

## ABSTRACT

### THE EFFECT OF UNIVERSITY FACULTY UNIONS ON INSTITUTIONAL OUTCOMES

by Teresa Emily Maloney

Faculty unions are becoming an increasingly prevalent method for university employees to advocate for better working conditions and have a voice in institution-level decision making. There is much controversy regarding the effectiveness of unions, specifically if they have positive effects on both faculty and students. Many benefits are often touted by supporters during the process to garner support for and form a union, but it remains unclear if members see these come to fruition. Similarly, many opponents highlight the potential negative effects of unions, but we have little evidence to validate either perspective. In this paper, I study the impact of the formation of a faculty union on a variety of institutional outcomes including salaries, expenditures, faculty makeup, and others using an event study specification.

THE EFFECT OF UNIVERSITY FACULTY UNIONS ON INSTITUTIONAL  
OUTCOMES

A Thesis

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# 1 Introduction

Unionization among faculty in higher education institutions in the United States has a long history that stretches back to the 1940s (Herbert and Apkarian, 2018). Faculty often have a strong desire to campaign for better working conditions in an industry that is extremely slow to change policies. In the 2021 school year, the average salary increase for full time university faculty was found to be just 2% (AAUP). When compared to the annual inflation rate of 7%, it becomes clear why faculty see a need to advocate for better compensation, increased job security, a voice on campus, and countless other factors.

The formation of a union is a choice by university faculty, but the realized benefits remain unclear. Additionally, while faculty utilize unions to champion their desires, one can only wonder if unions take away from the focus of higher education institutions on their students. Unions must come to an agreement with their institution on what changes will be made to their working conditions, but this might not always result in a net positive outcome for all university faculty or students. Those faculty that are not a part of a union may be subject to lower compensation, for example, to account for raises to those covered by the union. Countless arguments of this type are made by both proponents and critics of unions in higher education and other industries. Prior to unionization, it is hard to be sure of the actual effects a union may have on an institution.

In this paper, I analyze what impact the formation of a majority tenure track faculty union may have on important faculty and student outcomes using annual, institution-level data and an event study framework. Despite the recent rise in unions, most universities remain without any unions. These institutions create a rich control group. The treatment group includes institutions with a union that formed recently to examine thorough institutional financial and demographic outcomes.

I analyze 4 primary buckets of institutional outcomes: salary spending, faculty makeup, institutional spending, and student outcomes. Ultimately, I find evidence of a salary premium for tenure-track faculty, but negligible effects on the makeup of the number of tenure track and non-tenure track faculty. Additionally, I find that the formation of a union does not have significant negative effects on faculty not covered by the union but does lead to a change in spending on students.

The formation of a union is expected to increase the compensation for its members, but university budgets often do not have the ability to make this change without reducing expenditures elsewhere. The logical answer would be that salaries for non-union members may suffer or spending on students, infrastructure, or other services would decrease. I do not find suggestive evidence for this conclusion. Thus, faculty unions appear to have positive effects for their members, but not at the expense of students or other faculty members.

This analysis requires important caveats given the nature of the data and sample. For example, there may be large differences in the types of schools that do or do not form



faculty unions. Certain states have “right-to-work” laws that prohibit the formation of union units, and some schools may be small enough to not feel the need for a union. Additionally, given the recent rise in unionization, further results from younger unions may offer different conclusions with the addition of COVID-19 effects or other trends in higher education.

## **Related Literature**

Faculty unions are often advertised to prospective members and supporters as providing a salary premium, defined as an increase in earnings as a result of the union’s collective bargaining agreement. There has been extensive research in determining the magnitude of this premium in specific subsamples. Duncan and Leigh (1980) are some of the first to estimate this premium using adjusted OLS methods. Subsequent research by Kesselring (1991) estimates a 2% increase in unionized faculty salaries at P.H.D.-level universities. Ashraf (1999) continues this line of research by investigating a possible salary premium at 2-year “junior” colleges. More recently, Hedrick, et al. (2011) use modern empirical difference in difference strategies to determine that the salary premium is smaller than previously thought.

Faculty unions may also have a broader effect on the school environment and student experience. For instance, if there is a salary premium, many institutions do not have the ability to increase their budgets to accommodate this change, leading to subsequent decreases in other spending categories, such as long-term investments into new technology or buildings. Most recently, Farber et al. (2021) have investigated effects of unions in a variety of sectors in the 20<sup>th</sup> century, but not specifically higher education. They find significant evidence that unions reduce income inequality between those who are part of a union compared to those who are not. The goal of this paper is to determine if there are other effects outside of salary premiums associated with the formation of faculty unions. In addition, to the best of my knowledge, this is the first study to perform an event study analysis of the expansion of modern faculty unions on student and university-wide outcomes to understand how the effects can change over time.

## **2 Policy Background**

Collective bargaining and unionization have a long history in the higher education sector, stretching back as far as the 1940s (Herbert and Apkarian, 2018). The majority of faculty unions form at public state institutions instead of private universities. These unions operate under relevant state-level laws, which openly allow these units to form. On the other hand, private institutions must abide by Federal laws, including the Constitution, which are much stricter regarding unionization. For example, a Supreme Court ruling in 1980 determined that university faculty are managerial employees, thus not covered by the National Labor Relations Act (aaup.org).

In order to form a union, faculty must first work together to identify interest and support from fellow employees. They often form an Organizing Committee to define the

needs for improvement, create a plan, and ensure that the campaign remains on track. This is a lengthy process of recruiting members and garnering support before “going public” with their plan to unionize. Next, a vote will be held to determine if there is majority support for the formation of a collective bargaining agent. A bargaining agent is a union or association certified by a government agency or recognized by an institution of higher education as the exclusive representative of all employees in a bargaining unit for purposes of collective bargaining (National Center). The bargaining agent must determine the composition of its members, or who is in the bargaining unit. Commonly, this can include full-time tenured and tenure track faculty (FT TTT), full-time non-tenured or non-tenure track faculty (FT NTT), department chairs and administrators, or postdoctoral scholars and academic researchers. This composition is determined by the National Labor Relations Board or the relevant State Labor Relations Board. After the unit is recognized, the faculty must work with the institution to author a contract governing their requests. This contract is referred to as the collective bargaining agreement (CBA).

Faculty unions must decide their composition upon formation: either tenure track faculty, non-tenure track faculty, or a split between the two. In order to become tenure-track, a professor must apply to an explicitly tenure-track position (most often, assistant professor) and then work their way up to professor. On the other hand, some faculty choose to remain or are hired as instructors or other non-tenure track positions.

Recently, unionization among higher education faculty has become increasingly active in order to advocate for better working conditions and compensation. There has been increased attention on non-tenure track faculty in particular, as they often face more uncertain employment situations and lower pay (on average) than tenure track counterparts. This attention is also due to the marked increase in NTT faculty: in 1969, 78.3% of faculty were tenured or on the tenure-track, but by 2009, over 66% of faculty were now off of tenure track (USC). Additionally, faculty unions have been campaigning for greater transparency in university decision-making processes, better job security, and protections for academic freedom. Between 2013 and 2019, 118 newly recognized units covering nearly 16,000 faculty members were formed (National Center). There has also been new legislation in progress in some states that threatens the job security of tenured faculty (The Hechinger Report). All of these issues culminate in faculty organizing unions to advocate for themselves at a rapid pace. This study leverages data on this new influx of unions to investigate the effects of the formation of a faculty union on faculty and institutional outcomes in a dynamic difference-in-difference model.

### **3 Data Sources**

My analysis relies on institutional-level, annual data from the U.S. Department of Education’s Integrated Postsecondary Education Data System (IPEDS), gathered via the Urban Institute’s API and the National Center for the Study of Collective Bargaining in Higher Education and the Professions (National Center). IPEDS contains thorough information on the enrollment, faculty makeup, financials, and student outcomes of universities. The focus of this study is 4-year higher education institutions, so I limit my

sample to only include institutions of this type. To ensure the richest data is available, I choose to narrow my sample to years between 2001 and 2017. The IPEDS database includes some institutions with less than 300 FTE (student full-time equivalent enrollments), which may exhibit different characteristics than larger universities and colleges, so I choose to exclude them from my analysis.

The National Center data includes information pertaining to the formation, composition, and size of unions extending back to 1975. I limit my analysis to unions that formed at 4-year higher education institutions, mirroring the IPEDS data. Some institutions have faculty unions for both tenure track and non-tenure track faculty, although they operate as separate entities. I include only faculty unions that are composed of only tenure track faculty or are evenly split between tenure track and non-tenure track faculty, as there is more available data for these types. I calculate the treatment year as the year the first CBA was recognized on a campus, even if that applies to a majority non-tenure track faculty union. To understand the dynamic effects of unionization, I drop institutions that have a current CBA ratified outside of the years 2001 and 2017.

Table 1 displays the summary statistics for all dependent variables analyzed. The counts of faculty at each rank are provided as the number of faculty at the beginning of each school year in the fall. Professors, associate professors, and assistant professors are all part of tenure-track faculty. Instructors, lecturers, and faculty without a rank are considered non-tenure track faculty. Each institution has their own classification of faculty and may not utilize all of these titles. Average salary is calculated as the total expenditure for each rank divided by the count of a given rank for each institution in a given school year. Thus, average salary is only provided for the titles each institution utilizes in a given year. Note that there are additional expenditure domains not included in my analysis, so we should not expect these to sum to exactly to the average total expenditures.

