnover, I examine changes in both the superintendent name and beginning date of contracts for each school district. Specifically, I create a binary indicator for superintendent turnover that is equal to 1 if a new superintendent name is listed with a contract beginning on July 1st, 2011 (e.g. the start of the 2011-12 school year) and 0 otherwise. Table 2 reports that 64% school districts with an expiring superintendent contract experienced superintendent turnover following the 2010-11 school year. This was a

³ However, the main results are robust if these 12 districts are included in the analytical sample.

⁴ Charter schools are not included in the analytical sample because they are exempted from the NJSSC.

significantly higher value compared to school districts without an expiring superintendent contract.

Unfortunately, there is no data on the reason for turnover. It's possible that the superintendent retired, moved to another district, or took a non-superintendent position. While this is a limitation of the current study, a superintendent's decision to retire could be at least partially related to the NJSSC. For example, the salary cap may have been the catalyze for a superintendent to retire early, especially if the retiring superintendent does not believe he or she can earn their reservation wage at another school district (Star Ledger, 2011).⁵

Variables of Interest

There are two variables of interest. The first variable of interest is called expiring contract, which is a binary indicator for whether the school district has an expiring superintendent contract in the 2010-11 school year. The second variable of interest is called the estimated cut in salary, which measures the difference between the current superintendent base salary in 2010-11 and maximum salary after cap is in effect. To create this variable, I first calculate the maximum base salary for each school district. As shown in Table 1, the maximum base salary is a function of the district's enrollment. Additionally, school districts that contain a high school are allowed to increase their maximum base salary by \$2,500. The estimated cut in base salary equals 0 for all school districts with a negative value (i.e. the maximum salary is greater than current base salary). However, the main results are robust if I do not replace negative values with zero. For ease of interpretation, I divide the estimated cut in base salary by \$10,000. Therefore, as shown in Table 2, the average superintendent in a school district with an

⁵ Reservation wage is the minimum wage that a worker would accept to enter the labor market.

expiring contract was expected to experience a \$15,000 cut in base salary once the NJSSC went into effect.

District-level characteristics

Previous studies suggest that both the characteristics of the employee and the organization are important predictors of turnover. Data on superintendent characteristics come from the NJ salary contract data described above. It includes base salaries for all school districts in 2010-11, and the name of the superintendent. Using the name, I create a binary indicator for gender that equals 1 if the superintendent is male and 0 otherwise. To create this variable, I went through each individual name and identified whether the name was a male or female name.⁶

Unfortunately, there is no data on the superintendent's age, tenure, or race. This would be problematic if the goal of this paper was to identify predictors of superintendent turnover. However, the goal of current study is to estimate the impact of the NJSSC on superintendent turnover. If age and race are correlated with the timing of the contract expiration, the main results could be biased. However, regressions on the binary indicator for an expiring contract in 2010-11 summarized in results section suggest that the timing of the contract expiration is likely exogenous. As reported in Table 2, the average superintendent in a school district with an expiring contract had a base salary of almost \$167,000 and not significantly different than the average base salary for superintendents in school districts without an expiring contract.

Data on school district characteristics come from the National Center for Education Statistics (NCES) and the NJ DOE. NCES publishes annual finance and non-finance school

⁶ To confirm the coding, I used a gender check database from <http://genderchecker.com/>, and I also did google searches of superintendents with a unisex first name.

district-level data. Using the non-finance NCES data, I create the following variables: a binary indicator for whether or not the school district is a regular district; a binary indicator for whether or not the school district contains at least one high school; a continuous variable that measures the number of operating schools within the district; a binary indicator for whether or not the district is located in an urban area; and lastly, a binary indicator for whether or the district is located in a rural area. A regular school district is a locally operated district. A non-regular school district includes state or federally operated districts. As shown in Table 2, there are no statistically significant differences in district type variables between school districts with an expiring contract and all other school districts. Importantly, this suggests that the timing of an expiring contract is not correlated with any of the observable variables listed in the Table 2.

