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Raising the Floor: Teacher Retention Effects of a Statewide Minimum Salary Increase

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Abstract

Attracting and retaining a high-quality teacher workforce is a central challenge for education policy, and higher teacher salaries are often proposed as a solution. The LEARNS Act increased Arkansas's minimum teacher salary from $36,000 to $50,000, guaranteed all teachers a minimum raise of $2,000, and provided school districts with the flexibility to deviate from traditional, seniority-based salary schedules. We collected districts' teacher salary schedules one year before and after implementation and integrated these data with administrative records to study districts' adjustment to the law and teacher retention during the first three years of the reform. We find that districts made the minimum adjustments necessary to meet the new requirements. These changes increased the competitiveness of starting salaries across districts and reduced salary variation statewide. The Act also substantially increased salaries in rural and high-poverty districts, weakening the negative relationship between starting salaries, student poverty, and rurality. Using a triple-difference design, we find that teachers who received raises exceeding the $2,000 minimum were more likely to remain in their districts, with the strongest retention effects among those receiving the largest increases. We also find evidence that these effects may fade as inflation erodes the real value of the initial salary gains.

JEL classification

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teacher compensation, teacher retention, teacher turnover

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1. Introduction

Attracting and retaining a high-quality teacher workforce is a central challenge for state education policy, and teacher compensation plays a key role in shaping teachers' employment decisions. Over the past several decades, however, inflation-adjusted public school teacher salaries have stagnated (Kraft and Lyon, 2024), and teachers' wages remain lower, or, at best, on par with those of other college graduates (Allegretto and Mishel, 2020; Taylor, 2008; Richwine and Biggs, 2011; West, 2014). At the same time, the prestige of the profession and enrollment in traditional teacher preparation programs have declined, while staffing shortages, particularly in rural and high-poverty districts, have intensified (Kraft and Lyon, 2024). In response, many states have recently considered or adopted policies to increase minimum teacher salaries and/or restructure teacher compensation in other ways. Since 2023, lawmakers in at least 23 states have proposed bills raising minimum teacher salaries and offering bonuses to improve teacher recruitment and retention (Stanford, 2023), and at least six of these proposals have become law.

Among the most comprehensive of these reforms is the Arkansas LEARNS Act. Signed in March 2023, the LEARNS Act increased Arkansas's minimum teacher salary from $36,000 to $50,000, guaranteed all teachers a minimum raise of $2,000 above their prior-year salary, removed the statutory minimum salary schedule, and relaxed other salary schedule requirements. The state fully funded the mandated increases, representing approximately $183 million (6.5%) in additional annual state education funding. Although districts were granted flexibility to restructure compensation systems, most made only the adjustments necessary to comply with the new minimum requirements, resulting in substantial compression of salary differences across districts and, in many cases, across experience levels.

The LEARNS Act represents one of the most comprehensive statewide changes in teacher compensation policy in several decades, centered on a large, state-financed minimum salary increase that affected a substantial share of the teaching workforce and delivered the largest raises to teachers in traditionally hard-to-staff districts. Whether such a reform meaningfully improves teacher retention is an open question on which the existing literature offers only partial guidance.

A growing empirical literature examines whether higher teacher salaries improve recruitment and retention, though none speak directly to the impact of large, statewide minimum salary increases comparable in scale to the LEARNS Act. Using administrative data from Texas, Hendricks (2014) shows that base pay increases reduce district-level teacher turnover, with effects concentrated among early-career teachers. Evidence from state-level policy changes points in a similar direction. Sun et al. (2024) find that legislatively induced salary increases in Washington State reduced turnover among mid- and late-career teachers in the first year of implementation, though effects on hiring were limited. Nguyen et al. (2023), however, suggest that effects may take time to materialize. Their analysis of school finance reforms shows that meaningful retention gains required substantial and sustained funding increases over nearly a decade.

More broadly, a recent meta-analysis confirms that salary increases are associated with improved retention, though the magnitude of these effects tends to be modest (Nguyen et al., 2020). Taken together, this evidence suggests that salary increases can improve retention, but the magnitude, timing, and distribution of these effects depend on the scale and design of compensation changes. The LEARNS Act's large, state-funded minimum salary increase provides a strong setting for studying the impact of a reform that is currently of significant interest among policymakers.

A parallel line of research emphasizes not only the level of teacher pay but its structure. Most U.S. districts operate under a "single-salary schedule," in which compensation is determined almost exclusively by years of experience and educational attainment (Podgursky and Springer, 2007). Critics have long argued that such systems compress wages, fail to reward effectiveness, and limit districts' ability to respond to subject-area shortages or local labor market conditions (Ballou and Podgursky, 1997; Hanushek, 2007). For example, Hanushek (2007) argues that uniform salary increases reward high- and low-performing teachers alike and may reduce districts' flexibility to selectively retain more effective teachers, while Ballou and Podgursky (1997) found little evidence that across-the-board raises in the 1980s improved the academic quality of new recruits.

However, compressing salary schedules need not be detrimental across the experience distribution. Hendricks (2014) uses simulation models to show that flatter schedules could improve retention by reallocating compensation toward early-career teachers, though empirical evidence on this point remains limited. The LEARNS Act provides an opportunity to examine these dynamics empirically through a natural experiment. By raising the salary floor to $50,000, the reform delivered substantial salary increases concentrated among early-career and lower-paid teachers, the group of teachers for whom Hendricks's simulations predict the largest retention gains.

While the LEARNS Act compressed salaries at the bottom of the distribution, it also granted districts new flexibility to deviate from seniority-based schedules, a feature that connects it to a separate strand of literature on compensation and decentralization. Following Wisconsin's Act 10 reforms, which reduced collective bargaining constraints and allowed districts to move away from rigid salary schedules, districts adopting flexible compensation structures attracted higher-quality, experienced teachers and improved student outcomes (Biasi, 2021). Studying the same reform, Baron (2021) finds that the share of teacher preparation program completers from more selective institutions increased relative to neighboring states after compensation flexibility expanded. These studies reinforce the evidence that compensation policy affects teacher labor market outcomes but examine decentralization and pay differentiation rather than statewide minimum salary increases, making it difficult to infer the retention effects of a reform like the LEARNS Act from this literature alone.

Salary increases do not operate in a vacuum, however, and other factors undoubtedly impact teachers' labor market decisions. Early research emphasized that working conditions, including student demographics, school discipline, leadership quality, and peer composition, play an important role in turnover decisions (Hanushek et al., 2004; Loeb et al., 2005; Horng, 2009). If teachers weigh compensation against nonpecuniary job attributes, modest or uniform pay increases may be insufficient to meaningfully shift retention decisions. Retention effects may instead emerge only when salary increases are large enough to materially change relative pay, particularly in districts where working conditions have historically depressed recruitment and retention.

This paper provides the first comprehensive analysis of the LEARNS Act's effects on teacher compensation and retention. We combine a novel database of Arkansas districts' salary schedules collected one year prior to the LEARNS Act (2022–23) and during its first year of implementation (2023–24) with administrative records covering the universe of public-school teachers in the state through the third year of the reform. These linked data allow us to document how districts adjusted compensation policies and to leverage quasi-experimental variation in the size of individual salary increases to estimate the causal effect of LEARNS-induced raises on teacher retention using a triple-difference-in-differences design.

We address three research questions:

(RQ1) How have school districts' teacher compensation policies changed in response to the LEARNS Act?

(RQ2) How has the distribution of teacher salaries across districts and regions changed, and how have the relationships between teacher salaries and district characteristics shifted?

(RQ3) How have the LEARNS Act salary increases affected teacher retention?

We find that districts largely implemented the minimum adjustments required to meet the new statutory floor. These changes substantially increased the competitiveness of starting salaries in traditionally lower-paying, higher-poverty, and rural districts, weakening the previously negative relationship between starting pay and district poverty and rurality. Using a triple-difference-in-differences design that exploits variation in the size of LEARNS Act salary increases, we find that teachers who received raises exceeding the $2,000 minimum were more likely to remain in their districts in subsequent years, with the strongest retention effects among those receiving the largest increases. We also provide evidence that these retention effects may fade over time as inflation erodes the real value of the initial salary gains.

These findings are consistent with prior evidence that salary increases can reduce turnover (Hendricks, 2014; Sun et al., 2024; Nguyen et al., 2020) but suggest that the magnitude of individual salary gains matters. Modest, across-the-board increases may be insufficient to meaningfully shift retention, while larger raises can produce detectable effects even in the short run. This pattern, including the potential fade-out, also aligns with Nguyen et al. (2023), who find that meaningful retention gains emerge only from large and sustained increases, and extends their work by showing that even within a single reform, the size of individual raises matters for teacher retention.

The remainder of the paper proceeds as follows. Section 2 provides information about the Arkansas context and the legislation introduced as part of the LEARNS Act. Section 3 describes the data, while Section 4 presents descriptive results to answer Research Questions 1 and 2. Section 5 discusses our triple difference-in-differences approach to provide an answer to research question 3. Then, Section 6 presents the results for our estimates of the effect of LEARNS induced salary changes on teacher retention. Finally, Section 7 presents our conclusions and policy implications.

2. The Arkansas Context and the LEARNS Act

2.1 The Arkansas Context

Arkansas is a mid-size state located in the South-Central United States. The state's public school system serves about 490,000 students with 31,500 teachers employed each year. Reflecting the national trend, most teachers in Arkansas are women (77%), and a majority (87%) identify as white.

Arkansas has significant subject and geographic shortage areas. In many parts of the state, districts struggle to hire teachers who are certified to teach the subjects/grades to which they are assigned. The proportion of Arkansas teachers without certification currently in classrooms is about 5% in the past few years, more than double the national average of about 2%[1]. The Arkansas Department of Education identifies teacher shortage areas based on, among other measures, the proportion of teachers teaching more than half of the school day in subject areas and/or grades for which they are not licensed. Figure 1 shows this proportion for each school district between the 2021-22 and 2023-24 school years. As we can see in this figure, most geographical teacher shortage areas in Arkansas are in the Southeast, Northeast, and Southwest areas of the state.

2.2 The Arkansas LEARNS Act

The Arkansas LEARNS Act is a comprehensive education reform package aimed at improving student outcomes, strengthening the teacher workforce, and expanding school choice. One of its focuses is to boost teacher recruitment and retention. To do so, it included several major changes designed to impact teacher compensation, professional incentives, and the broader teaching profession. Of these, the most salient and the focus of this paper was raising the statewide minimum salary for classroom teachers from $36,000 to $50,000 and guaranteeing that all current teachers receive at least a $2,000 raise.

The Arkansas LEARNS Act was signed into law in March 2023. Soon after passage, districts were required to update their salary schedules to comply with the new statewide minimum teacher salary of $50,000 and the guaranteed $2,000 minimum raise. Districts had to

[1] https://nces.ed.gov/fastfacts/display.asp?id=58.

develop and submit these revised schedules before the start of the 2023–24 school year, with most districts approving new salary schedules in May or June.

In addition to the previously described salary changes, the law also established the Arkansas Merit Teacher Incentive Fund, which provides performance-based bonuses of up to $10,000 annually to educators who demonstrate strong performance, mentor new teachers, or work in areas with critical shortages. However, this merit pay program was not implemented until the second year of LEARNS, and the bonuses were distributed broadly across the state rather than concentrated among specific districts or teachers.

The LEARNS Act also introduced 12 weeks of paid maternity leave, which became mandatory for school districts in the third year of implementation; eliminated the Teacher Fair Dismissal Act, thereby granting districts greater discretion over personnel decisions; and restructured aspects of teacher preparation, including the introduction of new residency requirements for teacher candidates. While these initiatives affect teachers, they are not expected to be correlated with the variation in salary increases induced by the reform that we use for identification in our analysis, as described below. Therefore, we do not expect them to influence our estimated effects.

3. Data

To study how school districts adjusted to the new legislation, we collected salary schedules for school districts in Arkansas one year before the implementation of the LEARNS Act (2022-23) and during the first year of implementation (2023-24)[2]. While the total number of

[2] Salary schedules were collected through web searches and direct district communication and were primarily received as PDFs. We then used R programming to extract the necessary information from the PDFs. This worked for about half of the cases. For the rest, the team of researchers in the project manually coded the data from the

districts available for our analysis depends on the year and specific model, we were able to obtain salary schedule data for both years from nearly all traditional public-school districts (230 out of 234 traditional public school districts), as well as for 9 out of 12 of the charter school operators that were present in both years. We merged this information with other district characteristics from the Arkansas Department of Education and the National Center for Education Statistics' Common Core of Data, including urban-centric locales (i.e., city, suburban, town, and rural), student enrollments, student demographics, and proportion of students receiving free- or reduced-priced lunch (FRPL).[3]

To evaluate the effects that changes in teacher compensation had on retention, we integrated this district-level data with administrative records of educators' job assignments maintained by the Office of Education Policy and the Department of Education Reform at the University of Arkansas. These data cover the universe of traditional public and charter school teachers from 2014-15 through the 2025-26 school years and allow us to track individuals throughout their time in the Arkansas education workforce as well as differentiate retirements from other exits from the Arkansas public education workforce.[4]

We use this longitudinal administrative data to track teacher turnover in Arkansas public schools. An individual is classified as a teacher if they serve as a teacher of record for one or

PDFs. In both cases, the quality of the data was checked by another member of the research team. We also collected salary schedules for the second year of implementation (2024-25), but found minimal changes compared to the first year of LEARNS implementation.