There are clear trends that emerge from Table 1 about the characteristics of both the treatment and control groups. Institutions that never unionized have a smaller number of faculty on average than institutions with unions for both tenure track and non-tenure track positions. Additionally, institutions in the control group have significantly smaller average total expenditures of \$160 million compared to the pre-treatment average of \$517 million for institutions with unions. Despite these differences in magnitude, both groups spend similar shares of their expenditures on each domain. On average, the domains of focus in this paper account for 91.88% of the total expenditures for each institution. Institutions that eventually form a faculty union also have higher initial average tuition and fees and retention rates than those that never have a faculty union.

## **4 Identification Strategy**

To estimate how the treatment affects an institution's outcomes, I estimate event study equations in the following form:

$$Y_{it} = \sum_{k=-17}^{15} \pi_k * 1[t - CBA_i] + \theta_i + \gamma_t + \varepsilon_{it}$$

$k \neq -1$

Where  $Y_{it}$  is an outcome of interest for institution  $i$  in year  $t$ ,  $\theta_i$  is institution fixed-effects,  $\gamma_t$  is year fixed-effects interacted with the FTE for students in 2001 (the starting year of our data set), and  $\varepsilon_{it}$  is the idiosyncratic error term. The  $\pi_k$  coefficients trace out the trend of an outcome variable for years before and after the treatment. The time indicators,  $1[t - CBA_t]$ , are equal to 1 when an observation is  $k = -17, \dots, 17$  years before the current CBA was ratified. Standard errors are clustered at the institution level. I include institution-level fixed-effects in order to capture unobserved differences within each institution. I interact year fixed-effects with the FTE of students in 2001 to allow the fixed effects to vary based on the level of enrollment at an institution at the beginning of the analysis. This ensures that larger and smaller schools are not treated equally, and we can account for differences that are a result of larger enrollment.

In order to ensure the validity of the event study empirical strategy, one must assume that the treatment and control groups would follow parallel trends in the absence of the treatment and that nothing else changes at the time of treatment. In all of my event study figures, I discuss the relationship between treated and untreated institutions prior to treatment by analyzing the coefficients on pre-treatment dummy variables. If all of the coefficients are not significantly different from zero, then the parallel trends assumption is more plausible. Additionally, we must assume that no other outcomes or characteristics are changing as a result of the formation of a union. It is possible that larger and smaller schools experience different effects from a union, which is another reason that institution fixed effects and control for student enrollment levels. I also perform a robustness check by limiting the sample to public institutions to compare the results and ensure that the differences between private and public institutions do not drive my results.

## 5 Effects on Institutional Outcomes

In this section I review the results. The outcomes are broken down into 4 categories. I find evidence that unionized tenure-track faculty enjoy a faculty premium, but institutional spending is only slightly increased in student-facing domains. Overall, my results find that faculty unions do not have many significant effects on faculty and student outcomes. In all event study figures, the bars represent a 95% confidence interval.

### 5.1 Salary Outcomes

The most well-researched and highly advertised benefit of forming a faculty union in higher education is the salary premium. Various methods have estimated a range of salary premiums for a variety of faculty subsets, and even in other industries. Logically, union members are often primarily concerned with their pay and prioritize their bargaining agreement accordingly. To analyze this, I calculate the average salary for each rank of faculty: Professor, Associate Professor, Assistant Professor, and Non-Tenure Track Faculty. Figure 1 shows the baseline event study for the average salary of each rank. Due to

large variations in the reported salaries and a relatively small treatment group, the results often have relatively large standard errors and confidence intervals.

Panel A of Figure 1 displays the results for average Professor salary with moderate evidence of a premium. It is important to note that there is some evidence of salary growth over time from the pre-trends. However, after treatment, there is evidence of growth. After the formation of a tenure-track faculty union, the average salary for professors is seen to grow compared to institutions without any union by an average of \$4,085. This finding is in line with previous research. In Panel B, one can see slight evidence for salary growth for Associate Professors as well. It is important to note that there is some evidence of pre-treatment growth and none of the coefficients are significant at the 95% confidence level. The results for changes to Assistant Professor salaries can be found in Panel C of Figure 2. This analysis provides stronger evidence of a faculty premium, but it appears to decrease over time. Prior to treatment, there is no significant difference in the average assistant professor salary between treated and untreated institutions. After treatment, however the majority of the coefficients show a statistically significant result of salary growth for treated institutions by an average of \$1,913.

An analysis of the change to the average non-tenure track faculty salary in Panel D shows very minimal evidence of a salary premium. After the formation of a union, there is no trend in the average salary until 4-5 years after the formation of a union and there is evidence of parallel pre-trends between the treatment and control group. It is important to note that none of the post-treatment coefficients are statistically different from zero. Based on my analysis, it appears that non-tenure track salaries are definitively not hurt because of the presence of a faculty union.

Taken together, these results highlight how the formation of tenure-track faculty unions lead to slightly higher average salaries for tenure-track faculty and no change in the salaries for non-tenure track faculty. Union opponents may believe that there would be evidence of non-tenure track faculty suffering because of the salary premium for tenure-track, unionized faculty. My analysis provides results that do not indicate this. I concur with prior research that there is growth in tenure-track faculty salary spending following the formation of a union.

## **5.2 Faculty Makeup Outcomes**

An important aspect of universities' succession planning is their decision to hire tenure-track versus non-tenure track faculty. Tenure-track faculty can be hired with even relatively little experience and indicate their intention to remain at the same institution for the majority of their career. On the other hand, non-tenure track faculty can be hired at any level of experience and do not have lengthy contracts with an institution. As discussed in Section 2, there has been a noticeable rise in the share of faculty that are hired into non-tenure track positions nationwide in the last 10 years. For my analysis, I focused on the change in count of faculty at institutions in each category: Tenure-Track and Non-Tenure Track.

In Figure 3, Panel A displays the event study for the dependent variable of log of tenure-track faculty count. There is a slight decline in the post-treatment change in tenure-track faculty counts, however all of the coefficients are indistinguishable from zero, indicating no significant change in the percent change of faculty in a tenure-track position after the formation of a union. My analysis focuses on faculty unions that are either an even split or majority tenure-track faculty, so this leads me to conclude that despite the formation of these unions, there is no distinct change in the faculty that are represented by the CBA. There have been arguments on both sides of this result. Some believe that this number will increase, as tenure-track unions will bargain for a larger number of tenure-track positions to be available. This would provide greater job security and better compensation and benefits for those in the tenure-track positions. On the other hand, some believe that the formation of a tenure-track union could lead to a decrease in the number of tenure-track faculty, as the university seeks to limit the union's requests by reducing the number of covered faculty. My analysis finds a neutral result, signifying that neither side of the disagreement is overwhelmingly accurate and there is no change to the average number of tenure-track faculty. In addition to this analysis, Figure 14 in the appendix displays the change in the counts of each rank of tenure track faculty, where I find similar results.

I also analyze the change in the count of non-tenure track faculty. Panel B displays results that indicate no change in the count of non-tenure track faculty. There is a similar argument as above regarding whether the formation of a tenure-track faculty union would increase or decrease the number of non-tenure track faculty. Those that believe a union would decrease the number of non-tenure track faculty do so because the union may fight to hire more tenure-track faculty. Given that universities have limited budgets and faculty needs, the formation of a union would lead to less non-tenure track positions. Conversely, one could argue that despite the formation of a tenure-track union, a university would like to minimize the number of covered faculty that are able to bargain for better pay or job security. Since non-tenure track contracts are shorter in length, institutions are able to increase the number of these faculty they hire. My analysis, however, finds no suggestive evidence of an increase to the number of tenured and non-tenure track faculty.

### **5.3 Institutional Spending Outcomes**

In order to understand how average salaries and faculty makeup changes interact, I analyzed total spending on salaries (average salary multiplied by the count of the rank) for each rank of faculty. This captures the total average effect of a faculty union on institutional-level salary spending.

In Figure 2, Panel A displays the results for total Professor salary expenditures with moderate evidence of a premium. After the formation of a tenure-track faculty union, the total salary spending for professors is seen to grow compared to institutions without any union by an average of 5.41%. This finding is in line with previous research estimates. The slight increase in the average salary of Professors at unionized schools is at similar magnitudes to the increases to total Professor salary spending. Thus, I conclude that the

average number of Professors remains unchanged. This is supported by Appendix Figure 14 which shows the count of Professors has no significant increase or decrease.

In Panel B, one can find no discernable pattern for Associate Professor salary spending. It is important to note that there is some evidence of pre-treatment decline and none of the coefficients are significant at the 95% confidence level. Recalling the results discussed in Section 5.1, there is only a slight increase in average Associate Professor salary, although none of the coefficients are different from zero. This signals that this rank of faculty experiences no significant change in their count or average salary.

The results for changes to Assistant Professor salary spending can be found in Panel C of Figure 2. Interestingly, this analysis provides very slight evidence of a decline in total spending. Prior to treatment, there is no significant difference in the average assistant professor salary between treated and untreated institutions. After treatment, however, the majority of the coefficients show a statistically insignificant result of salary expenditure shrinkage for treated institutions by an average of 4.51%. This unique result can best be explained by the fact that we found no significant change to their average salary, but Figure 14 in the appendix highlights how the count of Assistant Professors significantly declines after the formation of a union. This may be a result of the fact that Assistant Professors have more freedom to leave an institution. Ultimately, our results do not allow us to determine if this result is driven by faculty choosing to leave or institutions making the decision.

An analysis of the change to the total non-tenure track faculty salary spending in Panel D shows no evidence of a salary premium. After the formation of a union, there is no trend in the total salary expenditures and there is evidence of parallel pre-trends between the treatment and control group. Based on my analysis, it appears that non-tenure track salaries are definitively neither hurt nor increased because of the presence of a faculty union.