I collect NJ DOE data on total spending per pupil and the percent change in total spending between the 2009-10 and 2010-11 school years. Total spending per pupil includes all costs to run a school district including costs for administration, instruction, instructional support, maintenance, etc. Table 2 reports no statistically significant differences for these two variables between school districts with an expiring contract and all other school districts. I also collect NJ DOE data on student demographics, including categories for race and at-risk students. As reported in Table 2, the average school district with an expiring contract has approximately 67 percent non-Hispanic white students, 11 percent non-Hispanic black students, 14 percent Hispanic students, 6 percent Asian students, 1 percent other race students, 48 percent female students, 24 percent eligible for free or reduced-price lunch, 2 percent considered limited English proficiency (LEP), and less than one percent migrant students. Migrant students come from families that short-term visitors who migrate to the school district to find work in the agricultural

and fishing industries. Importantly, there appears to be no significant differences in student demographics across expiring contract and non-expiring contract school districts.

Figure 1 motivates the empirical analysis by providing suggestive evidence of a differential effect of NJSSC on the likelihood of superintendent turnover following the 2010-11 school year between school districts with an expiring contract and those without an expiring contract in the 2010-11 school year. First, I plot average superintendent turnover rates over the expected cut in superintendent base salaries. Second, I plot separate slopes for those school districts with an expiring superintendent contract and those without an expiring contract, respectively. There are three noteworthy findings from Figure 1. First, this figure shows that the likelihood of superintendent turnover increases with an increase in the estimated cut in superintendent base salaries due to NJSSC. Second, the likelihood of superintendent turnover is almost 50 percent higher for school districts with an expiring contract compared to those without expiring contracts. Lastly, and most importantly, reductions in base salaries have a larger effect on superintendent turnover in school districts with expiring contracts compared to those in school districts without an expiring contract, as shown by the larger slope for the black line compared to the grey line.

METHODOLOGY

Building on Figure 1, the current study uses an interaction regression model to test whether school districts with larger expected reductions in base salaries due to the NJSSC are more likely to experience superintendent turnover in school districts with expiring superintendent contracts compared to those without expiring contracts. Specifically, I estimate the following linear probability model by Ordinary Least Squares (OLS):

$$Y_d = \alpha + \beta_1 \text{Expiring}_d + \beta_2 \text{Cut}_d + \beta_3 \text{Expiring}_d \times \text{Cut}_d + \delta X_c + \theta_d + e_d, \quad (1)$$

where d indexes school district, Y is a binary indicator for superintendent turnover, Expiring is a binary indicator for an expiring superintendent in the 2010-11 school year, Cut is a continuous variable that measures the expected reduction in base salary after NJSSC is in effect, X is a vector of superintendent and district characteristics, θ is a county fixed effect (FEs), and e is an error term.

The preferred model specification includes a county FEs to control for time-invariant unobserved and observed heterogeneity across NJ counties. For example, the county FE controls for potential differences in turnover rates between school districts that border another state and those that do not. This is important because being in a county near the state border would provide more opportunities for those superintendents to seek positions in neighboring states. Moreover, superintendents located in counties near New York City would have a higher probability to find more alternative job placements outside of NJ after the implementation of the NJSSC. As a robustness check, I run alternative model specifications with and without county FEs, and also with and without control variables. The main results are robustness to these alternative model specifications.

The main coefficient of interest is β_3 , which measures the percentage point change in the likelihood of superintendent turnover from a \$10,000 reduction in base salary for school districts with an expiring superintendent contract compared to those without an expiring contract. A positive and statistically significant coefficient for β_3 would provide support for the hypothesis described in the section three.

Whether β_3 can be given a causal interpretation depends primarily on whether or not the e in equation (1) is correlated with the interaction variable of interest. While it's possible that those school districts with the largest expected reductions in base salaries following the NJSSC are systematically different than all other school districts, it is unlikely that school districts with expiring superintendent contracts are systematically different than those without expiring contracts. The reason is that the timing of a superintendent contract is mostly due to chance and likely unrelated to the implementation of NJSSC because news of a pending salary cap was not finalized until the end of 2010, which did not allow enough time for school districts and superintendents to circumvent the cap by adjusting their current contract.

