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ABSTRACT

We evaluate potential determinants of enrollment in an early retirement incentive program for non-tenure-track employees of a large university. Using administrative record on the eligible population of employees not covered by collective bargaining agreements, historical employee count and layoff data by budget units, and public information on unit budgets, we find dips in per-employee finance in a budget unit during the application year and higher recent per employee layoffs were associated with increased probabiliites of eligible employee program enrollment. Our results also suggest, on average, that employees whose salaries are lower than we would predict given their personal characteristics and job titles were more likely to enroll in the early retirement program. To the extent that employees' compensation reflects their productivity, as it should under a pay system in which annual salary increases are based on merit, this finidng suggests that adverse selection was not a problem with the program. That is, we find no evidence that on average the "most productive" employees took the incentive.

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A Introduction

Cornell University, like many other academic institutions in the United States, was severely affected by the economic downturn and the financial meltdown that began in 2008. In May 2008, the university had projected a balanced operating budget over the next few years. By the fall of 2008 the university realized that these projections were way off. A combination of declining endowments, declining gifts for current operations, declining support from New York State (four of its colleges received some support from the state), increased needs for borrowing to finance ongoing capital projects (because of the failure of projected gift flows for capital construction to materialize) and increasing financial need of its undergraduate students because of declining family incomes, left the university with substantial operating budget deficits. The administration quickly understood that corrective actions had to be taken and that the university needed to rethink its cost structure. While layoffs would likely be necessary, because of its role as a major employer in the community in which it was located and its commitment to its employees, Cornell hoped to minimize the number of layoffs that occurred and the administration had the idea of funding a one-time early retirement incentive program for staff to encourage a voluntary reduction in its level of employment.

Our paper uses administrative data from Cornell to try to develop an understanding of the factors that led Cornell employees to elect to participate in the program. Our focus is on answering two questions: First, in a decentralized large university setting where budget units face different financial situations, did differences in

variables related to the financial situations of the units, namely reductions in operating budgets and recent layoff experiences, influence the probability that eligible non-union[1] employees chose to participate in the program? Second, did the program lead to adverse selection, in the sense that people who chose to accept the early retirement offer were those who tended to be of "above average productivity"? If the most productive staff were the ones who tended to accept the early retirement offer, the cost to the university in terms of lost productivity of the departing employees may offset the benefits of the program.

To preview our major findings, we find that employees' probabilities of accepting the early retirement offer were related to the budgetary pressures which they believed that their units faced. Moreover, while we cannot directly observe employee productivity, we can observe if employees were paid below or above average, given their personal characteristics, years of experience at Cornell, and job titles. We find a low value for this relative pay variable is a characteristic of the average employee Cornell chose to layoff in recent years. Furthermore, we find that employees who accepted the early retirement offer, on average, were paid less than we might expect given the above named variables. To the extent that the university's annual merit increase system was working the way it should and relative salaries at the university reflect relative productivities, this suggests that adverse selection did not prove to be a problem. That is, there is no evidence that the "above average ability" employees were most likely to take the early retirement package.

[1] Non-union refers to Cornell employees whose positions are not covered under a collective bargaining agreement. We restrict our analyses to the non-union population (except for a few falsification tests as we describe below) which represents 84% of those eligible for the retirement incentive. This restriction is imposed because pay increases under Cornell's collective bargaining contracts do not have merit pay components so relative pay comparisons among union workers will not yield meaningful comparisons of productivity differences.

B Data and methods

B.1 Program details

To evaluate the impact of job-related risk factors that may influence non-tenure-track staff's decisions to accept an early retirement program window offer, we use administrative data on all eligible non-union employees (n=1083) for the Staff Retirement Incentive (SRI) program at Cornell University. The SRI was announced to the University community on February 27, 2009 and was made available to all non-tenure-track staff aged 55 or older, with at least 10 years of eligible service at the university as of June 30, 2009, who received less than 25% of their salaries from sponsored research funds.[2] The SRI only required employees leave a benefits eligible position at the university; employees "retiring" under the program were eligible to return to temporary non-benefits eligible positions and, after three years, to regular university employment.