[3] While the share of students participating in FRPL is an imperfect proxy for student economic disadvantage (e.g., Cruse and Powers, 2006), we use this measure as it is available for all districts. Similar analyses using Small Area Income-Poverty Estimates (SAPIE) from the U.S. Census Bureau, which is restricted only to traditional public-school districts, are available upon request and display qualitatively similar results.

[4] For the teacher turnover analysis, we supplement teacher salary information collected from districts' PDFs with recorded administrative records on teachers' base salaries, so we can recreate salary schedule information and supplement salary change values in instances when information from districts' PDFs was missing.

more classes. We also include those who act as special education inclusion teachers.[5] Using annual job assignment records, we construct a categorical variable capturing five possible employment decisions for each teacher.

Teachers who remain in an instructional role within the same district as the prior year are classified as "Stayers." This category includes teachers who remain in the same school, as well as those who transfer schools but stay within the same district. Teachers who move to teach in a different district are categorized as "Movers." Those who leave classroom instruction but remain employed in Arkansas's public education system (e.g., as principals or instructional coaches) are classified as "Switchers." Teachers who retire are labeled "Retired." Finally, teachers who leave the state's public education workforce entirely and are not recorded as retired are classified as "Exiters."

Figure 2 presents patterns of teachers' employment decisions for public-school teachers in our analytic sample from 2015–16[6] through 2025–26, with the final three years corresponding to the initial implementation of the LEARNS Act. Consistent with Camp et al. (2024), we observe stable rates of teacher retention (Stayers) through the first pandemic year (2020–21). Retention then declined in 2021–22 and fell more sharply in 2022–23. This decline in retention coincided with an increase in exits from the Arkansas public education workforce following the pandemic, particularly in 2022–23, with exit rates remaining modestly elevated thereafter.

[5] For teachers who work in multiple schools, we assign them to their modal school.

[6] Note that, as our dataset starts in the academic year 2014-15, 2015-16 is our first year where we can observe teachers' labor transitions.

The post-pandemic decline in retention was driven not only by increased exits but also by a rise in teachers switching to non-instructional roles. The share of Switchers increased from approximately 3 percent in pre-pandemic years to about 4 percent after 2021–22. Additionally, inter-district mobility (Movers) increased during the pandemic and has remained somewhat elevated relative to pre-pandemic levels. In contrast, retirement rates remained relatively stable throughout this period.

During the first three years of LEARNS Act implementation (2023–24, 2024–25, and 2025–26), we observe modest improvements in retention compared to the post-pandemic low in 2022–23. However, retention remains below pre-pandemic levels, and exit rates continue to exceed their pre-pandemic baseline. The shares of Switchers and Movers also remain elevated relative to pre-pandemic years.

Although teacher turnover has remained higher in the post-LEARNS period than before the pandemic, there are signs of recovery. In particular, exits have declined relative to their peak levels, suggesting that workforce dynamics may be gradually returning toward pre-pandemic patterns. Similar signs of recovery have been documented in other states, including North Carolina (Bastian and Fuller, 2024). This improvement may also reflect the influence of salary increases enacted under the LEARNS Act, a possibility we examine in the following sections.

4. How did Districts Adjust Their Teacher Compensation Policies in Response to the Introduction of the LEARNS Act?

We first study the collected district-level salary schedule information to assess how school districts adjusted their teacher compensation policies in response to the introduction of the

LEARNS Act (Research Question 1). Then, we further study how the LEARNS Act might have improved the competitiveness of those school districts in rural areas or that serve higher proportions of disadvantaged students (Research Question 2). To do so, we use linear regression models to study the association between the salaries of teachers with differing levels of experience (i.e., 5, 10, and 15) and district characteristics, including urbanicity[7], district enrollment (i.e., total number of students in the district), districts' student demographics (i.e., proportion [0 to 1] of white students in the district), and student poverty as proxied for by the proportion (0 to 1) of students receiving FRPL. For this descriptive analysis, we focus primarily on the salaries of teachers with a bachelor's degree. Results for teachers holding a master's degree can be found in Appendix A. For comparability across districts, we do not consider intermediate lanes in a salary schedule that would compensate teachers for credit hours in pursuit of an advanced degree.

As we can see in the left panel of Figure 3, Panel A, before the reform in the 2022-23 school year, entry-level teacher salaries in Arkansas were significantly lower than the new minimum salary of $50,000 in almost all districts in the state. The average entry-level teacher salary for those holding a bachelor's degree was about $38,000, with 39% of districts (94 out of 241) paying the previously mandated minimum salary of $36,000.

As can be seen in the right part of Figure 3, Panel A, the LEARNS Act elevated beginning teacher salaries to the new minimum of $50,000, eliminating much of the variation in starting teacher salaries across districts. The average entry-level teacher salary for those holding

[7] We use the following definitions for differing levels of urbanicity: rural areas have a population under 5,000, suburban areas are located near a census-designated principal city, town school districts are located in areas with between 5,000 and 50,000 residents, and urban districts are located in areas with more than 50,000 residents.

a bachelor's degree became about $50,000, with 97% of districts (231 out of 239) paying this minimum and only 8 districts paying an entry-level salary above this amount.

Figure 3, Panels B, C, and D show the distribution of teachers' salaries across districts, for those holding a bachelor's degree and with 5, 10, and 15 years of teaching experience, respectively. Pre-LEARNS during the 2022-23 school year, average teacher salaries for those holding a bachelor's degree remained below the new minimum of $50,000 at about $41,000, $43,000, and $46,000, for those with 5, 10, and 15 years of experience, respectively. Less than 7% (5 out of 241 for 5 years of experience and 16 out of 241 for 10 years of experience) of school districts, during the 2022-23 school year, paid salaries equal to or above $50,000 for teachers with a bachelor's degree and up to 10 years of experience. The proportion of districts paying at or above the new $50,000 minimum salary increased only to 15% (37 out of 241) for those teachers holding just a bachelor's degree and with 15 years of experience during the 2022-23 school year.

Looking at the school year 2023-24, the first year of implementation of the LEARNS Act, on average, teachers' salaries for those holding a bachelor's degree remained around the new minimum at about $50,000 for those with 5 years of experience, and at about $51,000 for those with 10 to 15 years of experience. Most school districts continued to pay the new minimum salary of $50,000 to teachers holding a bachelor's degree even as experience increased. 86% of districts paid this minimum for teachers with 5 years of experience, 76% for teachers with 10 years of experience, and 65% for teachers with 15 years of experience.

In general, after analyzing the collected school districts' salary schedules, we observed that districts mostly did the minimum required changes to satisfy the LEARNS Act in the first year of implementation[8], leading to three patterns of adjustments in response to the LEARNS Act[9]. First, districts whose salaries were all lower than the new minimum of $50,000 for all steps during the 2022-23 school year transitioned to flat salary schedules in 2023-24 that pay the minimum of $50,000 regardless of teachers' years of experience, and in some cases, education credentials. Fifty-five percent of districts fall into this category when considering schedules for teachers holding a bachelor's degree. Second, districts with pre-LEARNS salary schedules that had some steps with salaries below $50,000 and others above adjusted by increasing pay to $50,000 for the cases paying below the minimum and providing a $2,000 raise for those cases paying above. Thirty-six percent of districts are in this case when considering schedules for teachers holding a bachelor's degree. Finally, districts whose salary schedule was entirely at or above $48,000 adjusted after the LEARNS Act by keeping their existing schedules but increasing salaries by $2,000 for all their teachers. 9% of districts are in this case when considering schedules for teachers holding a bachelor's degree.

We next explore how teacher salaries' competitiveness changed across and within regions of the state. Figure 4 shows teachers' salaries for those holding a bachelor's degree pre-LEARNS (2022-23) and in the first year of implementation (2023-24) for new teachers and those with 5, 10, and 15 years of experience. Pre-LEARNS, Northwest Arkansas, and Central Arkansas had school districts offering the largest starting salaries for beginning teachers holding a bachelor's degree. These districts' salary advantage continued as teachers gained experience.

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[8] We also collected salary schedules for the second year of implementation of the LEARNS Act and found that further changes in salary schedules were minimal compared with the first year of implementation.
[9] Interactive visualizations including complete salary schedules by education service cooperative can be found here: https://oep.uark.edu/teacher-salaries-under-the-arkansas-learns-act/.

However, because of the salary schedule adjustments to satisfy the LEARNS Act, teachers' salaries for new teachers were more equally distributed across regions of the state in 2023-24, with minimal variation across districts. However, experienced teachers still experience more differentiation across districts. Although pay differences for experienced teachers shrank under LEARNS, it remains advantageous to work in Northwest Arkansas and Central Arkansas districts, which continue to offer higher salaries to their experienced teachers.

Next, we calculated each district's salary differences between 2023-24 and 2022-23 for teachers holding a bachelor's degree with different levels of experience and used a regression model to study the relationship between the differences in salaries and different district characteristics. The results are presented in Table 1. This table shows how rural districts and those with higher levels of poverty experienced larger increases in their salary steps. An increase of 10 percentage points in the proportion of FRPL students in a district is associated with an average increase in starting salaries of about $475, while rural districts increased starting salaries by about $2,050 more than urban districts. However, the differences between rural and urban districts and districts with different levels of student poverty decrease for teachers with more experience. Overall, these results suggest that salary increases were substantially larger in rural, higher-poverty districts and for teachers with lower levels of experience.

We further study how the LEARNS Act might have affected school district competitiveness by using regression models to compare the relationship between salaries and district characteristics one year before LEARNS and in the first year of implementation. The panels of Table 2 provide a side-by-side comparison of the estimated relationships for different experience levels. In each panel, the first column shows the relationships pre-LEARNS in 2022-23 and the second column shows post-LEARNS in 2023-24.

Table 2, Panel A, provides the results for beginning teachers. As we can see in column (1), beginning teachers' pre-LEARNS starting salaries were, on average, about $2,075 lower in rural school districts than in urban districts, keeping other characteristics constant. Pre-LEARNS, we did not observe a statistically significant difference in starting salaries for beginning teachers in suburban areas, while beginning teacher salaries in town schools were about $1,580 lower compared to urban schools, keeping other variables constant. We also do not observe a statistically significant association (at the 95% or greater confidence level) between starting teacher salaries and the demographic composition of the district's student body, once we control for other factors. However, we do observe a significant association with the share of students participating receiving FRPL. An increase of 10 percentage points in the proportion of students receiving FRPL in the district is associated with about $487 lower starting salaries for teachers holding a bachelor's degree.

Panel A, column (2), shows the results for beginning teachers after the introduction of the LEARNS Act in the 2023-24 school year. As we can see, the changes implemented as a result of LEARNS reduced differences in starting teacher salaries between rural and urban school districts. Comparing columns (1) and (2), we see that, keeping other factors constant, the difference between urban and rural districts decreased from $2,075 lower salaries in rural areas to just $258 less. The salary changes also eliminated the relationship with the percentage of students receiving FRPL and starting salaries. For beginning teachers, the new legislation made it more attractive to start a teaching career in rural areas and districts with higher poverty.

Interestingly, starting salaries in suburban districts are now lower than in urban districts after the introduction of the LEARNS Act, but the difference is only about $366. We also observe a reduction in the relationship between district size and teacher salaries, with larger districts offering higher wages. However, that relationship was already small pre-LEARNS, after comparing districts in the same urbanicity areas and serving similar populations, so the practical impact of this change is small. Before LEARNS, an increase of 100 students enrolled in the district was associated with a $51 increase in teachers' starting salaries, keeping the rest of the district characteristics comparable, and that was reduced to $4 post-LEARNS.

Panels B, C, and D, show the results for teachers holding a bachelor's degree with 5, 10, and 15 years of experience. Looking at the second column in each panel, we see that as teachers gain experience, the difference in salaries for school districts serving a higher proportion of students receiving FRPL re-emerges, although the difference is smaller than it was before LEARNS. Looking at Panel D, which shows results for teachers with 15 years of experience, we observe that, before LEARNS, a 10 percentage point increase in the share of students receiving FRPL was associated with a salary reduction of about $570, and after LEARNS, that difference is $253.

Similarly, comparing rural, towns, and more urban districts, we observe that the Arkansas LEARNS Act considerably reduced the salary disadvantage in rural and town districts, but the differences increase as teachers gain experience, although the differences are smaller than they were pre-LEARNS at every experience level. Looking at Panel D, teachers with 15 years of experience who hold a bachelor's degree earn about $1,243 less post-LEARNS if they teach in a rural district than if they teach in an urban area, which is about 53% of the pre-LEARNS difference. Those teaching in a town district earn about $1,400 less.