While I cannot directly test whether or not the expiring contract indicator is endogenous, I can test for systematic differences in the likelihood of having an expiring superintendent contract in the 2010-11 school year by observable superintendent and district characteristics in two ways. The first test involves examining the sensitivity of estimates of equation (1) to conditioning on observed superintendent and district characteristics. If adding observed characteristics or county FEs changes the estimated coefficient, β_3 , then it is difficult to make a causal interpretation of β_3 .

The second test involves regressing the binary indicator for an expiring superintendent contract on a variety of observed superintendent and district characteristics. If the indicator for an expiring superintendent contract is orthogonal to observed characteristics, it is plausible that the likelihood of an expiring superintendent contract is similarly orthogonal to unobserved superintendent and district characteristics.

Lastly, the preferred specification for equation (1) is a linear probability model (LPM). Alternatively, I could formulate equation (1) as a logit model. One advantage of LPM over logit

is the latter estimator is vulnerable to the incidental parameter bias problem, which results in biased coefficients when including fixed effects (Wooldridge, 2010, p.621). As a robustness check, I run both logit and probit models without county FEs, and I find the average partial effects (APE) from logit and probit models to be very similar to the OLS results.⁷

RESULTS

Determinants of an Expiring Superintendent Contract

Table 3 reports results from regressions on the binary indicator for an expiring superintendent. When included individually, none of the vectors of superintendent characteristics, district type characteristics, and student demographics are jointly statistically significant at traditional confidence levels, as shown in columns 1 through 3, respectively. The specification reported in column 4, which conditions on all three vectors of covariates, similarly finds no jointly statistically significant results. Across all four specifications estimated in table 3, only one of the 19 covariates is even marginally individually significant. Interestingly, this one covariate is the total enrollment variable. However, it important to acknowledge that this coefficient is only marginally statistically significant and also not practically significant. Also, as shown by the adjusted R^2 , these four models explain zero percent of the variation in the likelihood of having an expiring contract in the 2010-11 school year. Taken together, these results suggest that the likelihood of an expiring contract is not correlated with observed superintendent or district characteristics, and therefore unlikely to be correlated with unobserved superintendent and district characteristics.

Baseline Estimates

⁷ The APEs estimates from the logit and probit models are available upon request.

Table 4 reports estimates from various regression models based on equation (1). Each column of Table 4 reports the coefficient for each variable of interest from a unique regression. The model estimated in column 1 does not condition on any control variables or county FEs. The coefficient of interest is 0.043. This tells us that an additional \$10,000 reduction in base salary due to NJSSC corresponds to a 4.3 percentage point increase in the likelihood of superintendent turnover for school districts with an expiring contract relative to those school districts without an expiring contract. This result supports the main hypothesis, and it is both statistically and practically significant. For example, given that the average turnover rate for a school district in the sample is 24%, another way to interpret this coefficient is that the enactment of the NJSSC increased the likelihood of superintendent turnover by 18%.

Table 4 also reports estimates from alternative model specifications. Across all five columns, the coefficient of interest is very stable and ranges between 0.038 and 0.043. The preferred model from column 5 includes all control variables and county FEs, and estimates the coefficient at 0.040. Given these robustness checks, this provides further support that β_3 can be given a causal interpretation. The main results are also robust to using logit and probit regressions.

Heterogeneity

So far, the current study finds that an additional \$10,000 reduction in base salary due to NJSSC corresponds to a 4.0 percentage point increase in the likelihood of superintendent turnover for school districts with an expiring contract relative to those school districts without an expiring contract. However, this is the average effect. It is possible that not all school districts with both an expiring superintendent and an expected cut in base salary due to NJSSC are the

same. For example, it's possible that male superintendents responded differently to NJSSC than female superintendents. Therefore, it is important to test for heterogenous effects.

Table 5 report coefficients from regressions that use three-way interaction variables to test for heterogenous effects. Generally, there appears to be heterogeneity in the effect of the NJSSC on superintendent turnover. First, shown in Column 1 of Table 5, I find that an additional \$10,000 reduction in base salary corresponds to a 7.0 percentage point higher probability of a school district experiencing superintendent turnover if the school district has a female superintendent with an expiring contract relative to school districts with a male superintendent with an expiring contract.