Universities have extremely large budgets, with an average expenditure of \$160 million for institutions that never have unions and \$750 million for institutions after they unionize. Faculty salaries constitute a large portion of institution spending, but they also must devote funds to a wide variety of other areas to benefit students. Financials for universities are often reported with many different labels based on how each institution classifies an expenditure. For this reason, I chose to focus on the percent change in spending in various domains. The IPEDS database organizes the wide array of expenditures into pre-determined buckets. In my analysis, I focus on 6 main domains of expenditures: Instruction, Academic Support, Student Services, Institutional Support, Research and Public Service, and Auxiliary. Figure 4 displays the regression results for the event study of these dependent variables.

Instruction spending is defined as the expenses of each college, school, department, or any other instructional division of each institution as well as the expenses related to departmental research (IPEDS). Generally, this domain is dominated by instructor salaries, but also includes costs for the operation and maintenance of instructional buildings. Even

though all institutional spending is intended to benefit students, this domain can be interpreted as spending that most directly benefits faculty. In Panel A, the event study of instruction spending displays results that show no significant change in spending on instruction. This aligns with my earlier discussion in this section, as there is only a very slight increase in the tenure-track salary expenditures and no change to non-tenure track salary spending.

Panel B displays the results for the change in spending on Academic Support. IPEDS defines academic support expenditures to include libraries, museums, galleries, academic administration, course and curriculum development, information technology (IT) related to academic instruction, etc. Essentially, these expenditures fund activities and services that support institutions' "primary missions of instruction, research, and public service" (IPEDS). The regression results show no significant change in this domain of expenditures. It is important to note that there does not seem to be parallel trends before treatment between the treatment and control groups. Thus, there are already significant differences between the two groups regarding their share of academic support spending prior to treatment.

Further, I analyze changes to the spending on Student Services. This domain encapsulates expenses with a primary goal of contributing to students' emotional and physical well-being and their development outside of explicit formal instruction. Specifically, this can include student activities, cultural events, newspapers, intramural athletics, student health services, and others. This domain of spending most clearly singularly benefits students. For this reason, I use this variable as a way to understand how the formation of a faculty union affects the funds allocated specifically for students. Panel C of Figure 4 displays results of a insignificant slight decrease in this domain of spending after the formation of a faculty union. Prior to treatment, there is no significant difference between treatment and control institutions, as seen by the pre-treatment coefficients that are not significant. After the formation of a union, there is no change in spending on these activities and goods. Thus, there is no distinct change in the amount of funds allocated to students after the formation of a union.

My analysis of changes in spending on Institutional Support can be seen in Panel D. These expenses are labeled as financing the day-to-day operational support of institutions through general administrative services, legal, purchasing, public relations, and others (IPEDS). There are no significant changes after the formation of a union, as all of the coefficients are not statistically different from 0. These expenditures often exist in the background of primary university functions, so this result is not surprising. These employees are not related to instruction and teaching faculty, so one would not expect the spending on their salaries or activities to change based on faculty unionization.

Continuing my analysis of institutional spending changes, Panel E of Figure 4 displays the event study for the spending on Research and Public Service. IPEDS defines this domain to include spending on activities organized to produce research outcomes (must be external to the institution or a separate organizational unit within the institution), conferences, institutes, community services, or other expenses that provide



noninstructional services to individuals outside of the institution. There is no evidence of a change in the spending on this domain. The panel shows evidence for parallel pre-trends between institutions with and without faculty unions, but after the formation of a union, all of the coefficients are extremely close to zero.

Finally, I analyze changes to spending on Auxiliary matters in Panel F. This domain includes expenses for residence halls, food services, college stores, and faculty and staff parking. More specifically, an institution charges fees for these services or goods that are related to (or possibly equal to) the cost of the service. There is moderate evidence of an increase in the share of spending in this domain, which also appears to grow over time. The average treatment effect is estimated to be an 8.45% increase in this domain of spending. As the other domains all show evidence of no change in spending after the formation of a union, this domain highlights where institutions are altering their expenditures. This analysis provides evidence that the formation of a faculty union is associated with an increase in the share of spending an institution devotes to student living accommodations. Although faculty may also benefit from this effect, I expect faculty parking to be a very small part of this domain's expenses. Thus, the formation of a faculty union may actually benefit student experience, as more funds are allocated toward student-facing domains.

#### **5.4 Student Outcomes**

The final bucket of outcomes I analyze are changes to student outcomes, specifically average tuition and fees, retention rate, and graduation rate. The literature of research on the effects of the formation of faculty unions in higher education rarely investigates whether students receive any differences to their outcomes. The ultimate goal of higher education institutions is to provide students with quality education and enriching experiences that allow them to develop into well-rounded, active citizens. Thus, institutions where faculty decide to unionize should balance students and their experiences with the wishes of the union. In this section, I analyze the effects of unionization on student's experiences and outcomes in an event study specification.

Figure 5 displays the results for the dependent variable of log of average tuition and fees for in-state students. Private institutions often only have one "price" independent of where the student is from. On the other hand, public institutions often offer students from other states (out-of-state students) a more expensive tuition and fees to incentivize in-state students to remain in the area for their education. In order to ensure that these results are comparable, I chose to exclusively focus on the average tuition and fees for in-state students. The event study for both variables shows an interesting treatment effect where the average tuition and fees initially decrease after the formation of a union, but then tuition grows 4 years after the union is formed. This may be due to the fact that institutions often are limited in the changes they can make to tuition and fees. Institutions with unions appear to lower their tuition and fees more than institutions without a union. Interestingly, the fees at unionized schools appear to remain lower, which disputes the fear that some may have about schools using fees as a way to increase their revenue in a more discrete way. Thus, the effects on students may be positive or negative depending on when they attend the school relative to when a faculty union is formed.

Another way to understand how student experience is affected by the presence of a faculty union is through retention rates. IPEDS defines the retention rate to be the percentage of first-year students who returned to the same institution the next fall semester. Oftentimes, higher education institutions advertise a very positive experience to potential students, but they might not actually enjoy a positive experience once they arrive on campus. The retention rate is a great indicator of how much support there is for students and their ability to persist in classwork. Figure 6 shows the results for the event study of the retention rate. The figure shows very slight evidence of an increase after the formation of a union, though it is important to note that none of the coefficients are statistically distinguishable from zero. This analysis provides evidence that students do not have a negative effect from a faculty union.

Finally, I analyze changes to the 6-year graduation rate after the formation of a faculty union. This is another high-quality indicator of how students are able to perform overall at an institution. Figure 7 shows my analysis of changes to the graduation rate. There is no discernable pattern after treatment, indicating that the formation of a faculty union has no effect on student graduation rate. Taken together with other student outcomes, my analysis provides definitive evidence that students are not hurt as a result of faculty unionization. They may even enjoy decreased tuition and fees if they attend an institution shortly following the formation of a faculty union.

## **5.5 Robustness**

As discussed in Section 3, the only restrictions on institutions in the sample were for them to be 4-year institutions and to enroll at least 300 full-time equivalent students. Thus, both public and private institutions are included in my analyses above. There is a wide-held belief that public and private institutions may react differently after the formation of a faculty union because of where they receive funding from. Private institutions receive their funding from tuition payments and private donations. On the other hand, public institutions receive the majority of their funding from state and federal governments. Thus, public institutions do not have as much freedom with their financial decisions as private institutions. To explore this difference, I ran the baseline specification for each outcome with only public institutions. If any coefficients are drastically changed, one would say the original result was biased from the inclusion of private institutions. Appendix Figures 8 through 13 display these event study results. Ultimately, none of them display different trends than the baseline results and the large majority of the coefficients remain statistically insignificant. Therefore, I conclude that the original analysis was not biased with the inclusion of private institutions.

## **6 Conclusion**

Faculty unions at universities are an increasingly popular way for professors to have a voice on campus and fight for better working conditions. In this paper, I first review the previous literature and its contributions in analyzing the effect of the formation of unions

in higher education on faculty outcomes. Utilizing a dynamic event study specification, I show that the formation of a majority tenure-track faculty union creates a salary premium for tenure-track faculty, but also alters institutional spending on auxiliary items. I also show that there are negligible effects on university hiring decisions with regards to how many tenure-track and non-tenure track positions are offered. Finally, I discuss how the formation of a faculty union has negligible effects on student retention and graduation rates.

This analysis does have some limitations that may affect the results. In particular, the comparison group is institutions that have never formed a faculty union. Based on underlying characteristics as seen in the summary statistics, there may be large differences in the types of schools that do or do not form faculty unions. Just as an example smaller, liberal arts schools vary drastically from large, public state schools in a wide variety of areas such as administrative structure, attitude towards education, budget allowances, etc. It is important to note that the characteristics of schools that choose to form faculty unions may differ from those that do not. Certain states have “right-to-work” laws that prohibit the formation of union units, and some schools may be small enough to not feel the need for a union. Additionally, given the recent rise in unionization, further results from younger unions may offer different conclusions with the addition of COVID-19 effects or other trends in higher education. Further, there may also be heterogeneous effects of faculty unions across different areas of an institution, including different schools, departments, and potential other areas of difference. Future work may address these areas of further variation to provide a deeper understanding of faculty unions among higher education institutions.