These results show how LEARNS drastically raised teachers' pay across the state, improving competitiveness for rural and higher-poverty districts. It functioned primarily as a salary floor-setting policy, where school districts mostly made the minimum changes to satisfy the new law. Therefore, salary raises depended on the specific school district and the step (i.e., experience)/lane (i.e., education level) that teachers were on before the reform. It is the variation in salary raises induced by the reform that we exploit in our next section to estimate its effects on teacher retention.

5. Analytical Strategy to Study the Effects of Arkansas LEARNS on Teacher Labor Transitions

5.1 Empirical Model

Given the sizable public investment of the LEARNS Act, extensive prior literature linking teacher compensation to turnover, and the recent focus from policymakers on sustaining and expanding the teacher workforce, estimating the effect of the LEARNS Act on teachers' career decisions is important and the focus of Research Question 3.

To capture the variation in salary changes induced by the reform, we construct a simulated salary variable, R_{ids}, representing the salary raise (in thousands of dollars) a teacher i at step/lane position s in district d would need to comply with the LEARNS Act, as shown by Equation (1) below. $Salary_{ds}^{pre}$ denotes the pre-policy 2022-23 base salary for a teacher at position s in district d.

This simulated salary change captures the policy-induced component of salary changes, abstracting from any discretionary adjustments districts may have made beyond the minimum requirements. It should be stressed, however, that deviations in salary changes from what was required in law were minimal. Comparing actual salary changes with our simulated salary change leads to an average difference of just \$300, with the 75th percentile at zero.

$$R_{ids} = \frac{\max(\$50{,}000 - Salary_{ids}^{pre}, \$2{,}000) - \$2{,}000}{\$1{,}000} \quad (1)$$

Note that we center the values of R_{ids} at \$2,000, meaning that our simulated salary captures raises in excess of the \$2,000 minimum that all teachers received. As we can see in Figure 5, simulated salary raises among the teachers in our analytical sample ranged from the minimum of \$2,000 to almost \$14,000, with teachers receiving an average raise of \$4,246, while the median teacher received the minimum raise of \$2,000, and the 75th percentile was almost \$6,000. Figure 5 also shows how simulated salary changes relate to teachers' years of experience. While, as we described in the prior section, salary raises were inversely related to years of experience, there is still considerable variation in the data that we exploit in our empirical approach.

While discretionary salary changes beyond compliance with LEARNS were rare, when present, they will always be more than the raises required (and values our simulated salary captures). As a result, any noncompliance with the simulated salaries would result in a downward bias of our estimates of salary increases on teacher retention. In that respect, our estimates with simulated salary changes represent an Intent-to-Treat effect and therefore, a lower bound of the effects of LEARNS.

To develop our identification strategy for the effect of simulated salary changes on teacher turnover, we begin by considering a standard difference-in-differences specification that exploits variation in treatment intensity across district-step/lane combinations. Let Y_{idst} denote a binary labor transition outcome (exits, retirements, switches, and district moves, using stayers in the district as comparison), for teacher i in district d at a given step/lane s in year t. A natural starting point is the difference-in-differences model represented by Equation 2, where γ_{ds} represents district-by-step/lane fixed effects, where a step is defined by a combination of education (bachelor's or master's) and years of experience. λ_t represents year fixed effects for the different years in the analysis (2014-15 to 2025-26), and $Post_t$ is an indicator equal to one for years after the introduction of the LEARNS Act, 2023-24 school year and later.

Estimates of our parameter of interest β_1 capture the effect of a one-thousand-dollar increase in the required simulated salary raise on teacher labor outcomes. The district-by-step/lane fixed effects (γ_{ds}) absorb time-invariant differences across combinations of experience and education within each district. The year fixed effects (λ_t) capture common shocks to teacher retention affecting all teachers equally in the year t. Thus, identification of β_1 comes from comparing changes in retention over time within district-by-step/lane combinations that experienced different treatment intensities.

$$Y_{idst} = \beta_0 + (R_{ids} \times Post_t)\beta_1 + \gamma_{\text{ds}} + \lambda_t + \epsilon_{idst} \qquad (2)$$

The identifying assumption required for Equation (2) to estimate unbiased effects of the LEARNS Act-induced salary raises is that, absent the policy, retention trends would have evolved in parallel across different values of R_{ids}. While our model controls for differences in levels of a given labor outcome across districts and steps with the use of district-by-step/lane fixed effects (γ_{ds}), it requires that labor outcomes evolve similarly across district step/lane combinations. This is unlikely to be satisfied, especially considering that in this model, districts whose salary schedules had all steps above the new minimum salary, whose teachers all received the minimum salary raise of $2,000, are considered as part of the "comparison group". As we showed in the prior section, districts with smaller salary changes might differ systematically (e.g., more urban districts that share different unobservables). In this case, our estimates of β_1 from (2) might confound the LEARNS induced effects with these systematic differences across districts.

To address these concerns, we follow Ortiz-Villavicencio and Sant'Anna (2025) and develop a triple-differences specification that leverages the fact that some districts in Arkansas had pre-policy salary schedules at or above $48,000 for all step/lanes. Teachers in these districts all received the uniform $2,000 raise regardless of their step/lane position. These *untreated districts* provide a reference group for identifying how retention evolves across step/lane positions in the absence of differential treatment. We leverage this between- and within-district variation to isolate the causal effect of salary raises in Equation (3).

Let T_d be an indicator equal to one if district *d* is a treated district, i.e., a district containing at least some teachers whose required raise exceeds $2,000. Our triple difference-in-differences specification is:

$$Y_{idst} = \alpha_0 + (T_d \times R_{ds} \times Post_t)\alpha_1 + \gamma_{\text{ds}} + \delta_{st} + \zeta_t(T_d) + \upsilon_{idst} \qquad (3)$$

Here, R_{ds}, $Post_t$, and γ_{ds} are defined as above. The district-by-step/lane fixed effects, γ_{ds}, continue to absorb all time-invariant differences across district-step/lane combinations. To absorb arbitrary year-specific shocks that affect retention differentially across the career cycle, the model includes a set of year-by-step/lane fixed effects δ_{st}. Critically, these fixed effects are identified in part from untreated districts where all teachers receive the same $2,000 raise. The year-by-step/lane fixed effects (δ_{st}) thus, capture the "natural" evolution of labor outcomes across the career cycle that would have occurred absent differential raises.

Lastly, we allow for differential labor trajectories over time for treated districts (i.e., where any teachers receive a raise of greater than $2,000) and untreated districts (i.e., where no teachers receive a raise greater than $2,000) with a set of treated-district-by-year fixed effects $\zeta_t(T_d)$. These fixed effects are critical to our identification strategy in that they address concerns that treated districts, which definitionally had lower pre-policy salaries, may have experienced differential common shocks than untreated districts.

In this triple difference-in-differences model, the parameter of interest α_1 is identified from variation in how the *within-district gradient* of retention across step/lane combinations shifts after the LEARNS Act policy, as a function of the required salary raise. Specifically, we ask: within a treated district in a given year, do step/lane positions that require larger raises exhibit differential changes in labor outcomes, beyond what we would expect based on the overall trajectory of that step/lane position (as observed in districts with no raises in excess of $2,000) and the overall trajectory of treated districts as a group?

The identifying assumption required for Equation (3) to produce unbiased causal estimates is that, absent the differential raises, the *relationship* between step/lane position and labor outcomes would have evolved similarly in treated and untreated districts. This assumption is substantially weaker than that required by the naïve difference-in-differences specification in (2). While the naïve approach requires parallel trends across different treatment intensities, the triple-differences approach only requires that labor outcomes across the career cycle would have evolved similarly across district types. For this reason, we considered the triple differences-in-differences approach the preferred approach[10]. Moreover, we assess the plausibility of the identifying assumption required by Equation (3) using an event-study analogue as is common in the differences-in-differences literature. Under our identifying assumption, estimated treatment effects before the period in which treatment began (i.e., before the 2023-24 school year) should be close to zero and exhibit no systematic trend. We report these event-study analogs alongside our main results to allow readers to assess the credibility of our identification strategy.

5.2 Estimation Approach

We next consider two distinct challenges in estimating the triple difference-in-differences model described in (3). First, the model presented above considers treatment intensity as a continuous variable, implicitly assuming that the marginal effect of each additional $1,000 raise is constant. While there are relatively few reasons *a priori* to be skeptical of this assumption, recent developments in the difference-in-differences literature, and by extension the triple-differences literature, have raised concerns about the implicit assumptions underlying a non-binary treatment and show that violations of this linearity assumption may introduce bias (Callaway et al., 2024).

[10] While we consider the triple differences-in-differences approach to be preferred, we still provide estimates of a naïve differences in differences approach following the model in (2) in Appendix B. Results are consistent across these two models.

To address the concern of potential non-linear effects of salary raises, we estimate effects under three specifications of the treatment variable. First, we estimate Equation (3) as written, with R_{ids} entering continuously. This specification provides a summary measure of the average effect per $1,000 raise. Second, we replace the continuous treatment intensity measure (R_{ds}) with a binary indicator equal to one if $R_{ds} > 0$ (i.e., if a teacher receives any raise of more than $2,000). This specification collapses to a standard triple difference-in-differences model and avoids any assumptions about linear treatment effects entirely. Callaway et al. (2024) show that under the traditional parallel trends assumption described above, the estimated coefficient of such a dummy indicator for receiving salary raises above the minimum will capture the Average Treatment Effect on the Treated (ATT) across all dose values (R_{ds}) ($ATT = E[ATT(Y|R_{ds})|R_{ds} > 0)$. Third, we discretize treatment into four bins based on the magnitude of the simulated salary raise amount: $2001-$4000, $4001-$6000, $6001-$8000, and $8001 or more. This binning allows for a flexible, non-parametric dose-response relationship while maintaining statistical power within each bin.

We present estimates of Equation (3) with each of these treatment definitions in our main results. To the extent that binned estimates exhibit an approximately linear pattern, the continuous treatment specification provides a reasonable summary of treatment effects. Departures from linearity would suggest that the continuous specification masks important heterogeneity in the dose-response relationship.

The second challenge in estimation that we face relates to the nature of treatment effects over time (i.e., dynamic treatment effects), as effects during the first year of LEARNS implementation may differ from effects in later years. The presence of dynamic treatment effects introduces a well-documented source of bias in two-way (or three-way) fixed effects estimation. Even in settings where treatment timing is uniform across units, as in our case, dynamic treatment effects may bias estimates of the fixed effects (Gardner et al., 2024; Borusyak et al., 2024). This problem is especially pronounced in event-study specifications. As Borusyak et al. (2024) demonstrate, the presence of dynamic effects can generate spurious pre-trends or mask true dynamic patterns, even when the parallel trends assumption holds.

We address the concern of dynamic treatment effects by implementing the two-stage difference-in-differences estimator proposed by Gardner et al. (2024).[11] In the first stage of this approach, we estimate the fixed effects from Equation (3) using only untreated observations—specifically, all observations from the pre-LEARNS period and observations from untreated district-step/lane cells in the post-LEARNS period. This approach ensures that fixed effects are estimated entirely from variation that is uncontaminated by treatment effects. We then residualize outcomes for all observations using these "clean" fixed effect estimates. In the second stage, we regress these residualized outcomes on our treatment variables. To obtain correct analytic standard errors, we implement this estimator using the *did2s* package in R (Butts & Gardner, 2022).

6. Results

6.1 Triple Difference in Differences Estimates

Table 3 presents our estimates of the effects of the LEARNS-induced salary increases on teachers' year-to-year labor market transitions. We consider five outcomes: remaining in the

[11] Despite these issues with the two/three-way fixed effects estimators, we replicate our analyses using this estimator. The results, which are qualitatively similar to those we present here, can be found in Appendix C.

district (Stayer), moving to another district (Mover), switching from classroom teaching to a non-instructional role (Switcher), exiting the Arkansas public education workforce (Exiter), and retiring. Panel A presents average treatment effects on the treated (ATTs) when treatment is defined as a binary indicator for receiving a raise above the minimum. Panel B reports estimates per $1,000 increase above the minimum when treatment is modeled as continuous. Finally, Panel C allows effects to vary across different magnitudes of salary increases.

Overall, our results indicate a positive effect of LEARNS-induced salary increases on teacher retention in the district. Looking at Panel A, on average, the probability of a teacher staying in the district increased by about 2 percentage points among those teachers in treated districts. This effect corresponds with an increase in teacher retention in the district of about 0.4 percentage points per $1,000 salary increase. Looking at the results in Panel C, however, we observe that effects appear non-linear and concentrated in teachers receiving the larger salary raises. We do not find statistically significant effects on teacher retention in the district for salary raises up to $4,000. Receiving salary increases between $4,000 and $6,000 led to an increase in the probability of retaining a teacher in the district of 1.4 percentage points, while receiving raises between $6,001 and $8,000, and raises above $8,000 presented estimated increases in the probability of retention of 2.2 and 3.1 percentage points, respectively.