The plan's incentives included a taxable lump sum payment equal to one year of base pay and a nontaxable contribution to a defined contribution retirement fund of 30% of base pay. Enrollment in the SRI was only available for a fixed amount of time; employees were required to announce their intent to enroll in the program between March 1st and March 30th of 2009. Within this interval of time, there were no additional constraints that would make early or later enrollment desirable.[3] After enrolling,

[2] Specific exclusions were made for senior administrators reporting to the president of the university; County-Based Cornell Cooperative Extension Association employees who were paid by the local County Cooperative Extension Associations and not by Cornell; employees at Cornell's Puerto Rico observatory; employees on long-term disability; employees on university leave (who are not guaranteed reemployment rights; and individuals who had submitted voluntary resignation letters prior to March 1st.

3 The university had announced that if the number of submitted applicants exceeded the funds available to finance the program that it would base enrollment in the program on applicants'

severance with the university from a benefits eligible position was required by June 30, 2009. Staff enrolled in the program received the same benefits provided to all staff retirees, including retiree health insurance coverage.

The SRI was not the only retirement option offered to staff at the time. A Phased Retirement Incentive (PRI), which previously had existed only for tenure-track faculty, was concurrently offered that permitted employees to reduce their working hours to 20 per week for up to three years following enrollment. Under this program, salaries would be proportionately reduced, but benefits (such as retirement system contributions) would continue to be based on the employees' full-time salary. Employees could not enroll in both programs and the PRI required supervisor approval, while the SRI did not. These differences could have caused some individuals that would otherwise have accepted the SRI in isolation to accept the PRI when offered together so our results should be seen as conditional on PRI availability. In practice, only two individuals enrolled in the PRI as of June 30, 2009.

B.2 Data and descriptive statistics

Our analyses make use of data from three sources. Our primary data source consists of administrative records on the universe of non-union individuals eligible for the SRI. These data are typical of what would be available to administrators trying to understand take-up rates for similar incentive programs. Other than salary data, for which we have ten years for each employee, and the SRI enrollment outcome; all other variables are as of the date the plan became available, March 1st, 2009. In this primary

seniority at the university, not the date of their applications. Ultimately it decided to accept all of the eligible applications. Any submitted application could be withdrawn before the window offer expired. Any individual that received layoff notice while the window was available could still enroll in the program.

data source we have information on such items as retirement plan in which the individual is enrolled (defined benefit or defined contribution), demographic variables (such as age, gender, race/ethnicity, marital status and number of dependents currently covered by Cornell's health insurance programs), employment unit (consisting of the 10 colleges and three administrative units), position typical weekly hours of work, job families, pay bands, years employed at Cornell, and years since the last job change within the university. Job families are groupings of job positions by task area (such as Human Resources) or type of position (such as technical or administrative). This variable is tied to job codes and job titles, and has relevance for compensation. Pay bands are defined pay ranges (minimum and maximum) for positions meant to encourage equitable pay across employees with similar expertise or duties. They are set at the university level and restrict management's discretion in setting pay. Higher pay bands typically reflect higher minimum, maximum, and medians for a pay range. Pay bands in our sample fall into two main classifications: "banded" which consist of eighteen bands set by the university for staff positions, and "unclassified/academic/executive/" ones in which more flexibility is given management in setting pay than it had in the "banded" structure.

Our second source of information is on historical employee counts and layoffs. Employee counts are by year as of the end of the fiscal year, June 30th, and are at the employment unit (college or administrative unit) level. When per employee variables are computed, the denominator is the prior end-of-fiscal year employee count. Our layoff data are at the individual level; for much or our analyses they are aggregated up to employment unit fiscal year numbers. When we construct Fiscal Year (FY) 2009 layoff variables we only use layoff numbers through March 2009 and then multiply them by

1.333 to get a projected annual FY number. We do this because layoffs in April, May, and June of 2009 were not observed by SRI applicants before they had to make their decisions by March 31, 2009 to enroll in the program and so we implicitly assume the employee projects that the rate of layoff for the last three months of the fiscal year would be the same as in the previous nine months.