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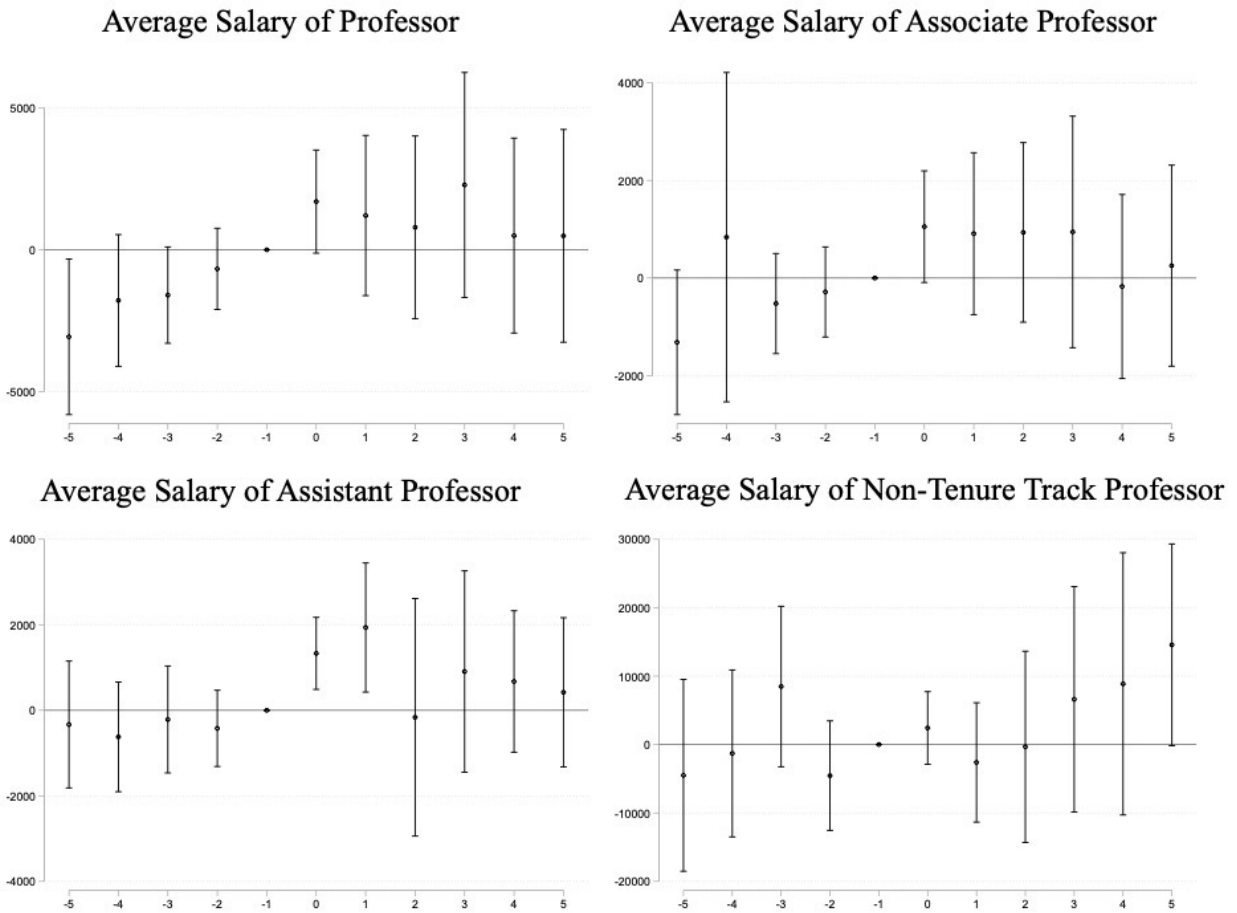
## Figures and Tables

**Table 1: Summary Statistics**

	<i>Institutions With Union</i>		<i>Institutions Without Union</i>
	Before Treatment (1)	After Treatment (2)	Control Group (3)
Average Count of Tenured/ Tenure-Track Faculty	442.44	614.06	201.93
Average Count of Non-Tenure Track Faculty	86.46	172.56	40.19
Average Professor Salary	102,973.00	111,962.10	79,250.92
Average Associate Professor Salary	75,925.31	82,363.57	63,648.11
Average Assistant Professor Salary	63,980.56	71,083.24	54,703.18
Average NTT Faculty Salary	51,042.52	53,909.18	44,561.44
Average Total Expenditures (Millions)	517.3072	749.3102	160.1289
Average Instruction Expenditures (Millions)	178.9429	255.6006	49.6006
Average Academic Support Expenditures (Millions)	41.5697	61.1330	15.6425
Average Student Services Expenditures (Millions)	26.6986	37.9592	11.8665
Average Institutional Support Expenditures (Millions)	48.8109	71.7450	19.0420
Average Research and Public Service Expenditures (Millions)	85.9854	133.6300	25.2075
Average Auxiliary Expenditures (Millions)	47.4291	92.7887	16.5418
Average Tuition and Fees	19,386.08	13,220.22	15,480.41
Average Retention Rate	0.7900	0.7894	0.6900
Average Graduation Rate	0.5904	0.5488	0.4888
Number of Institutions	63	50	2,665
Number of Observations	709	330	29,793

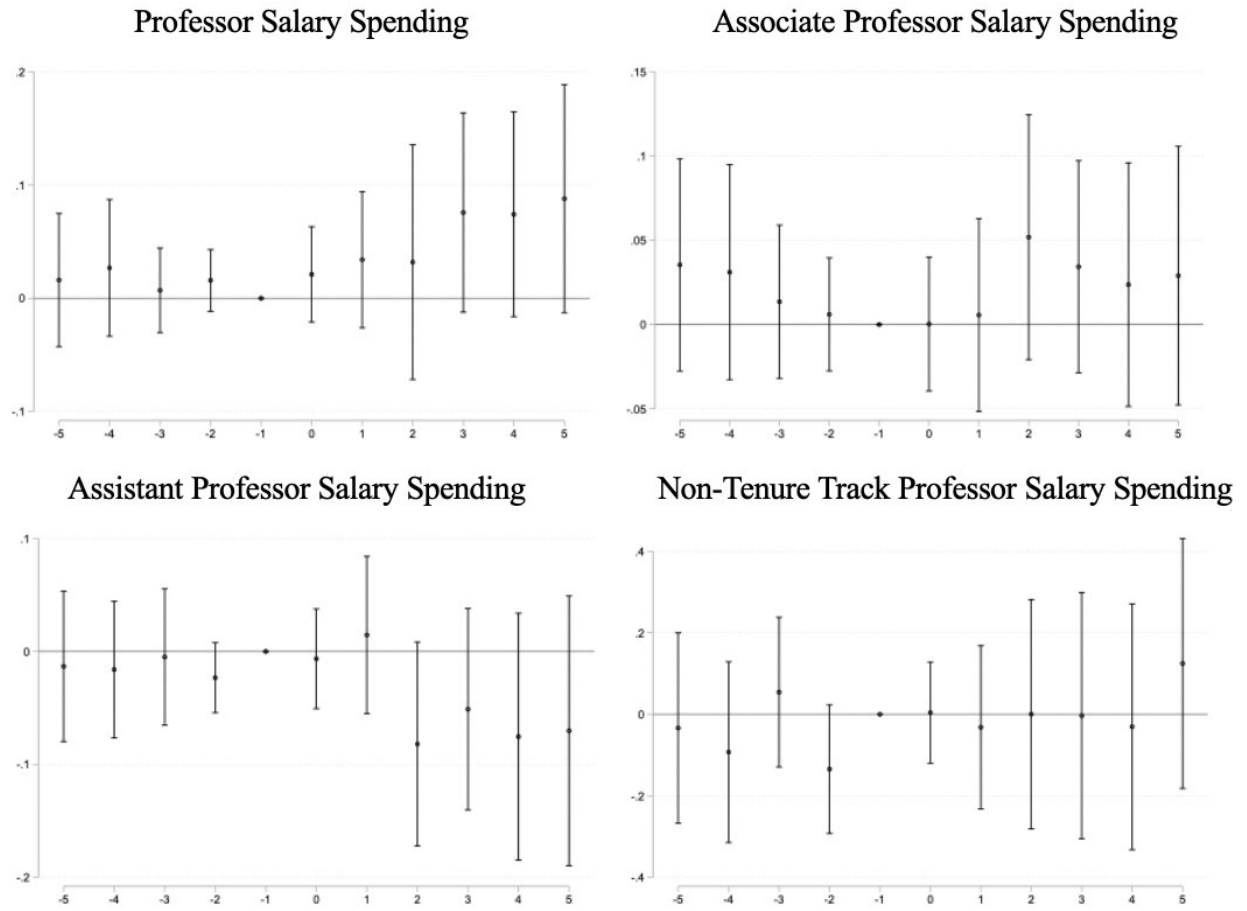
*Note: Summary statistics for both the treatment and control groups, before and after the treatment are included in this table for all dependent variables.*

**Figure 1: Event Study of Average Salary, By Rank**



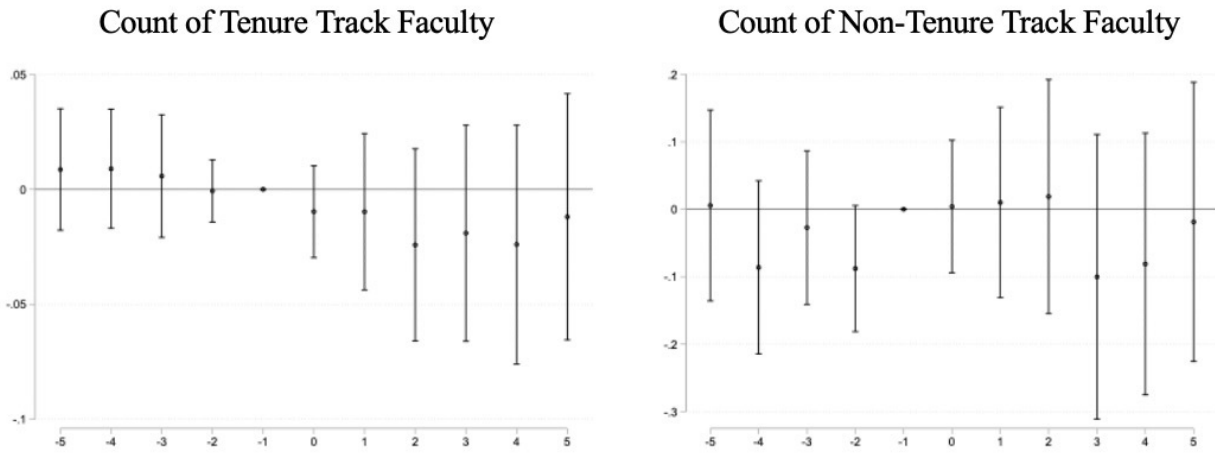
*Note: This figure shows the dynamic change in the average salary of tenure track (professor, associate professor, and assistant professor) and non-tenure track faculty.*