Looking at the other labor transitions, we observe that the increases in teacher retention correspond with decreases in teacher exits, retirements, and, to some extent, moves outside the district. On average, the probability of a teacher exiting the Arkansas public education system decreased by 0.9 percentage points (0.2 percentage points per $1,000 increase). Similarly, the probability of a teacher retiring decreased on average by 0.7 percentage points (0.1 percentage points per $1,000 increase). The probability of moving outside the district also decreased by 0.2

percentage points per $1,000 increase, but the estimates were not significant for the ATT estimates in panel A. As was the case for teacher retention in the district, these effects appear more concentrated among those receiving larger salary increases, especially for exits and moves outside the district. Receiving salaries above $8,000 leads to reductions in teacher exits, moves outside the district, and retirements of 1.5, 1.4, and 0.9 percentage points, respectively. Finally, we do not find any significant effects for the probability of teachers switching to a non-instructional role.

As we explained in the prior section, the validity of our estimates relies on the parallel trends assumption. To test the plausibility of this assumption, we estimate event study versions of our estimates using Equation 3. Figure 6 shows the results of ATT estimates using the binary version of the treatment[12]. As we can see in this figure, overall, pre-treatment estimates are not statistically significant, providing some reassurance that the parallel trends assumption is satisfied. Looking at the dynamics of LEARNS' effects once implemented, we observe that, while imprecisely estimated, the effects on retention in the district (Stayers) generally appear more concentrated in the first year of implementation and decrease somewhat in subsequent years. That appears to be also the case for moves outside the district (Movers) and exits from the profession (Exiters). The effects on retirement, in contrast, appear more concentrated in the second and third year of implementation.

6.2 Extensions: Within-District Movements and Cost-of-Living Adjustments

[12] Results were similar with the continuous and categorical versions of the treatment. Results available from the authors upon request.

Given that LEARNS salary raises were uniform within districts, our main estimates consider teachers who stayed in their current district, both those who stayed in their current school and those who moved schools within the district, as a comparison for different labor transition outcomes. However, it might be important to analyze within-district mobility separately, as improved overall retention in the district may reduce the opportunities of teachers changing schools within districts. At the same time, teachers dissatisfied with their current assignments may respond to the salary raises by moving to another school within the same district rather than exiting or switching districts, as salaries became more equalized across the state. To examine these dynamics directly, we re-estimate Equation (3) using within-district school moves as a separate outcome compared with teachers staying in their current school. Our results, which are reported in Appendix D, are qualitatively similar to the main results presented above. Looking at the second column of Table D.1, we observe that if anything, the LEARNS Act appears to have also reduced moves within the same district, but the results are more imprecisely estimated in this case.

Next, we study the robustness of our results to adjustments for the cost of living. For this purpose, we use information from the American Community Survey Wage Index for Teachers (ACS-CWIFT) (Cornman et al., 2019) as of 2022.[13] We report the results of this analysis in Appendix E. Overall, our results are robust to adjusting for differences in the cost of living.

7. Discussion and Conclusions

[13] The ACS-CWIFT was developed by the National Center for Education Statistics to facilitate comparisons across geographic areas by capturing data from the American Community Survey about wage and salary differences, for college graduates, in a school district area.
https://nces.ed.gov/programs/edge/docs/EDGE_ACS_CWIFT_FILEDOC.pdf

The LEARNS Act represents one of the largest statewide minimum teacher salary increases in recent decades, and our analysis of its first three years of implementation yields several key findings.

First, we find that districts largely implemented the minimum changes necessary to comply with the new statutory floor. Before the LEARNS Act, starting teacher salaries in nearly all districts fell below the new $50,000 minimum. In response, most districts raised salaries to meet the floor without making additional adjustments, resulting in substantial compression of salary differences across districts and, in many cases, across experience levels. Because the state fully financed the mandated increases, the reform also represented a meaningful increase in education funding for traditionally under-resourced districts.

Second, the LEARNS Act substantially increased the competitiveness of starting salaries in rural and higher-poverty districts. Our analysis shows that the reform largely eliminated the previously negative and significant association between starting teacher salaries and district poverty and rurality. However, although post-LEARNS pay differences are smaller at all experience levels, cross-district differentiation reappears as teachers gain experience, and it remains advantageous to work in more urban districts that continue to offer higher salaries to experienced teachers. As experience is a predictor of teacher quality (Wiswall, 2013; Papay and Kraft, 2015), these pay differentials could still affect the distribution of effective teachers across the state. At the same time, the sharp increase in starting salaries may improve recruitment into rural and higher-poverty districts where pay is now substantially more competitive. Both are important questions that we plan to examine in future work.

Third, our estimates indicate that LEARNS Act salary increases had positive effects on retention, reducing exits, retirements, and moves to new districts. These findings are consistent with prior evidence that salary increases can reduce turnover (Hendricks, 2014; Sun et al., 2024) and with meta-analytic evidence linking higher salaries to improved retention (Nguyen et al., 2020). Our results also align with those of a recent survey of superintendents and principals across the state, where most administrators expressed confidence that the changes made to teacher salaries through LEARNS are enhancing their ability to attract and retain teachers (Zamarro et al., 2024; Schellhase et al., 2025).

Critically, however, these retention effects are concentrated among teachers who received the largest salary increases, i.e., those exceeding $6,000. This pattern suggests that the magnitude of salary gains matters. Smaller increases may be insufficient to shift teachers' employment decisions, while larger raises can produce substantive retention gains. This finding aligns with Nguyen et al. (2023), who show that meaningful retention gains from school finance reforms required substantial and sustained funding increases.

Policymakers and school districts should also consider the sustainability of these positive effects. Our event-study estimates suggest that the retention effects of LEARNS Act salary increases may attenuate over time, with effects on staying, exits, and cross-district moves appearing more concentrated in the first year of implementation, though these year-specific estimates are imprecise. One plausible explanation is that inflation erodes the real value of the initial salary gains, diminishing their influence on teachers' employment decisions.

To date, districts have largely not made further meaningful changes to their salary schedules beyond the initial adjustments required to comply with the law. If retention gains depend on the magnitude of real salary increases, as our main results suggest, sustaining these effects may require ongoing adjustments to compensation.

More broadly, adopting innovative compensation strategies may be needed to maintain improvements in teacher recruitment and retention over the longer term. In this regard, the LEARNS Act also established a bonus program that rewards teachers based on criteria including working in subject and geographic shortage areas and student growth performance, among others. Meta-analytic evidence suggests that such performance-pay incentives may be particularly effective in schools serving higher proportions of disadvantaged students (Pham et al., 2021). Evaluating the effects of this bonus program is an important direction for our future research.

As other states consider similar minimum salary reforms, our findings carry a clear implication: the scale of salary increases matters considerably. Only larger raises produced meaningful retention effects, and even those effects may diminish without continued investment. These results underscore both the promise and the limitations of minimum salary policies as a tool for strengthening the teacher workforce.

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Figure 1 – Average Percentage of Teachers Who Are Not Licensed to Teach More Than Half Their Classes.

2021-22 through 2023-24

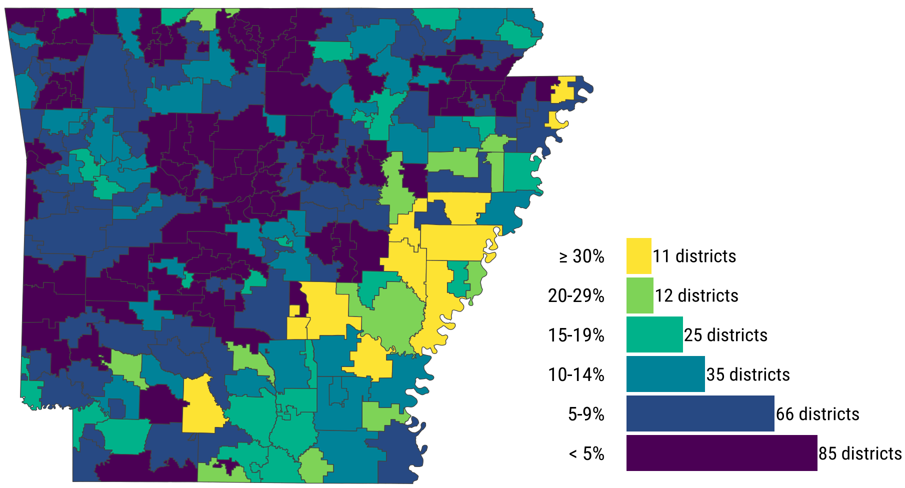


Figure 2 – Arkansas Public School Teachers' Turnover and Retention over Time

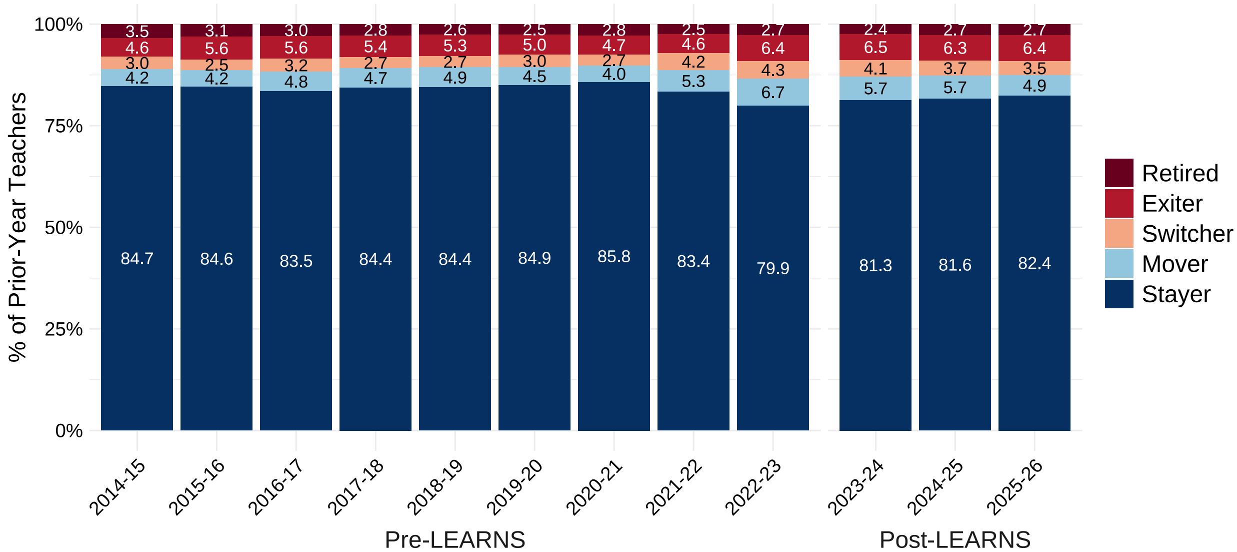
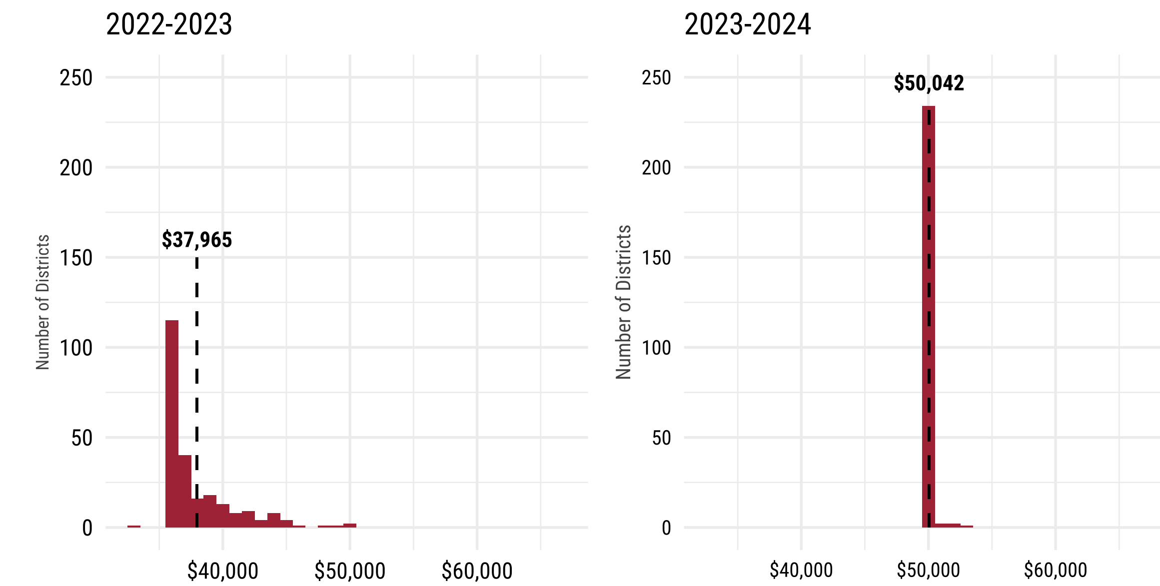
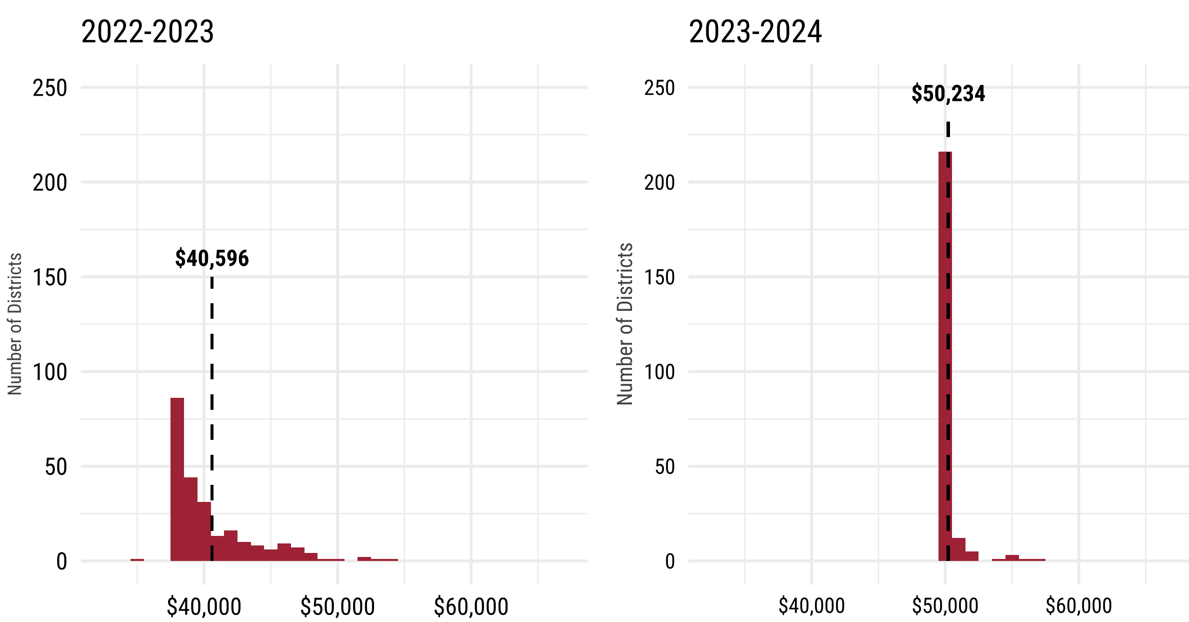