This is a surprising result, especially given that male superintendents in the sample earn about \$15,000 more per year than female superintendents, even after controlling for county FEs. However, one possible explanation for this result is that the NJSSC impacted the NJ superintendent labor market in a way that negatively impacts the mobility of male superintendents compared to female superintendents. For example, since the average female superintendent's salary was lower than the average male superintendent's salary, female superintendents would be more likely than male superintendents to find an alternative superintendent position in a NJ school district that pays a salary close to their 2010-11 salary. Whereas, male superintendents might find it more difficult to find a school district that can offer a base salary that matches their current base salary. As a result, affected male superintendents might delay their decision for another year to find a better placement outside of NJ.

Second, shown in Column 3, I find school districts in South NJ counties are almost 8.0 percentage points less likely to experience superintendent turnover following the 2010-11 school year than non-South NJ school districts that have an expiring superintendent contract. One

possible reason is that average salaries in South NJ are approximately \$10,000 lower than all other regions, and South NJ tends to have more rural school districts.⁸

While there is no evidence that NJSSC impacted rural school districts differently than non-rural schools, Table 5 reports findings that suggest school districts in the lowest socioeconomic status (SES) communities were impacted substantially more than school districts in more affluent communities. Shown in Column 4, school districts in the lowest SES communities were more than 30.8 percentage points more likely to experience superintendent turnover compared to all other school districts in the state. This is equivalent to a 125% increase in the probability of superintendent turnover. The state of New Jersey categorizes all school districts by their community SES using census data including % adults with less than high school degree, unemployment rates, median household income, etc. These categories are called district factor groups (DFG). Type A school districts are considered the lowest SES in the state.

DISCUSSION

The current study documents the effects of the NJSSC on public employee turnover. Using an interaction regression model, I find an additional \$10,000 reduction in base salary corresponds to a 16% increase in the likelihood of superintendent turnover. The effect is largest for school districts with female superintendents, in the non-south region of the state, and in the lowest SES communities. The main results are robust to alternative model specifications including county FEs and control variables.

⁸ South NJ counties include Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Ocean, and Salem. This classification is consistent with previous studies on regional differences within NJ (e.g. Author citation).

This study makes at least three important contributions to previous studies on public employee turnover. First, this study provides a credible estimate of the effect of salary reductions on public employee turnover by using a natural experiment. Only a few previous studies, mostly out of public administration, have been able to identify the effect of salary on turnover. Second, most previous studies use data on turnover intention, not data on actual turnover. The current study measures actual turnover, not turnover intention, which is an important contribution because previous studies suggest turnover intention and actual turnover are not necessarily correlated (Cohen, Blake, & Goodman, 2015). Lastly, the current study provides evidence that the relationship between salary and turnover varies substantially depending on the organization's working conditions. Specifically, this study finds that the effect of the NJSSC on the likelihood of superintendent turnover is primarily driven by school districts in the most economically distressed areas.

This study also adds to prior research on the effects of TELs. This is the first study to document the effects of tax and expenditure limitation (TELs) placed directly on public employee. Like other previous research on TELs, this study finds evidence that TELs encourage strategies to circumvent a TEL. In the case of the NJSSC, it appears that superintendents attempted to circumvent the NJSSC by leaving their school district to avoid pay reductions. This is another case of how state imposed TELs can distort local government decision making which results in both financial and non-financial costs in local public organizations. State policymakers should avoid arbitrary across-the-board salary caps on public employees that cause sudden salary reductions unless they are prepared for potential increases in employee turnover.