**Figure 2: Event Study of Log Salary Spending, By Rank**



*Note: This figure shows the dynamic change in the total salary spending on tenure track faculty (professor, associate professor, and assistant professor) and non-tenure track faculty.*

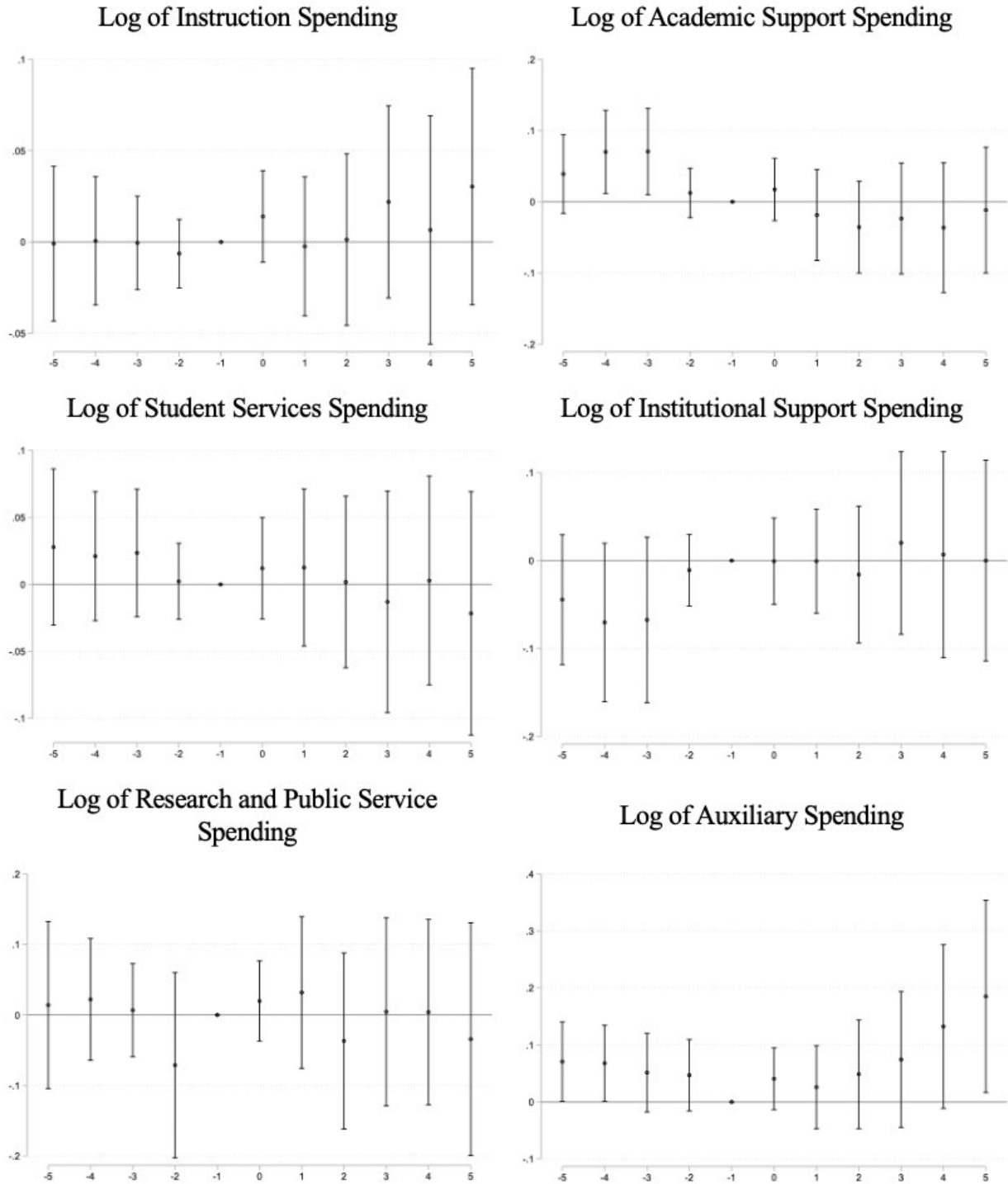
**Figure 3: Event Study of Log Count Faculty, By Rank**



*Note: This figure shows the dynamic change in the average count of tenure track and non-tenure track faculty.*

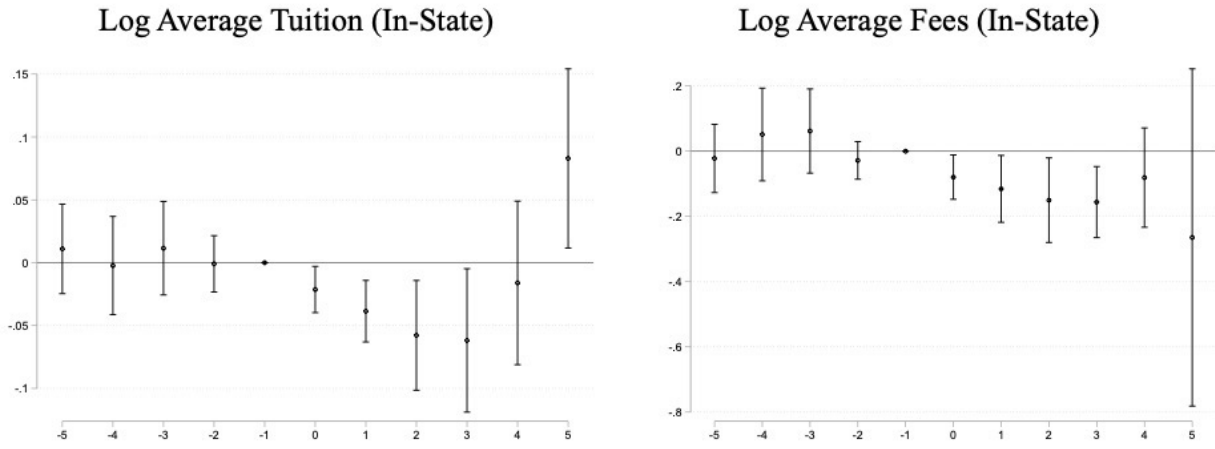


**Figure 4: Event Study of Log Institutional Spending, By Domain**



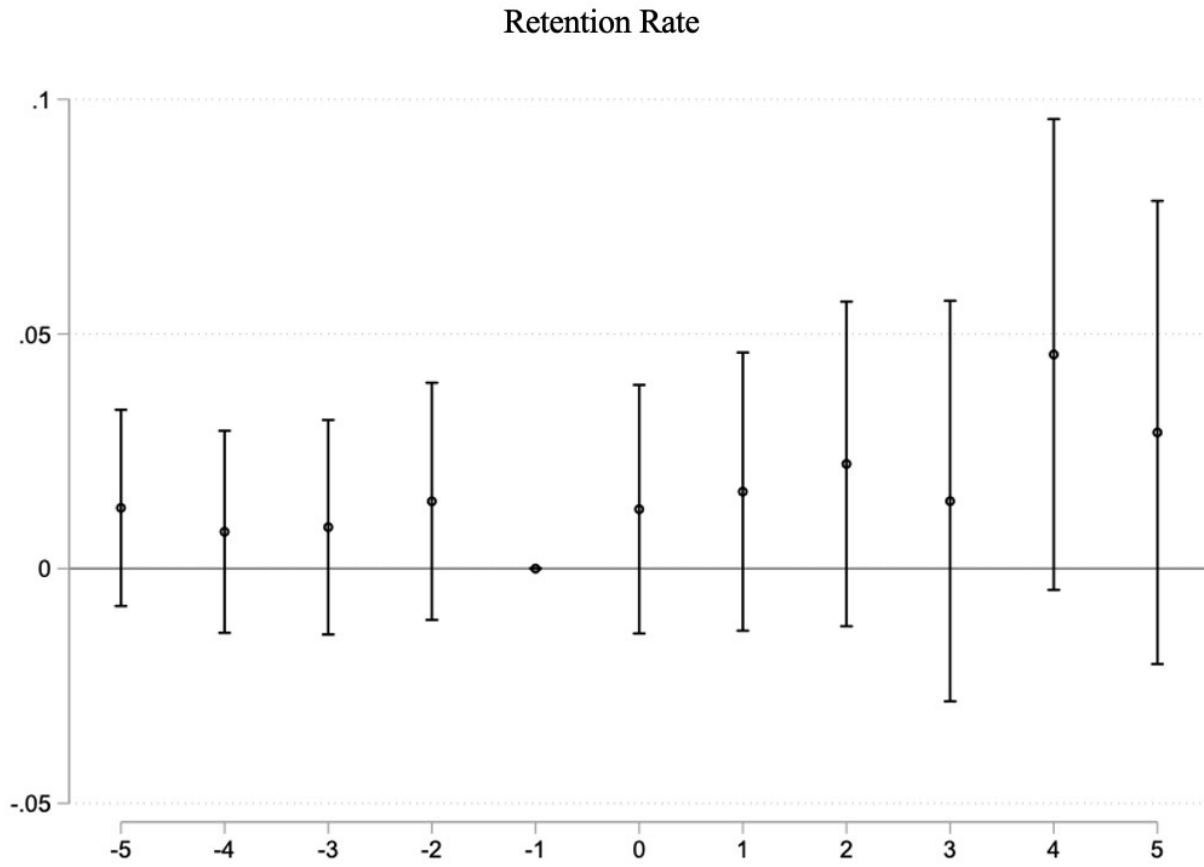
*Note: This figure shows the dynamic change in the average spending on instruction, academic support, student services, institutional support, research and public service, and auxiliary items.*