Figure 3 - Distribution of Teacher Salaries - Bachelor's Degree

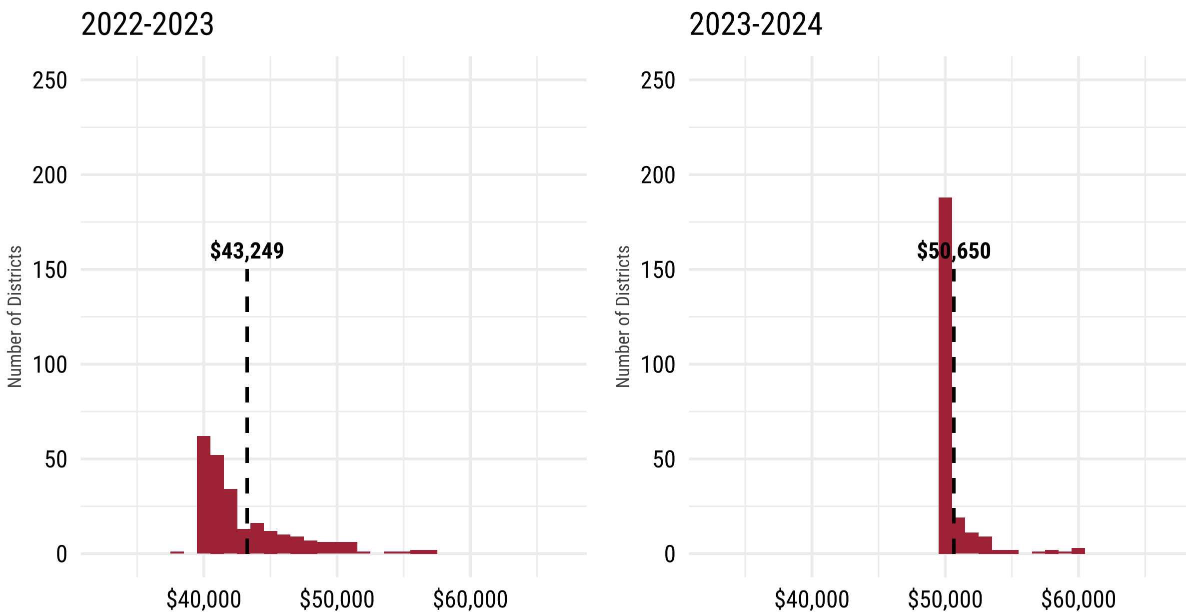
Panel A: Entry-Level



Panel B: 5 Years of Experience



Panel C: 10 Years of Experience



Panel D: 15 Years of Experience

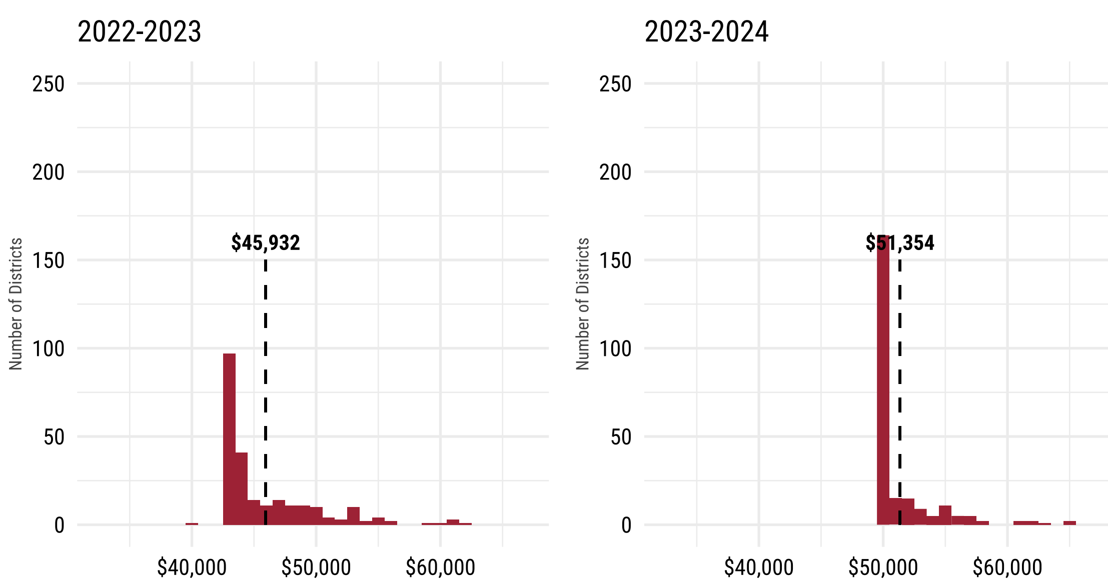
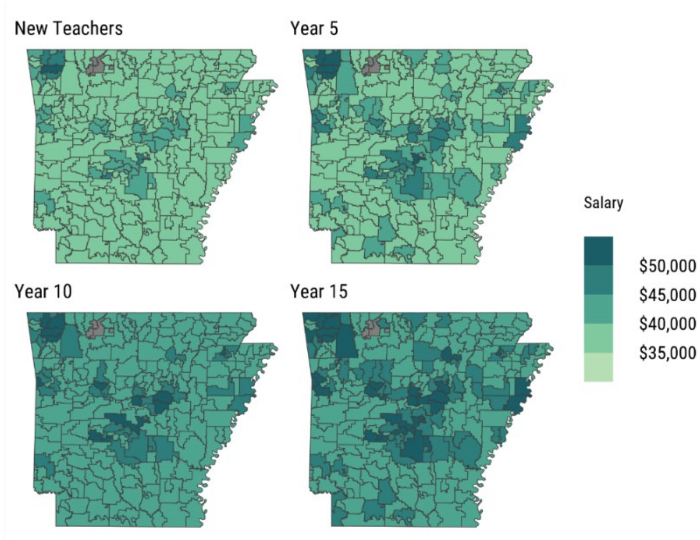


Figure 4 - Teacher Salaries for BA, by Years of Experience & District

2022-2023 School Year



2023-2024 School Year

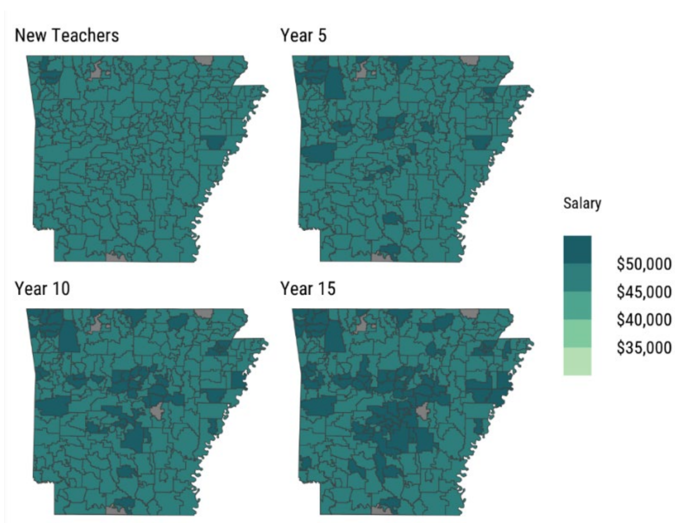
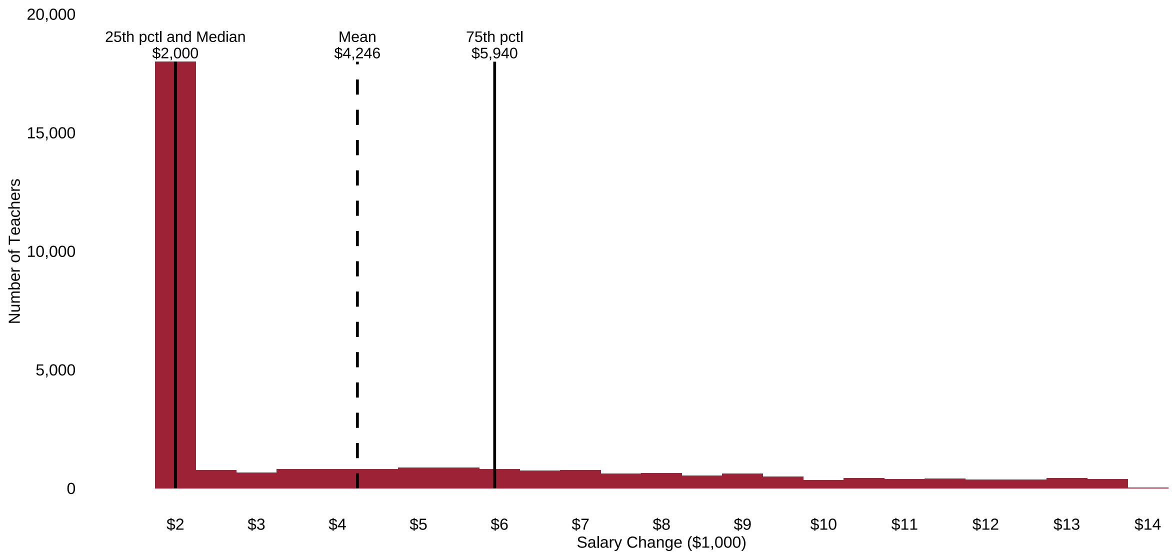


Figure 5 – Distribution of Simulated Teachers' Salary Changes as a Result of the LEARNS Act