While I believe the current study's findings are considerable, this study is not without limitations. First, it is important to acknowledge that employee turnover can be healthy for

organizations, especially if the employee is ineffective. While it is outside the scope of the current study to examine how the NJSSC impacted organization performance, future research should examine how the NJSSC impacted other outcomes of interest like student achievement and principal/teacher turnover. Second, the employee contract data used in this study does not include information on whether turnover was voluntary or involuntary. Voluntary and involuntary turnover are different concepts, and it would be ideal to have this data. The study must rely on the untestable assumption that the NJSSC did not systematically change the likelihood of involuntary turnover between school districts with an expiring contract and all other school districts. A third limitation of this study is that NJSSC is a unique case study. For example, the data for this study relies on only one kind of public employee (i.e. school superintendents) and from only one state (i.e. New Jersey). Future research should test the robustness of the current study's results by using data in other contexts. Lastly, the models are not able to control for all observable and unobservable superintendent characteristics that likely impact turnover. While the main results are robust to alternative modeling strategies that include and do not include controls, future research should test the robustness of the current study's results with more observable characteristics.

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Table 1. Expected Reductions in Salaries after 2010-11 by Enrollment Category

Enrollment	% of Districts	Cap on Salary	Average Salary before Cap	Expected Reduction
0-250	7.5	\$125,000	\$128,951	-3,951
251-700	20.9	135,000	143,943	-8,943
751-1,500	23.3	145,000	160,556	-15,566
1,501-3,000	23.3	155,000	192,732	-37,732
3,001-6,500	19.2	165,000	187,224	-22,224
6,501-10,000	5.8	175,000	200,962	-25,962
Over 10,000	.	Waiver	221,182	.

Notes: Each row is a subsample of the analytical sample for a particular enrollment category. The cap on salary is the maximum salary for new contracts after implementation of the New Jersey Superintendent Salary Cap (NJSSC). The maximum salary does not include the additional \$2,500 for school districts that contain a high school. The average salary is based on data from the 2010-11 school year. School districts with enrollment above 10,000 students are not included in the analytical sample.

Table 2. Descriptive Statistics for New Jersey School Districts

	Expiring Contract		No Expiring Contract	
	Mean	SD	Mean	SD
<i>Outcome of Interest</i>				
Turnover following 2010-11 SY	63.9***		9.4	
<i>Independent Variable</i>				
Expiring contract during the 2010-11 SY	100.0		0.0	
<i>Superintendent Characteristics</i>				
Estimated cut in salary (in 00000s \$)	1.5	2.7	2.0	9.4
Base salary in 2010-11 (\$)	166,754.4	32,104.1	170,721.0	96,900.7
Male superintendent	75.9		71.0	
<i>District Type</i>				
Regular district	95.4		95.8	
Contains a high school	53.7		49.0	
# of operating schools	3.9	3.3	3.8	3.1
Total enrollment	2,146.1	2,004.5	2,164.5	2,161.9
Located in urban area	0.9		1.3	
Located in suburban area	73.1		78.2	
Located in rural area	26.0		20.5	
Total spending per pupil (\$)	17,770.1	4,699.8	17,485.6	
Δ in total spending from last year	-1.7	5.2	-1.7	4.8
<i>Student Demographics</i>				
White students	66.5	25.7	69.9	23.5
Black students	11.2	16.2	8.6	12.2
Hispanic students	14.8	15.3	13.2	15.4
Asian students	6.3	6.9	7.0	8.3
Other race students	1.2	1.2	1.2	1.4
Female students	48.5	2.8	48.4	3.8
FRL students	24.2	21.9	20.2	20.5
LEP students	2.3	3.4	2.1	3.2
Migrant students	0.1	0.2	0.1	0.2
N Districts	108		308	

Notes: Values are shown as percentage except as noted. Standard deviations (S.D.) are only reported for non-binary variables. SY stands for school year. A regular school district is a locally operated district. Non-regular school district includes state or federal operated districts. FRL stands for students that are eligible for free or reduced-price lunch. LEP stands for limited English proficiency. Marked *p* values indicate the statistical significance of the mean difference between NJ school districts with an expiring superintendent contract and NJ school districts without an expiring superintendent contract. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 3. Expiring Contract Regressions (OLS Estimates)