**Figure 5: Event Study of Log Tuition and Fees**



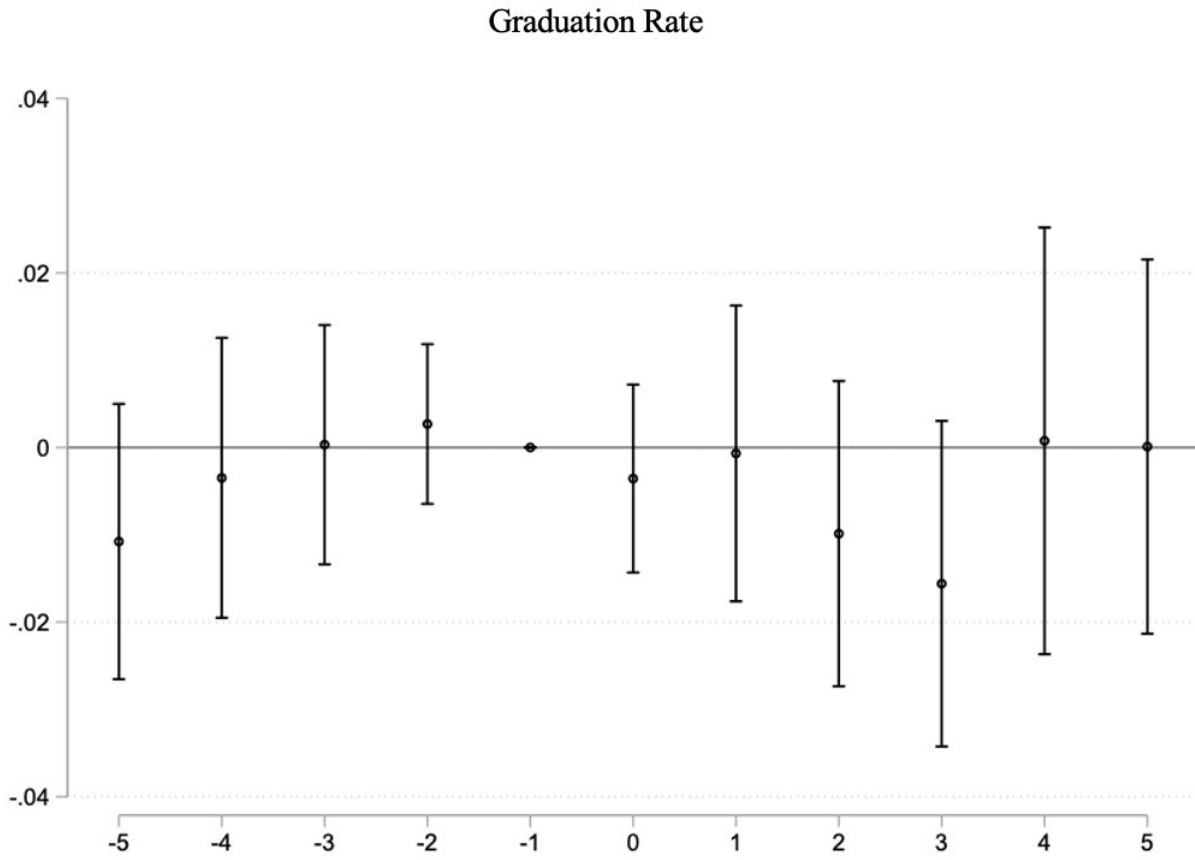
*Note: This figure shows the dynamic change in the average tuition and fees for in-state students.*

**Figure 6: Event Study of Retention Rate**



*Note: This figure shows the dynamic change in the student retention rate.*

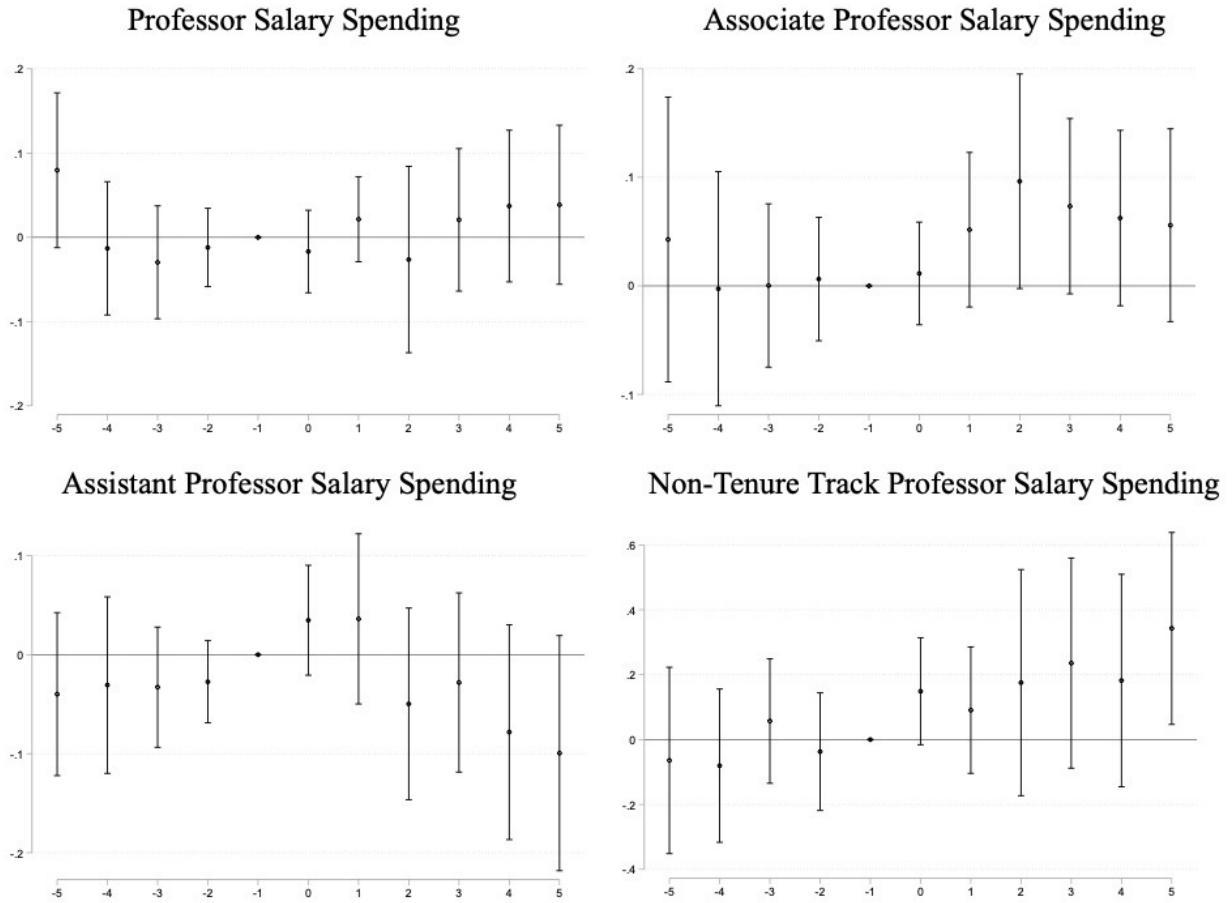
**Figure 7: Event Study of Graduation Rate**



*Note: This figure shows the dynamic change in the student 6-year graduation rate.*

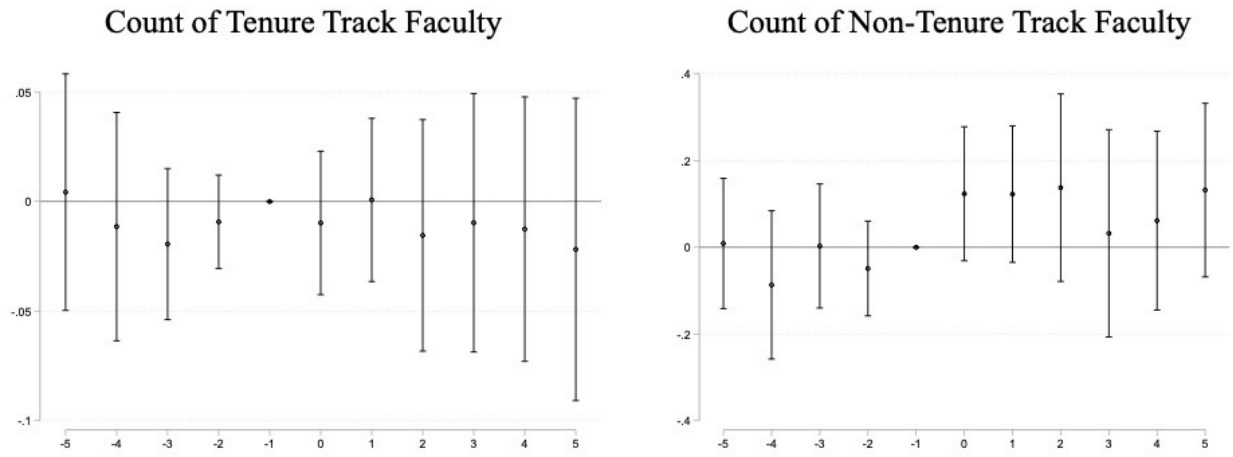
## Appendix

Figure 8: Event Study of Log Salary Spending, By Rank (Public)