Our third set of data comes from budget reports available to the public on Cornell's website. FY budget reports, which include projections of the next FY's resources and spending, are typically released in May of each year. So, for example, in May 2009, the FY 2010 (July 1, 2009 to June 30, 2010) report was released. This report contained projected unit resources and expenditures for FY 2010. However, it was not released in time for employees considering whether to accept the SRI offer to use this information. While we could have assumed that employees had rational expectations, we instead assumed that they based their projections on likely unit budget changes in FY 2010 on the budget changes that their units had experiences during FYs 2006 through 2009.[4]

In what follows we exclude three individuals who held multiple jobs, three individuals for whom retirement plan data were missing or who were enrolled in a hybrid defined benefit/contribution retirement plan, and four individuals for whom 2006 salary data were missing, for a total of ten individuals.[5] Our analysis thus uses a sample of

[4] In results not shown in this paper we estimated models using FY 2010 budget information to test an assumption of rational expectations. The FY 2010 budget information was not available to the employees prior to accepting the SRI. These models were inconsistent across specification and seldom had precise coefficients.

[5] One possibility for missing salary is that the individual was temporarily away from the university that year (for example a spouse of a faculty member accompanying the faculty member when he or she was on sabbatical). Eligibility for the SRI required 10 years of service, not 10 consecutive years of service.

1073 individuals. Approximately one-third of the non-union SRI eligible individuals chose to accept the retirement incentive.

Unfortunately, several potentially important variables are absent from our data. We do not observe dependents, spouses, or partners in our administrative databases, but rather whether dependents, spouses or partners are covered by the employee's health plan. We also do not observe spousal/partner or employee retirement wealth or health status.[6]

The first column of panel A of Table 1 presents mean values for many of the variables used in this analysis. A relatively small percentage, about 16% of the eligible employees, are covered by a defined benefit pension plan. Most eligible employees were working full time (as defined as more than 38 hours per week), were white, and were neither lecturers nor researchers. Eligible employees have an average of 24 years of seniority, which is well above the required 10 years for SRI eligibility, and their years of service varies widely across individuals and has a standard deviation of 8 years. The average age of SRI eligible employees was 60 and 63% were women.

The first column of panel B shows the fraction of SRI eligible individuals employed in different units at the Ithaca campus of the university.[7] These units are the ten different colleges at Cornell and three composite other units that we have created; student services, academic programs, and administration and support.[8] The units have

[6] Using the Health and Retirement Survey, Bound, et. al. (1999); Brown (2000) and Dwyer and Hu (2000) showed that higher employee health is negatively correlated with the decision to retire while spousal health has a positive association with retirement probabilities. Stock & Wise (1990) and Samwick (1998) show that the present discounted value of future wealth from retiring at a given date is an important factor in retirement decisions.

[7] Cornell also has campuses in New York City and Doha, Qatar. Only Ithaca employees were eligible for the SRI.

[8] Employment unit codes are as follows: SS "Student Services", AP "Academic Programs", AS "Administration and Support", CALS "College of Agriculture and Life Sciences", AAP "Architecture, Art & Planning", ART "Arts and Sciences", ENG "Engineering", HOTEL "Hotel

considerable autonomy in making staffing decisions and in deciding how to allocate resources. Furthermore, because funding of the different units comes from a variety of sources, for example some of the colleges receive some appropriations from New York State and the endowment level per student varies across colleges, the units face different budgetary pressures. To emphasize this point, Figure 1 displays both budgeted resources and salary expenditures per employee in $10,000's, averaged from 2005 to 2008, by unit, with the vertical lines representing two standard error bands around the mean. This figure indicates that there was substantial variation in per employee resources and budgeted salary expenditures among units, with movements between salary and resource levels being very similar across units. The extent of variability in within unit budget amounts for the years 2005 to 2008 differs among the units with the most variability displayed by the Academic Programs (AP) unit for both per employee resources and salary, and the least variability shown by School of Hotel Administration (HOTEL) for resources and by Student Services (SS) for salary.