Overall Distribution

,simulated



Distribution as a function of years of experience

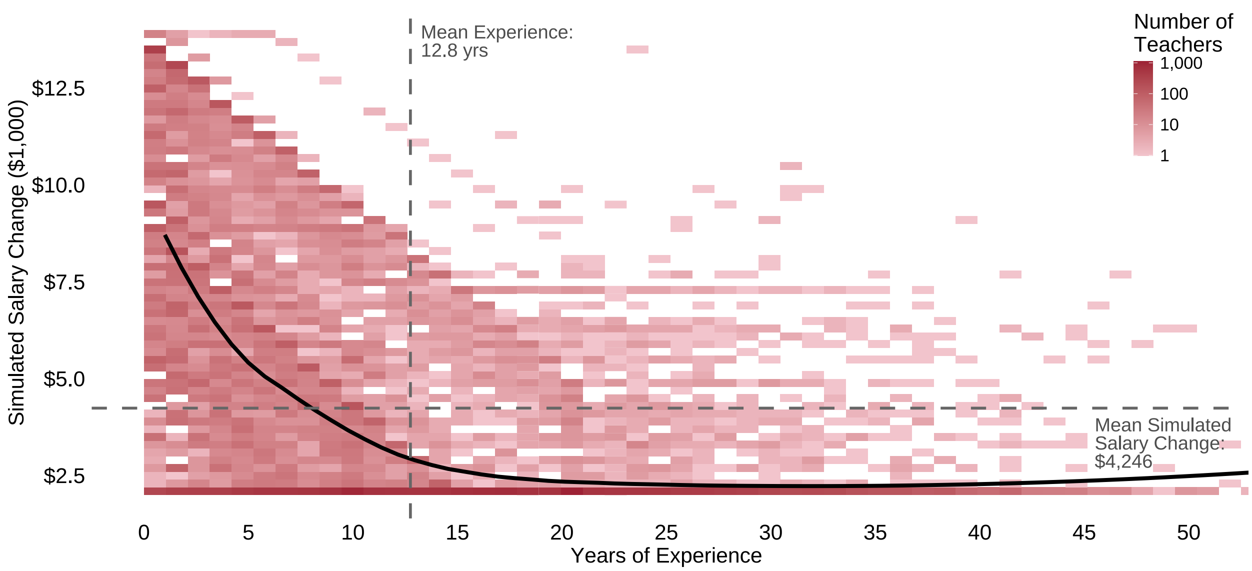
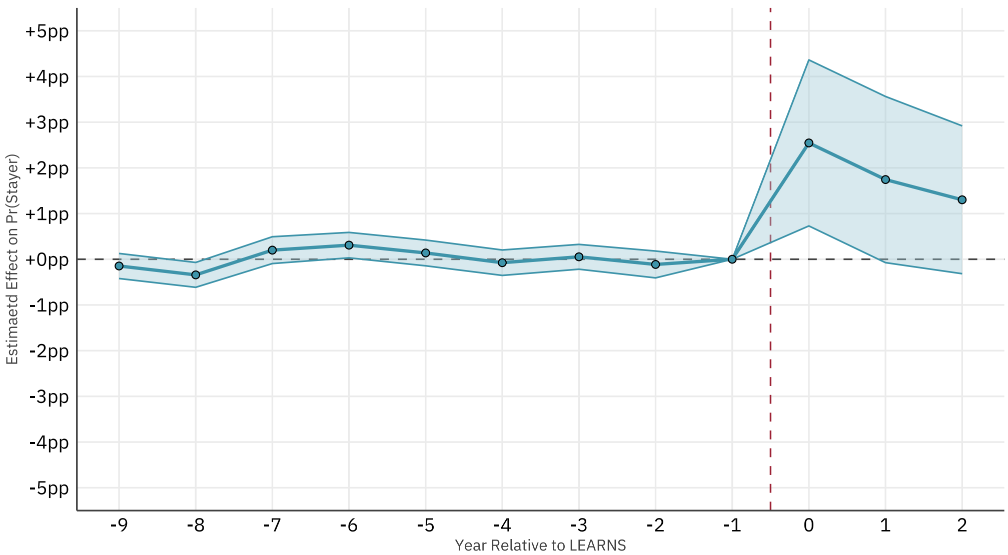
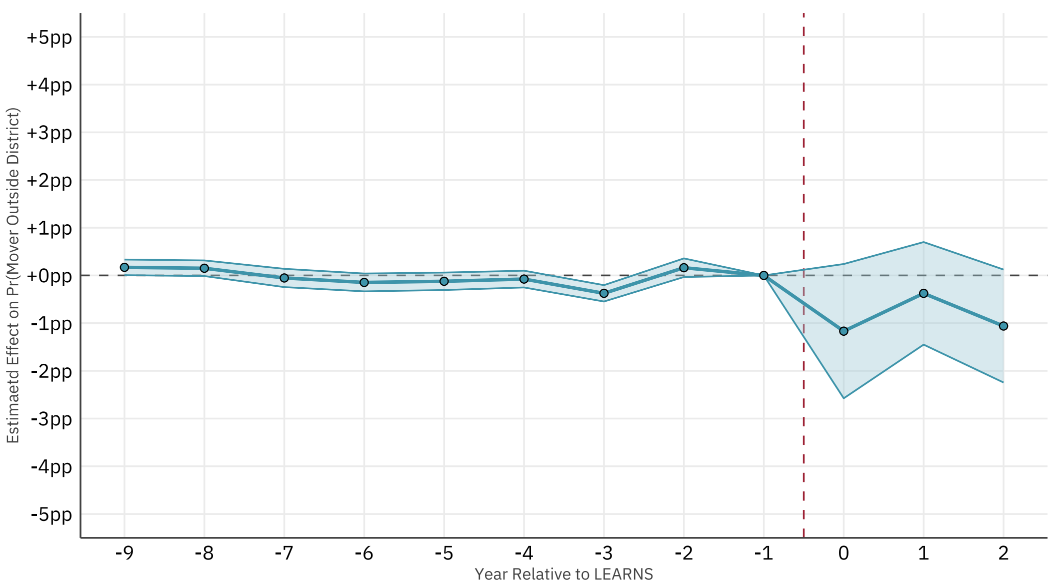


Figure 6 – Event Study Estimates: Triple-Differences Specification- Binary Treatment

Stayers

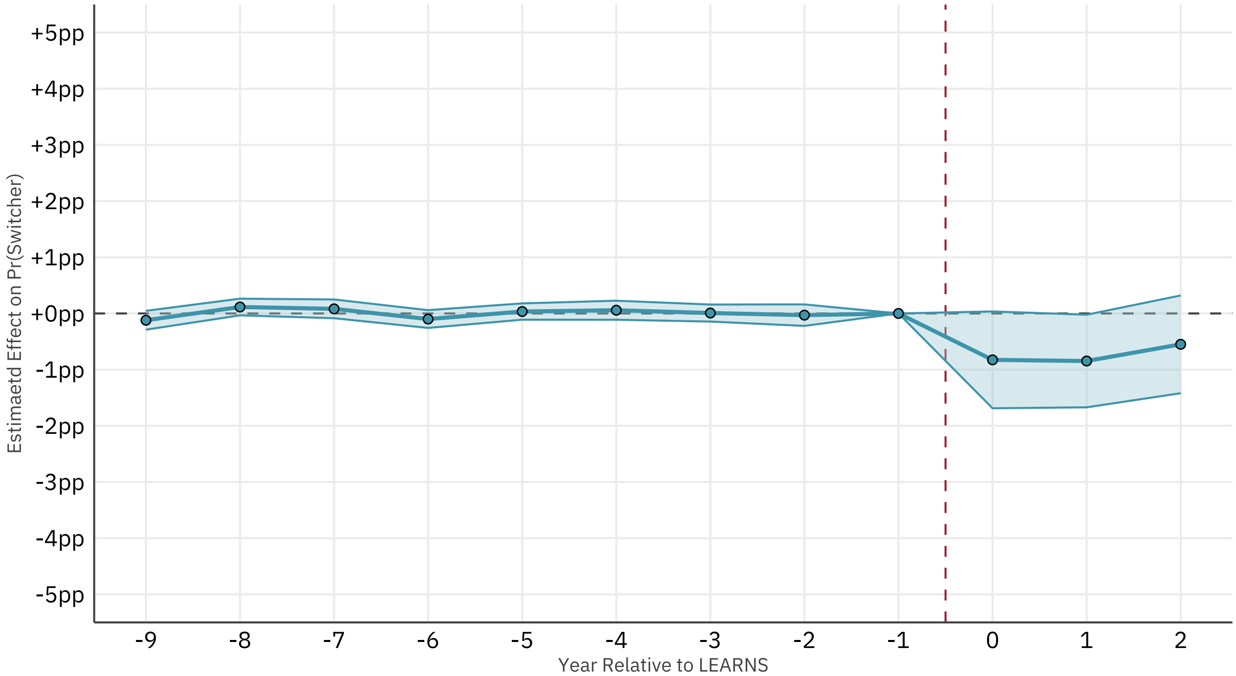


Movers

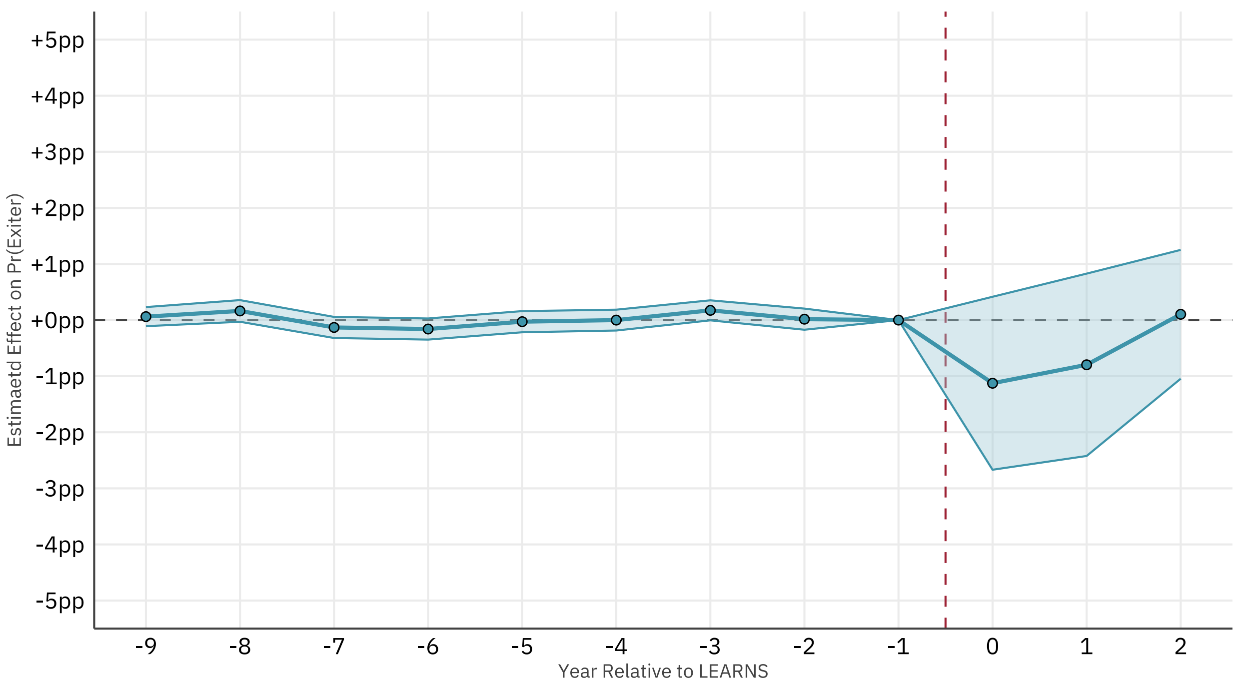


years

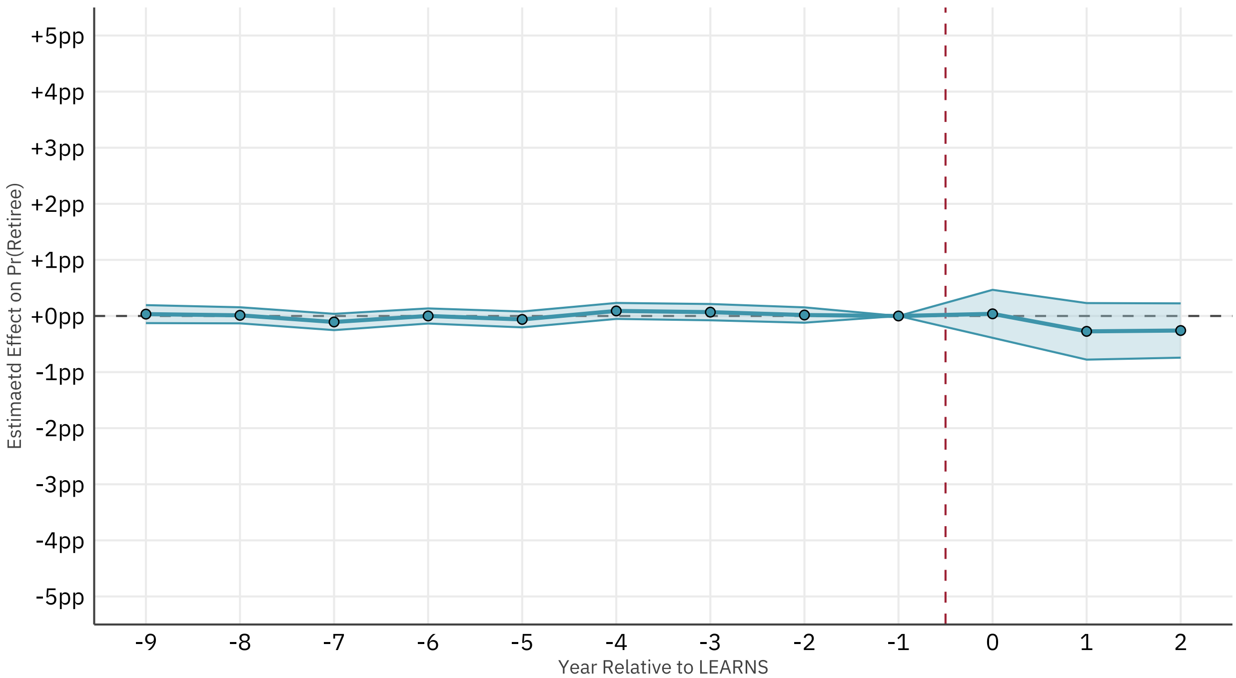
Switchers



Exiters



Retired



+5pp
+4pp
+3pp
+2pp
+1pp
+0pp
-1pp
-2pp
-3pp
-4pp
-5pp
Estimaetd Effect on Pr(Retiree)
-9
-8
-7
-6
-5
-4
-3
-2
-1
0
1
2
Year Relative to LEARNS

Table 1 - Associations Between Salary Increases and District Characteristics (Bachelor's Degree)

	Beginning Teacher	**5 Years of Experience**	**10 Years of Experience**	**15 Years of Experience**
Rural District	2051.56**	2256.33**	2101.53**	1430.49+
	(621.28)	(705.45)	(737.69)	(760.39)
Suburban District	-336.18	-405.21	-331.65	-235.42
	(655.25)	(744.03)	(778.00)	(801.94)
Town District	1512.42*	1591.39*	1523.75*	915.37
	(589.63)	(669.52)	(700.59)	(722.15)
Enrollment	-0.45**	-0.37**	-0.26**	-0.16*
	(0.05)	(0.06)	(0.06)	(0.06)
Proportion White Students	1001.11+	1324.64*	1611.72*	1512.50*
	(559.35)	(635.13)	(664.17)	(684.60)
Proportion FRPL	4762.95**	5123.94**	5140.89**	3665.97**
	(881.10)	(1000.48)	(1046.13)	(1078.32)
Constant	7499.49**	4307.28**	1780.79	1198.77
	(1007.10)	(1143.54)	(1195.72)	(1232.52)
Observations	236	236	235	235
Adjusted R^2	0.647	0.563	0.462	0.269

Note: Table 1 presents estimated coefficients from linear regression models and regular standard errors in parentheses. ** refers to p-value < 0.01; * refers to p-value < 0.05; + refers to p-value < 0.10.