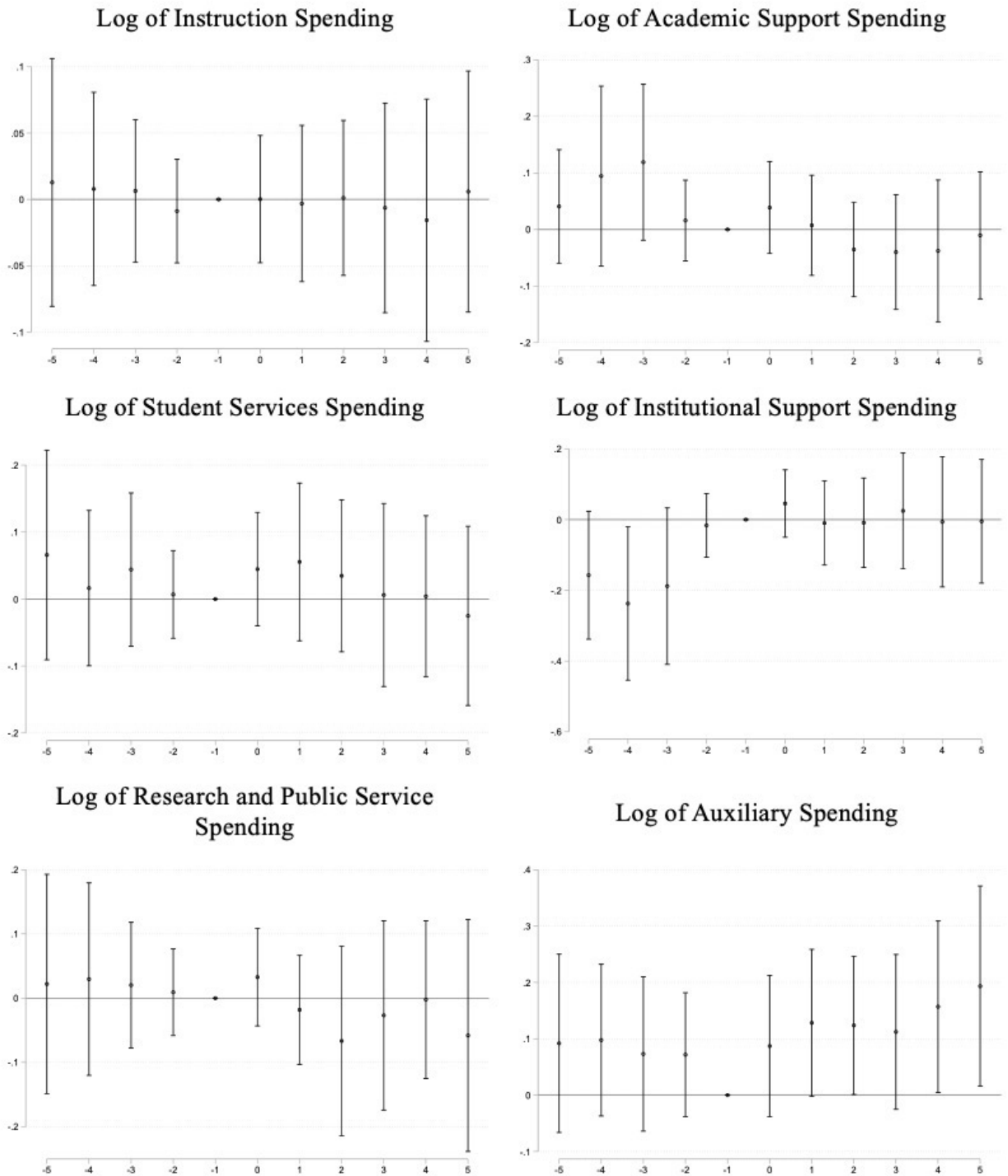
*Note: This figure shows the dynamic change in the total salary spending on tenure track faculty (professor, associate professor, and assistant professor) and non-tenure track faculty for public institutions.*

**Figure 9: Event Study of Log Count Faculty, By Rank (Public)**



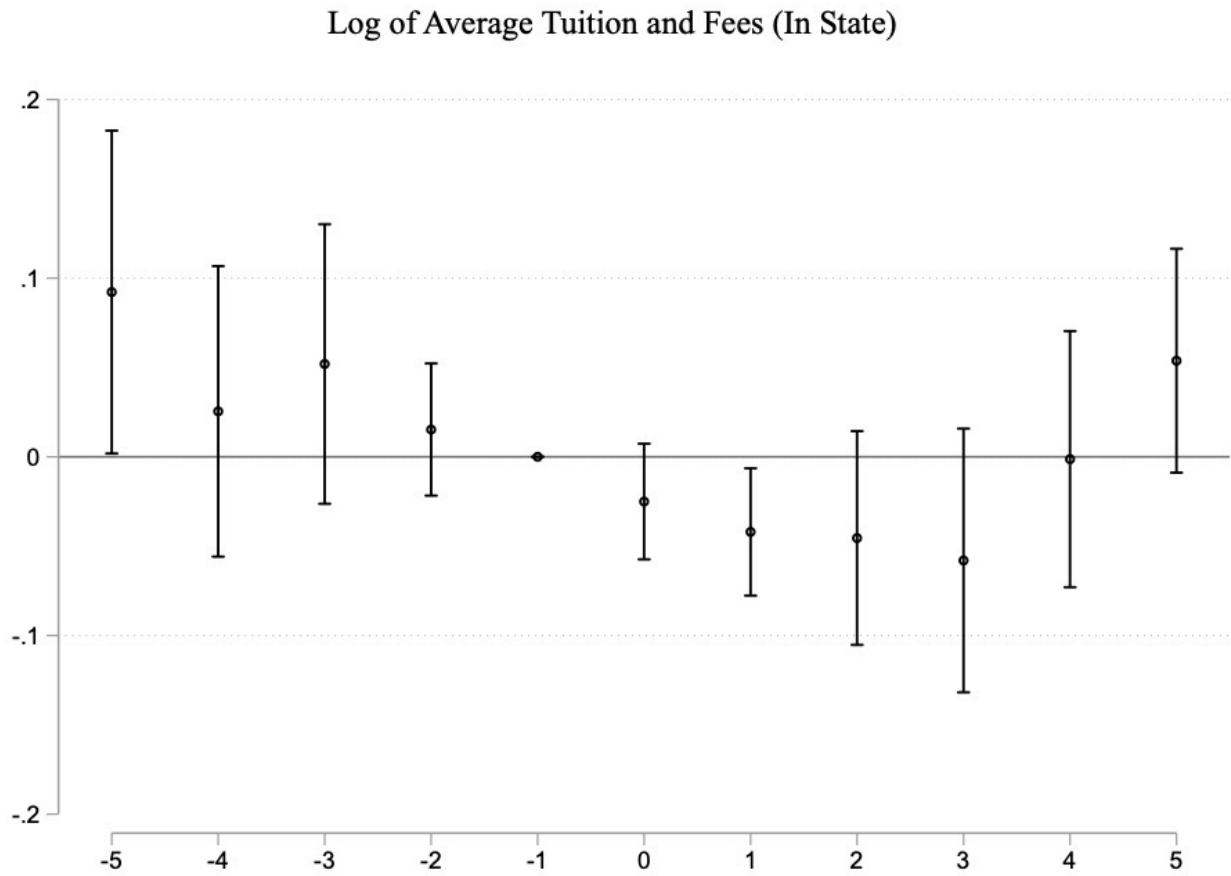
*Note: This figure shows the dynamic change in the average count of tenure track and non-tenure track faculty for public institutions.*

**Figure 10: Event Study of Log Institution Spending, By Domain (Public)**



*Note: This figure shows the dynamic change in the average spending on instruction, academic support, student services, institutional support, research and public service, and auxiliary items for public institutions.*