	(1)	(2)	(3)	(4)
Base salary in 2010-11 (\$)	0.000 (0.000)			0.000 (0.000)
Estimated cut in salary	-0.000 (0.000)			-0.000 (0.000)
Male superintendent	0.044 (0.048)			0.027 (0.051)
Regular district		-0.006 (0.119)		0.026 (0.134)
Contain a high school		0.066 (0.057)		0.016 (0.070)
# of operating schools		0.023 (0.015)		0.019 (0.015)
Total enrollment		-0.000* (0.000)		-0.000* (0.000)
Located in urban area		-0.172 (0.224)		-0.276 (0.226)
Located in suburban area		-0.083 (0.056)		-0.099 (0.061)
Total spending per pupil (\$)		0.000 (0.000)		0.000 (0.000)
Δ in total spending from last year		-0.082 (0.480)		-0.069 (0.501)
% Black students			0.002 (0.002)	0.002 (0.003)
% Hispanic students			-0.000 (0.003)	0.001 (0.003)
% Asian students			-0.001 (0.003)	-0.001 (0.003)
% other race students			0.002 (0.015)	0.003 (0.016)
% Female students			0.002 (0.005)	0.002 (0.005)
% FRL students			0.001 (0.002)	0.000 (0.002)
% LEP students			0.000 (0.011)	0.002 (0.012)
% Migrant students			-0.095 (0.084)	-0.135 (0.091)
Adjusted R ²	-0.004	-0.006	-0.007	-0.017
F Statistic	1.513	0.694	0.643	0.879
(p value)	(0.211)	(0.697)	(0.742)	(0.609)

Notes: N= 416. Expiring contract is a binary indicator that equals 1 if the district's superintendent contract expires at the end of the 2010-11 school year and 0 otherwise. Located in rural area and % white students are the omitted groups. *** p<0.01, ** p<0.05, and * p<0.1.

Table 4. Baseline Estimates of the Effects on Superintendent Turnover (OLS estimates)

	(1)	(2)	(3)	(4)	(5)
Estimated Cut (in 00000s)	0.000 (0.001)	-0.001 (0.001)	-0.001 (0.012)	0.001 (0.045)	0.001 (0.045)
Expiring	0.477*** (0.056)	0.491*** (0.055)	0.486*** (0.055)	0.482*** (0.056)	0.483*** (0.056)
Estimated Cut × Expiring	0.043*** (0.014)	0.038** (0.015)	0.038** (0.015)	0.039*** (0.014)	0.040*** (0.014)
County FEs		√	√	√	√
Superintendent Controls			√	√	√
District Type Controls				√	√
Student Demographics					√
Adjusted R ²	0.332	0.333	0.333	0.322	0.317

Notes: N = 416. Each column reports the coefficients from a unique regression. All unreported coefficients are available upon request. Estimated cut is the expected reduction in base salary in the next school year (in 00000s). Expiring is a binary indicator that equals 1 if the district's superintendent contract expires at the end of the 2010-11 school year and 0 otherwise. FE = fixed effects. *** p<0.01, ** p<0.05, and * p<0.1.

Table 5. Heterogeneous Effects on Superintendent Turnover (OLS Estimates)

	(1)	(2)	(3)	(4)
Estimated Cut × Expire × Female	0.069** (0.032)			
Estimated Cut × Expire × Rural		-0.040 (0.052)		
Estimated Cut × Expire × Non-South			0.079** (0.040)	
Estimated Cut × Expire × Lowest SES				0.308*** (0.085)
County FEs	√	√	√	√
Adjusted R ²	0.343	0.343	0.345	0.349

Notes: N = 411. All urban school districts are eliminated from the sample (N=5) because there no urban school districts that had an expiring contract in the 2010-11 school year. Each column reports the coefficients from a unique regression. All variables interacted are included in the model in levels, but these coefficients are not reported in the interest of brevity. Therefore, this table only reports the coefficients from the three-way interaction variables. Estimated cut is the expected reduction in base salary in the next school year (in 00000s). Expire is a binary indicator that equals 1 if the district’s superintendent contract expires at the end of the 2010-11 school year and 0 otherwise. Non-South is a binary indicator that equals 0 if the school district is in a south NJ county (Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Ocean, and Salem) and 1 otherwise. Lowest SES is a binary indicator the equals 1 if the district is located in one of the lowest socioeconomic status communities and 0 otherwise. FE = fixed effects. *** p<0.01, ** p<0.05, and * p<0.1.