Table 2 - Relationship Between Teachers' Salaries by Experience and School Year (Bachelor's Degree)

	Panel A: Beginning Teacher		*Panel B: 5 Years of Experience*		*Panel C: 10 Years of Experience*		*Panel D: 15 Years of Experience*	
	2022-23	**2023-24**	**2022-23**	**2023-24**	**2022-23**	**2023-24**	**2022-23**	**2023-24**
Rural District	-2078.50**	-258.02**	-2689.83**	-351.53	-3331.42**	-668.16	-3726.08**	-1243.45+
	(589.36)	(87.52)	(628.71)	(236.69)	(732.76)	(442.96)	(885.91)	(637.97)
Suburban District	12.96	-365.56**	-306.42	-586.24*	-685.58	-601.77	-1048.29	-576.51
	(632.96)	(92.43)	(675.22)	(249.96)	(786.97)	(467.77)	(951.45)	(673.71)
Town District	-1580.91**	-293.88**	-2176.49**	-520.49*	-2811.97**	-810.03+	-3244.31**	-1400.32*
	(561.74)	(83.17)	(599.24)	(224.92)	(698.42)	(421.23)	(844.39)	(606.67)
Enrollment	0.51**	0.04**	0.57**	0.19**	0.62**	0.39**	0.71**	0.60**
	(0.05)	(0.01)	(0.05)	(0.02)	(0.06)	(0.04)	(0.08)	(0.05)
Proportion White	-930.43+	18.34	-1114.90+	144.76	-1380.03*	121.84	-1748.13*	-370.65
	(550.31)	(77.78)	(587.05)	(210.34)	(684.21)	(393.66)	(827.21)	(566.97)
Proportion FRPL	-4867.72**	-49.56	-5242.56**	-191.11	-5508.35**	-653.16	-5695.70**	-2528.76**
	(871.97)	(124.14)	(930.18)	(335.72)	(1084.13)	(628.26)	(1310.72)	(904.85)
Constant	42482.88**	50237.31**	45933.63**	50260.04**	49416.65**	50886.05**	52695.45**	53222.95**
	(993.41)	(141.62)	(1059.73)	(383.01)	(1235.12)	(716.75)	(1493.27)	(1032.30)
Observations	240	238	240	238	240	237	240	237
Adjusted R^2	0.672	0.350	0.697	0.501	0.681	0.542	0.645	0.625

Note: Table 2 presents estimated coefficients from linear regression models and regular standard errors in parentheses. ** refers to p-value < 0.01; * refers to p-value < 0.05; + refers to p-value < 0.10.

Table 3 - Effects of Salary Raises on Teacher Retention

Panel A: Effect of LEARNS Raise (any amount over $2,000)

	Stayer	Mover	Switcher	Exiter	Retiree
Effect of Any Raise	0.019**	-0.006	-0.002	-0.009*	-0.007**
	(0.005)	(0.004)	(0.001)	(0.004)	(0.003)
Observations	371,876	331,439	322,140	329,458	323,640

Panel B: Effect of LEARNS Raise (per $1,000)

	Stayer	Mover	Switcher	Exiter	Retiree
Effect per $1,000	0.004**	-0.002*	-0.000	-0.002*	-0.001**
	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)
Observations	371,876	331,439	322,140	329,458	323,640

Panel C: Effect of LEARNS Raise (Binned)

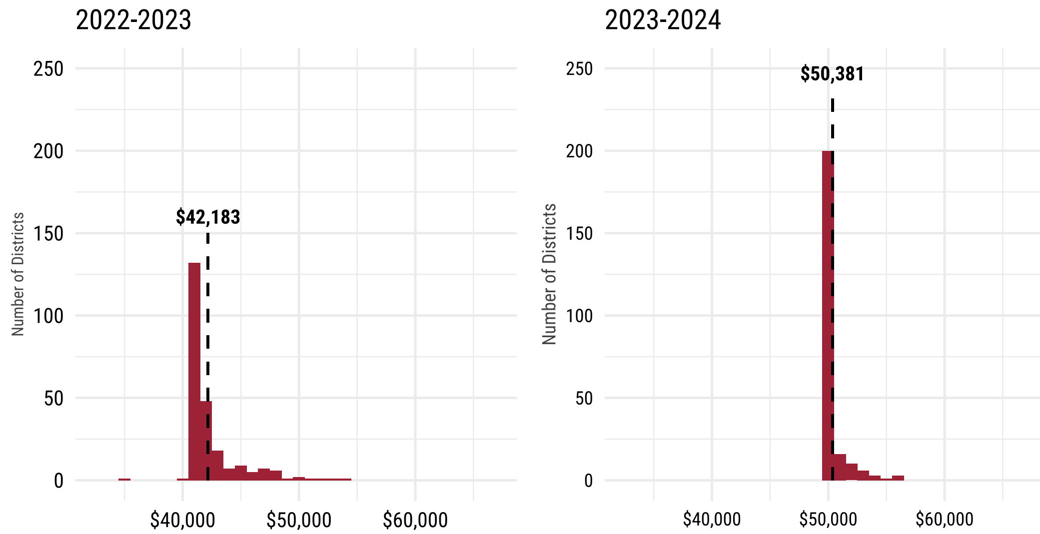
	Stayer	Mover	Switcher	Exiter	Retiree
Raise: $2,001-4,000	0.002	0.004	-0.000	-0.003	-0.003
	(0.006)	(0.004)	(0.002)	(0.004)	(0.003)
Raise: $4,001-6,000	0.014*	-0.002	-0.002	-0.005	-0.008*
	(0.006)	(0.005)	(0.002)	(0.005)	(0.003)
Raise: $6,001-8,000	0.022**	-0.009+	-0.002	-0.009+	-0.009*
	(0.007)	(0.005)	(0.002)	(0.005)	(0.004)
Raise: > $8,000	0.031**	-0.014+	-0.002	-0.015*	-0.009*
	(0.008)	(0.007)	(0.002)	(0.007)	(0.004)
Observations	372,033	331,555	322,225	329,577	323,736

Notes: Estimated using the two-stage estimator (Gardner et al., 2024). Standard errors clustered at the district-by-step-by-lane level. Each column of each panel represents results from a separate regression. ** refers to p-value < 0.01; * refers to p-value < 0.05; + refers to p-value < 0.10.

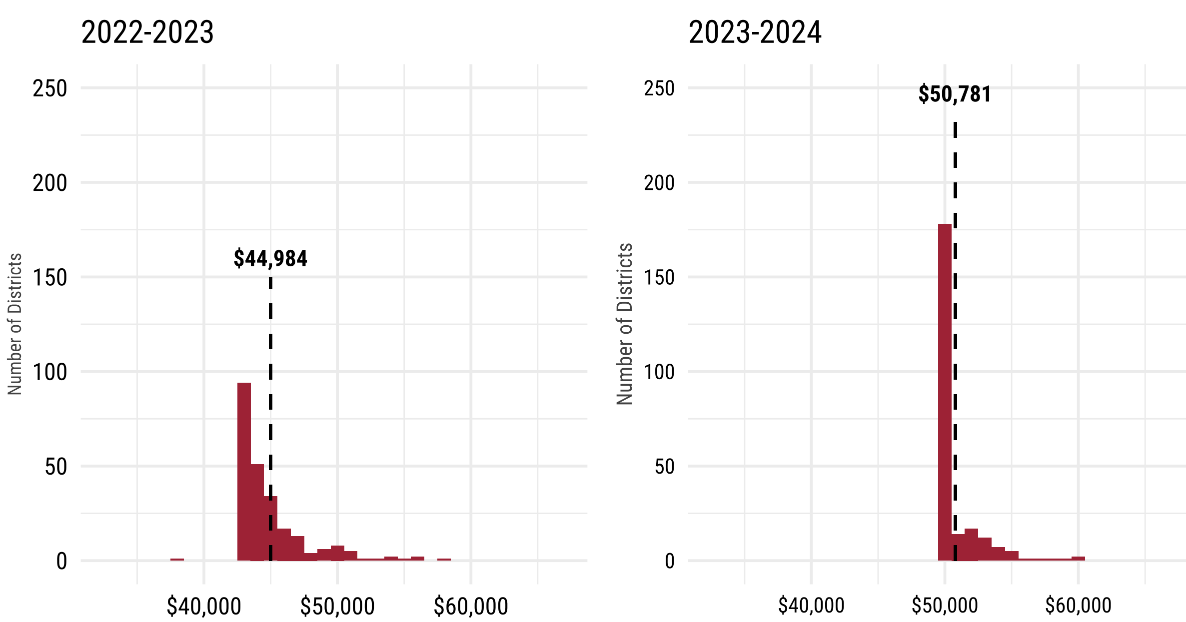
Appendix A: Teacher Salary Schedules for those holding a Master's degree