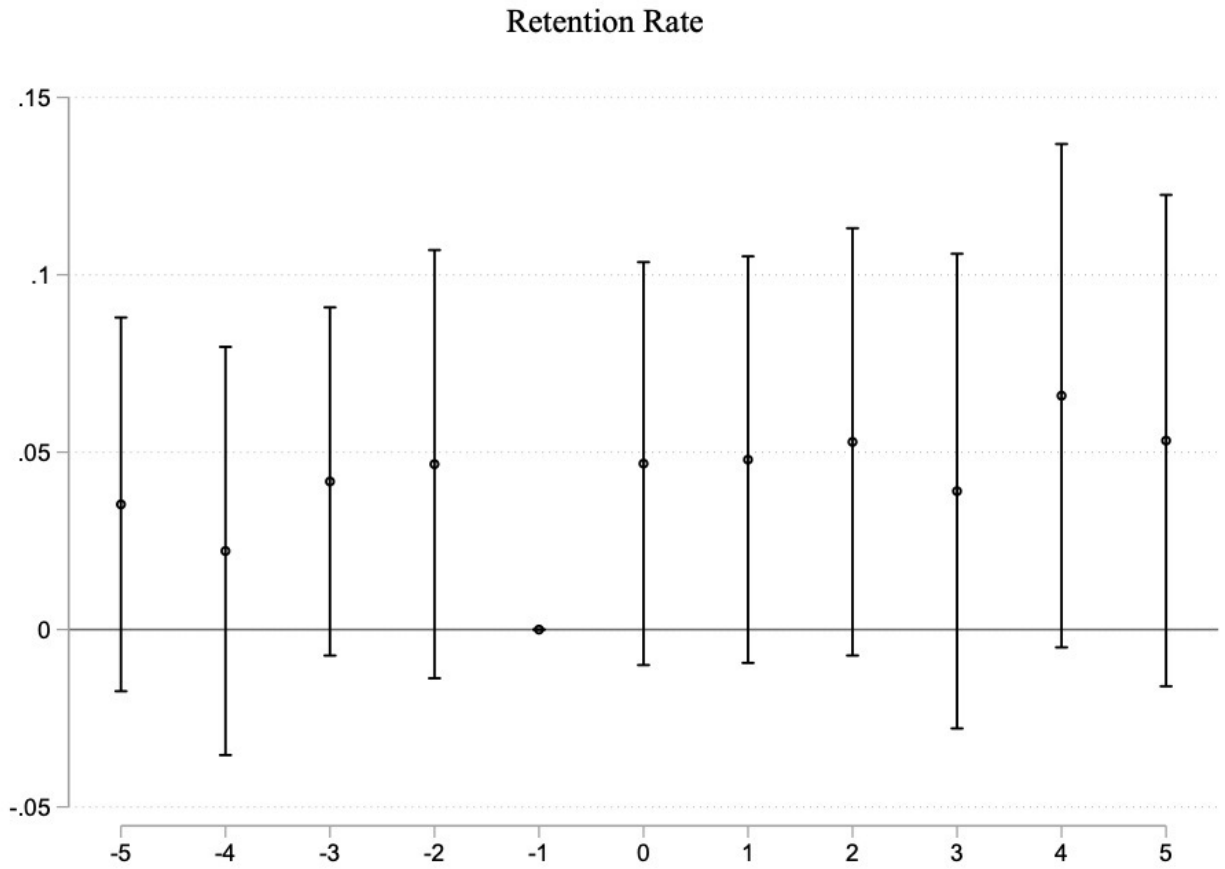
**Figure 11: Event Study of Log Tuition and Fees (Public)**



*Note: This figure shows the dynamic change in the average tuition and fees for in-state students for public institutions.*

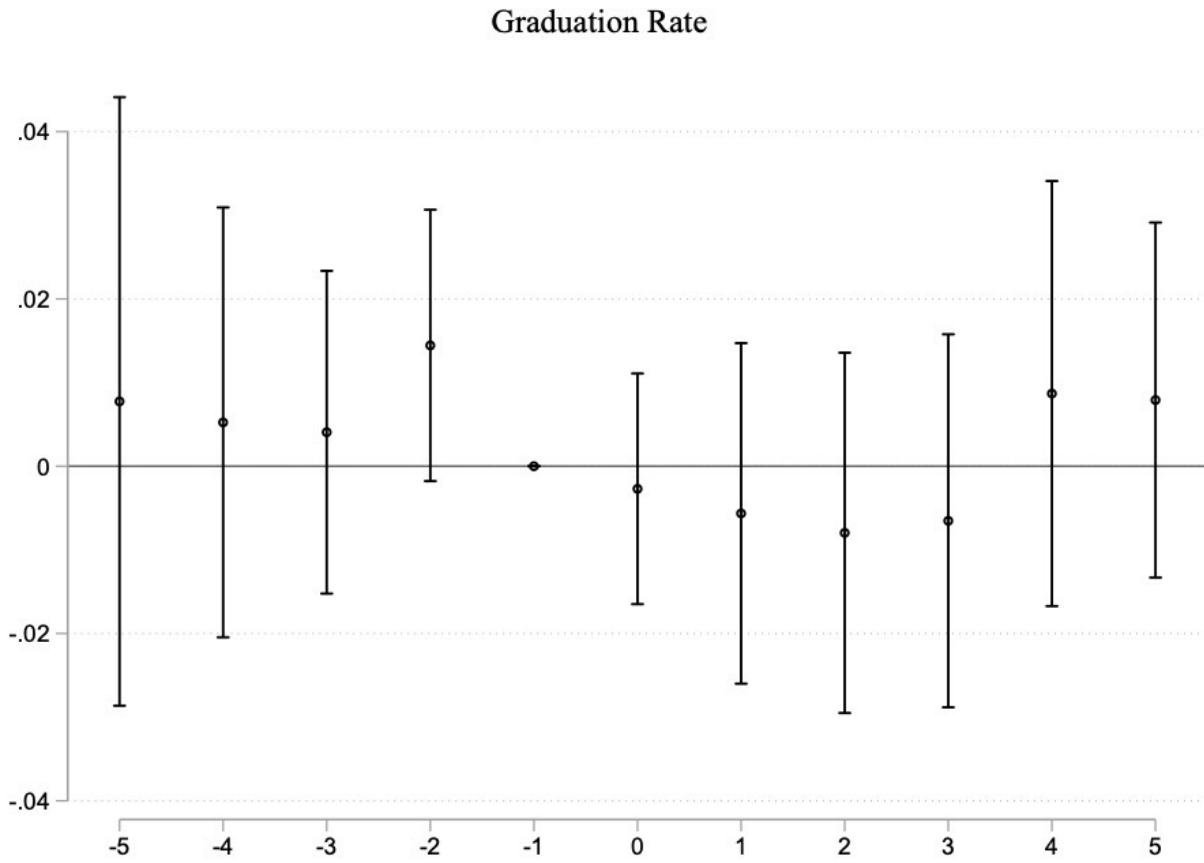


**Figure 12: Event Study of Retention Rate (Public)**



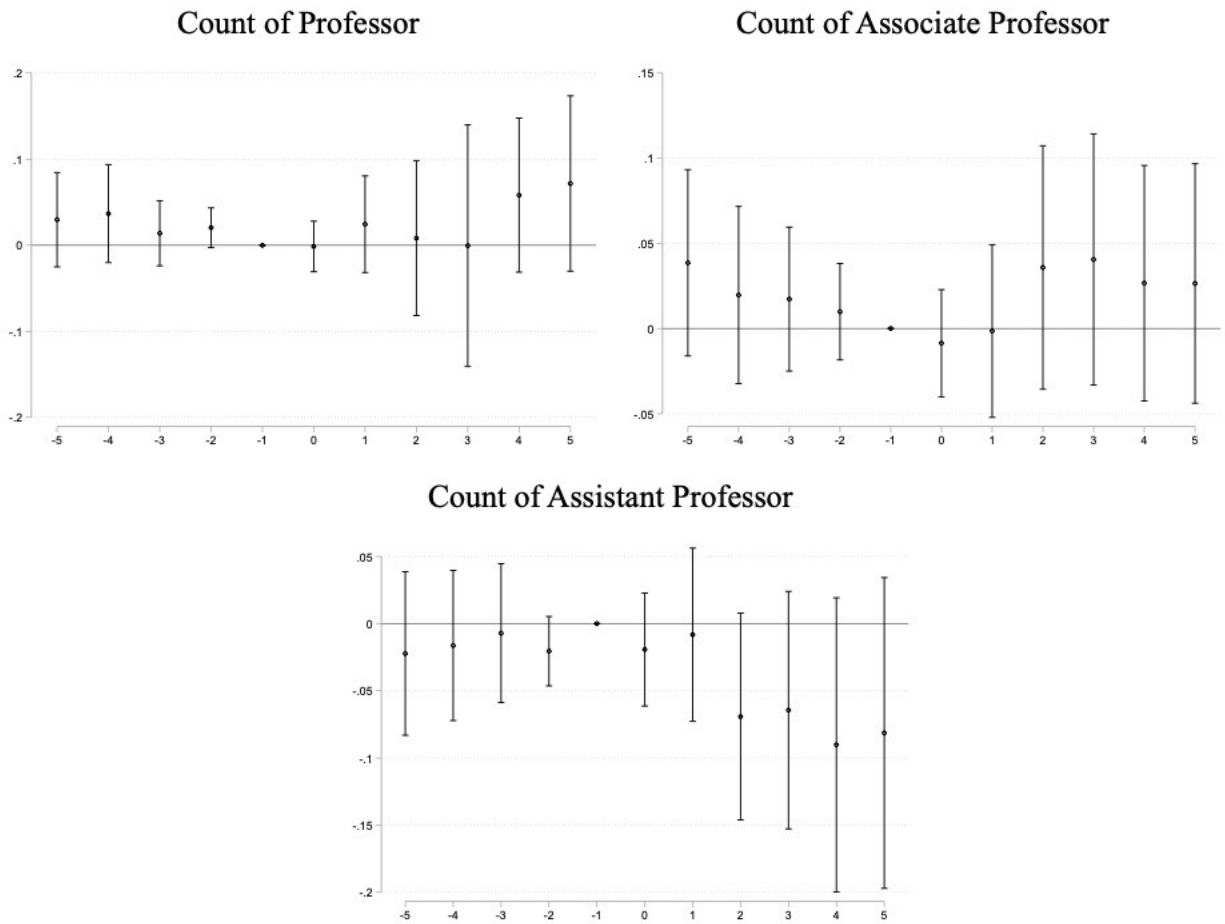
*Note: This figure shows the dynamic change in the student retention rate for public institutions.*

**Figure 13: Event Study of Graduation Rate (Public)**



*Note: This figure shows the dynamic change in the student 6-year graduation rate for public institutions.*

**Figure 14: Event Study of Log Count Tenure Track Faculty, By Rank**



*Note: This figure shows the dynamic change in the average count of tenure track faculty by specific ranks.*