Figure 1. Average Turnover Rates by Estimated Reductions in Salary

Figure 1.A.

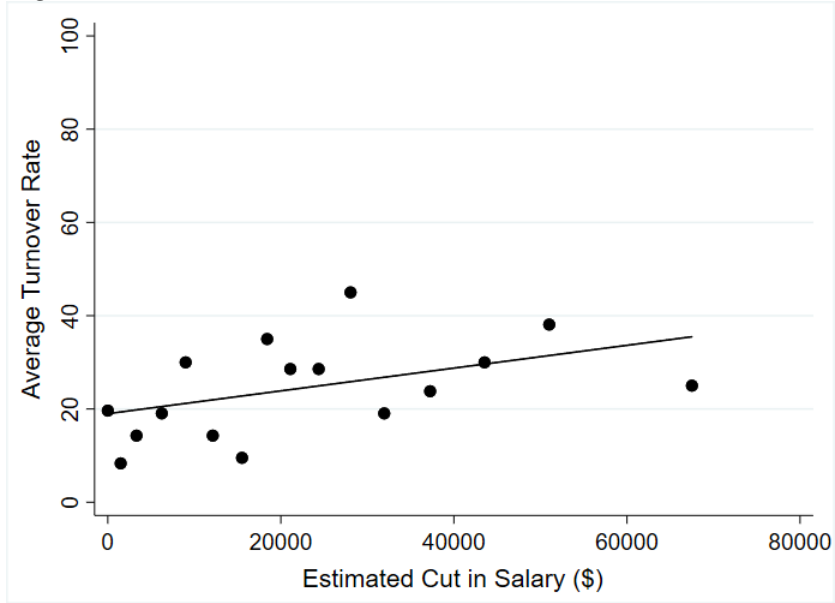
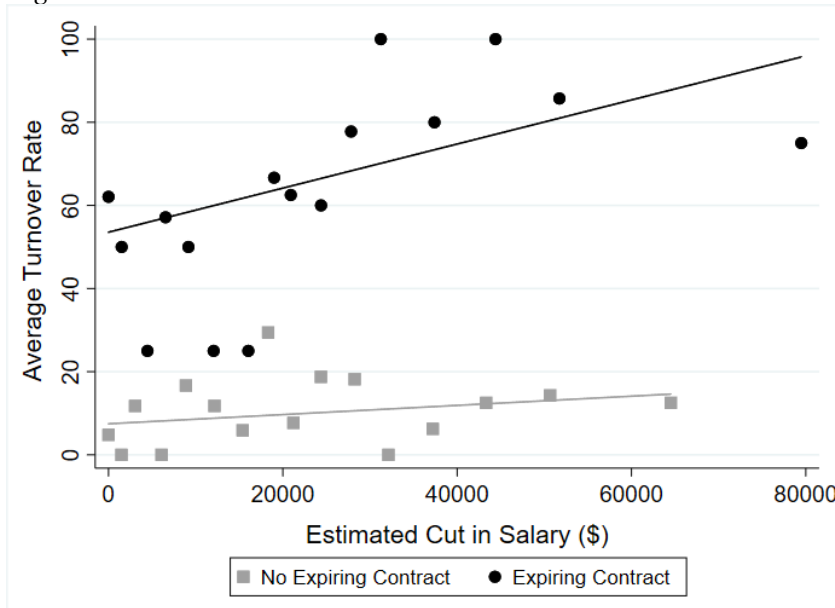


Figure 1.B.



Notes: Each dot represents the average turnover rate for an equal-size bin of school districts. Estimated cut in salary is the absolute value of the difference between the district's superintendent base salary in 2010-11 and maximum salary allowed in future contracts after implementation of the New Jersey Superintendent Salary Cap (NJSSC). Districts with a negative value for estimated cut in salary (e.g. no expected reduction in salary) are set to 0. Expiring contract are school districts in the final year of their superintendent's contract.