Figure A.1 -Distribution of Teacher Salaries

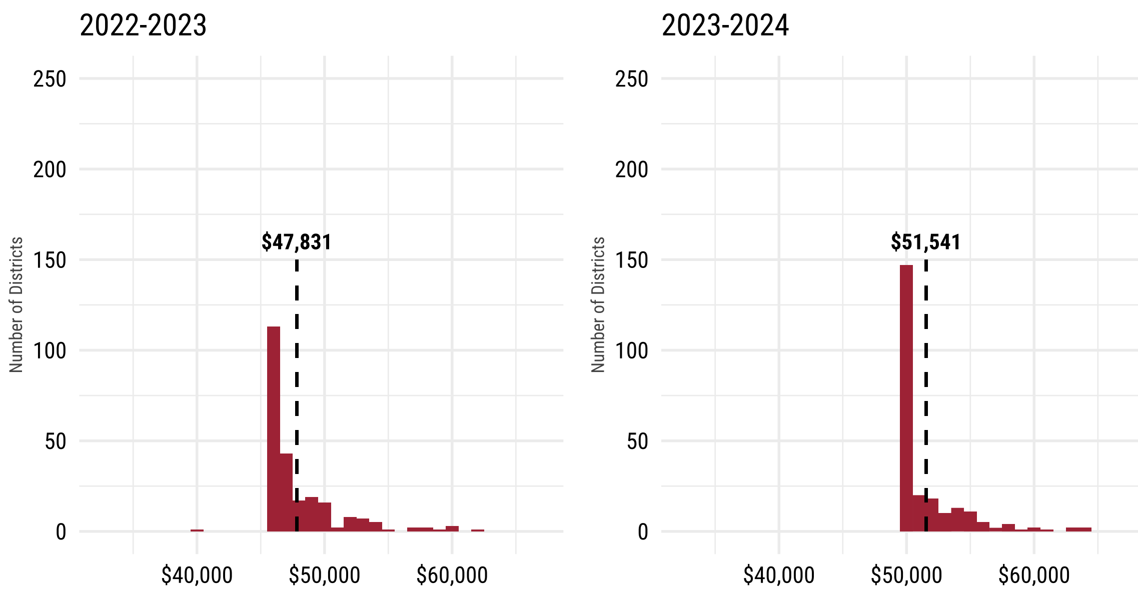
Entry-Level Teacher Salaries



5 Years of Experience



10 Years of Experience



15 Years of Experience

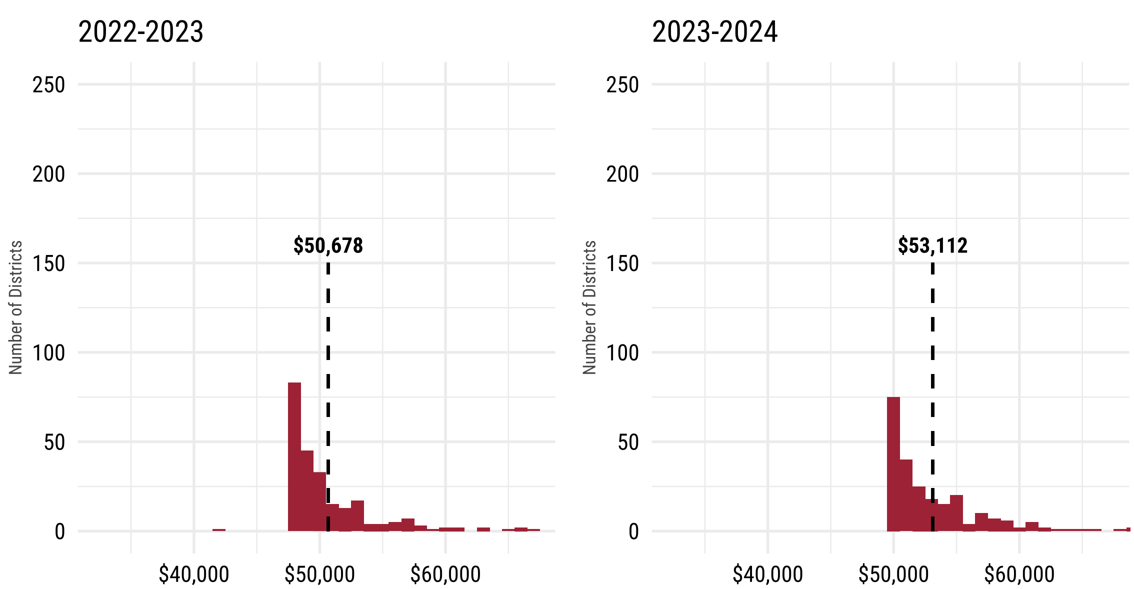
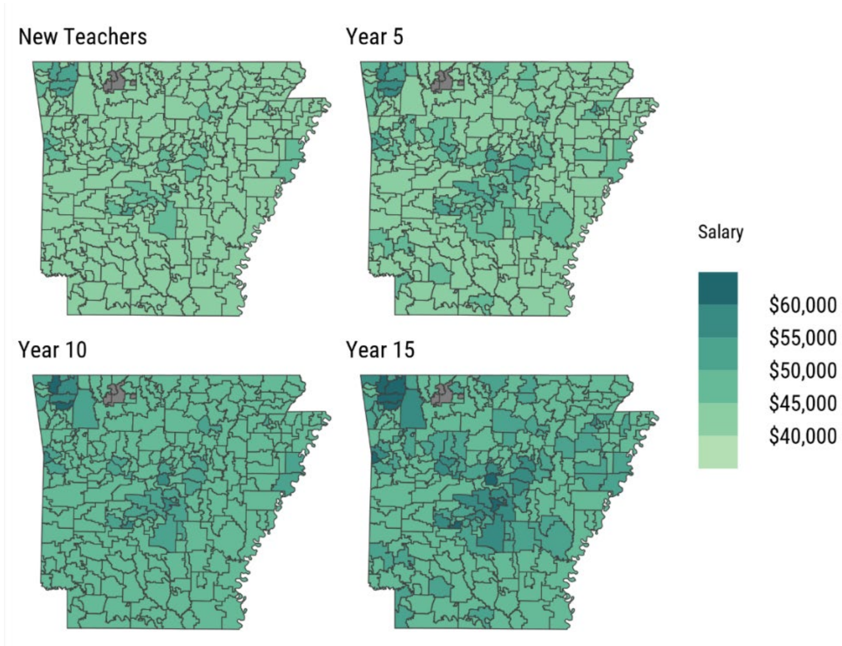
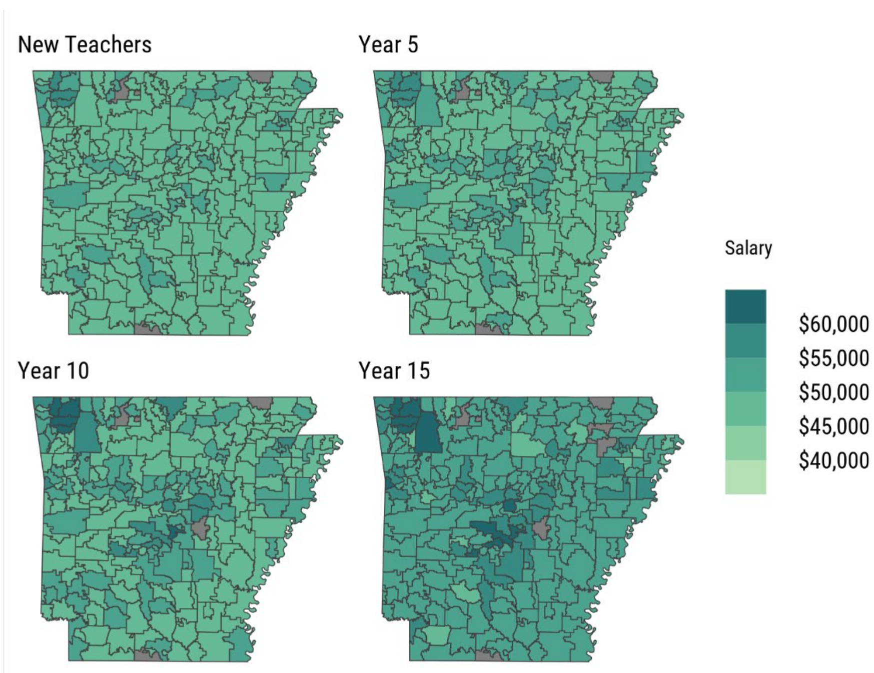


Figure A.2 - Teacher Salaries for MA, by Years of Experience & District

2022-2023 School Year



2023-2024 School Year



Appendix B: Estimates Using a Naïve Difference-in-Differences Approach

Table B.1: Estimated Effects of LEARNS Salary Raises (Naïve DiD Specification)

Panel A: Effect of LEARNS Raise (any amount over $2,000)

	Stayer	Mover	Switcher	Exiter	Retiree
Effect of Any Raise	0.008*	-0.000	-0.001	-0.006**	-0.002
	(0.003)	(0.002)	(0.001)	(0.002)	(0.002)
Observations	371,897	331,457	322,159	329,478	323,658

Panel B: Effect of LEARNS Raise (per $1,000)

	Stayer	Mover	Switcher	Exiter	Retiree
Effect per $1,000	0.002**	-0.001*	-0.000	-0.001**	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	371,897	331,457	322,159	329,478	323,658

Panel C: Effect of LEARNS Raise (Binned)

	Stayer	Mover	Switcher	Exiter	Retiree
Raise: $2,000-3,999	-0.005	0.008*	0.000	-0.001	0.000
	(0.005)	(0.004)	(0.002)	(0.003)	(0.003)
Raise: $4,000-5,999	0.002	0.004	-0.002	-0.001	-0.004
	(0.005)	(0.004)	(0.002)	(0.004)	(0.003)
Raise: $6,000-7,999	0.007	-0.000	-0.001	-0.004	-0.003
	(0.005)	(0.004)	(0.002)	(0.004)	(0.003)
Raise: ≥ $8,000	0.018**	-0.007*	-0.002	-0.013**	-0.002
	(0.005)	(0.004)	(0.001)	(0.003)	(0.002)
Observations	382,157	340,167	329,838	337,854	331,706

Notes: Estimated using the two-stage estimator (Gardner et al., 2024). Standard errors clustered at the district-by-step-by-lane level. Each column of each panel represents results from a separate regression. ** refers to p-value < 0.01; * refers to p-value < 0.05; + refers to p-value < 0.10.

Appendix C: AR LEARNS Salary Changes Effects- Three-Way Fixed Effects Estimates

Table C.1: Estimated Effects of LEARNS Salary Raises (TWFE Estimator)

Panel A: Effect of LEARNS Raise (any amount over $2,000)

	Stayer	Mover	Switcher	Exiter	Retiree
Effect of Any Raise	0.011**	-0.005+	-0.004+	-0.004	0.001
	(0.004)	(0.003)	(0.002)	(0.003)	(0.002)
Observations	372,507	330,158	324,322	332,176	322,860

Panel B: Effect of LEARNS Raise (per $1,000)

	Stayer	Mover	Switcher	Exiter	Retiree
Effect per $1,000	0.004***	-0.002***	-0.001+	-0.003***	-0.000
	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
Observations	372,507	330,158	324,322	332,176	322,860

Panel C: Effect of LEARNS Raise (Binned)

	Stayer	Mover	Switcher	Exiter	Retiree
Raise: $2,000-3,999	-0.001	-0.002	-0.002	0.004	0.002
	(0.006)	(0.004)	(0.003)	(0.004)	(0.002)
Raise: $4,000-5,999	0.007	-0.002	-0.005	-0.001	0.000
	(0.006)	(0.004)	(0.003)	(0.004)	(0.002)
Raise: $6,000-7,999	0.021***	-0.008+	-0.007*	-0.011*	-0.000
	(0.006)	(0.005)	(0.003)	(0.004)	(0.002)
Raise: ≥ $8,000	0.027***	-0.014**	-0.004	-0.016***	0.000
	(0.006)	(0.005)	(0.003)	(0.004)	(0.002)
Observations	372,940	330,496	324,652	332,509	323,159

Notes: Estimated using a three-way fixed effects estimator. Standard errors clustered at the district-by-step-by-lane level. Each column of each panel represents results from a separate regression. ** refers to p-value < 0.01; * refers to p-value < 0.05; + refers to p-value < 0.10.

Appendix D: AR LEARNS Salary Changes Effects- Moves Within District Separated

Table D.1: Estimated Effects of LEARNS Salary Raises

Panel A: Effect of LEARNS Raise (any amount over $2,000)

	Stayer	Mover (Same District)	Mover (New District)	Switcher	Exiter	Retiree
Effect of Any Raise	0.014+	-0.006	-0.002	-0.008+	0.005	-0.007*
	(0.007)	(0.005)	(0.001)	(0.005)	(0.005)	(0.003)
Observations	371,876	313,428	304,128	311,448	311,588	305,638

Panel B: Effect of LEARNS Raise (per $1,000)

	Stayer	Mover (Same District)	Mover (New District)	Switcher	Exiter	Retiree
Effect per $1,000	0.003*	-0.002+	-0.000	-0.002	0.001	-0.001+
	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)
Observations	371,876	313,428	304,128	311,448	311,588	305,638

Panel C: Effect of LEARNS Raise (Binned)

	Stayer	Mover (Same District)	Mover (New District)	Switcher	Exiter	Retiree
Raise: $2,000-3,999	0.003	0.004	-0.000	-0.003	-0.001	-0.003
	(0.007)	(0.004)	(0.003)	(0.005)	(0.004)	(0.004)
Raise: $4,000-5,999	0.006	-0.002	-0.002	-0.004	0.008+	-0.007+
	(0.007)	(0.005)	(0.002)	(0.006)	(0.005)	(0.004)
Raise: $6,000-7,999	0.016*	-0.009	-0.002	-0.008	0.006	-0.008+
	(0.008)	(0.006)	(0.002)	(0.006)	(0.005)	(0.005)
Raise: ≥ $8,000	0.024+	-0.014+	-0.002	-0.014	0.005	-0.007
	(0.012)	(0.008)	(0.002)	(0.010)	(0.008)	(0.006)
Observations	372,033	313,535	304,207	311,554	311,673	305,727

Notes: Estimated using the two-stage estimator (Gardner et al., 2024). Standard errors clustered at the district-by-step-by-lane level. Each column of each panel represents results from a separate regression. ** refers to p-value < 0.01; * refers to p-value < 0.05; + refers to p-value < 0.10.

Appendix E: AR LEARNS Salary Changes Effects-Correcting for Cost of Living

Table E.1: Estimated Effects of LEARNS Salary Raises

Panel A: Effect of LEARNS Raise per $1,000 (Original Estimates)

	Stayer	Mover	Switcher	Exiter	Retiree
Effect per $1,000	0.004**	-0.002*	-0.000	-0.002*	-0.001**
	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)
Observations	371,876	331,439	322,140	329,458	323,640

Panel B: Effect of LEARNS Raise per $1,000 (CWIFT Adjusted)

	Stayer	Mover	Switcher	Exiter	Retiree
Effect per $1,000	0.003**	-0.001+	-0.000	-0.002*	-0.001**
	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)
Observations	369,517	329,472	320,479	327,536	321,854

Notes: Estimated using two-stage estimator (Gardner et al., 2024). Standard errors clustered at the district-by-step-by-lane level. Each column of each panel represents results from a separate regression. ** refers to p-value < 0.01; * refers to p-value < 0.05; + refers to p-value < 0.10.