The variability in resources over time across units comes from the variety of revenue sources the units receive and the variability in each source over time. The units differ in the shares of their revenues coming from tuition, gifts, endowment income, sponsored programs, state and federal appropriations and allocations from the central administration. In our empirical work we focus on unit level per employee budgeted resources and salary expenditures as the measures that eligible employees may focus on in thinking about the financial pressures that their units face.

Administration", CHE "College of Human Ecology", ILR "Industrial and Labor Relations", JS "Johnson School", LAW "Law School", VET "College of Veterinary Medicine".

The remaining columns of Table 1 display comparisons of means for those eligible employees that enrolled in the SRI and those that declined the retirement incentive offer. Some eligible employees were probably inclined to retire within the interval of time that the SRI required accepted applicants to retire (March 1, 2000 – June 30, 2009) independent of the SRI. Their retirement decisions could be motivated by variables such as age, years of service, health, and family considerations, so it is important to control for these variables in our statistical analyses. The comparison of means for those that accepted and declined the retirement incentive sheds light on some of the variables that may prove to be important in our multivariate analyses.

Retirement age incentives appear in government policies and in employee benefit structures. The Internal Revenue Service specifies ages for minimum distributions and penalty free withdrawal of retirement funds, while the Social Security Administration specifies ages for receipt of full or partial Social Security benefits. Defined benefit pension plan structures also play a role by setting how annual pension benefits levels depend upon years of service, age at retirement, and a measure of average "final" salary. For these reasons we might expect the relationship between SRI enrollment, age, and years of service to be increasing but non-linear. Indeed, Table 1 shows that individuals that enrolled in the SRI are on average 2.19 years older and worked 2.26 more years at Cornell, than individuals who turned down the opportunity to accept the retirement incentive offer. Further analyses reported below describe the non-linear relationship.

Having a dependent child on an employee's health plan is associated with not accepting the retirement incentive. This may reflect the age of the employee or that the employee has greater financial responsibilities that reduces the attractiveness of the

incentive. Finally, on average, employees who accepted the incentive offer had lower levels of salaries and recent salary growth than employees who did not enroll in the program.

Differences in all of the factors mentioned above across employment units at the university may be responsible for the differences in enrollment rates across employment units observed in Panel B of Table 1. For example, while 3.8% of eligible employees were from the School of Industrial and Labor Relations (ILR), 6.3% of the employees who accepted the incentive offer came from this unit. In contrast, while 1.9% of the eligible employees came from Cornell's Law School (LAW), only 1.10% of the employees who accepted the incentive came from this unit. As such, we turn to a multivariate analysis to see if differences in acceptance rates across units still exist after we control for the characteristics of the eligible non-union eligible employees in each unit that are available to us in our data.

Appendix Table 1 presents estimates of a linear probability model of SRI enrollment (Yes = 1, No =0) as a function of all of the eligible employee characteristics listed in panel A of Table 1 as well as dichotomous variables for the units (panel B) in which the employee was employed.[9] In this model, the continuous age and years of service variables have been converted to two-year binary indicator variables to allow the effects of age and years of service on the acceptance decision to be nonlinear. The omitted (reference) group in the model is individuals who are white male employees ages 55-56 with 10 to 15 years of service, who are employed in the administration and support unit (AS). These estimates suggest that in the multivariate context there are no

[9] For comparison purposes a logit model is also presented in this table; the signs and significance of the coefficients are very similar in the two models.

statistically significant differences in the acceptance probabilities associated with employees' full-time/part-time status, academic/nonacademic staff status, race/ethnicity, retirement plan type, or presence of spouse or dependents on the employee's health insurance.

In Figure 2, we graphically display the coefficients (with two standard error bands) that show the impact of the age, years of service, and employment unit dichotomous variables from Appendix Table 1 on the decision to accept the retirement incentive offer. The acceptance probability increases monotonically with age at a decreasing rate until roughly ages 63 and over when it flattens out. The acceptance probability also increases with years of service, with the steepness of the relationship increasing after 30 years of service. The point estimates suggest that an individual with 36 years of service or more has about a 15 percentage point higher probability of accepting the offer than an individual with 10-15 years of service, all other factors held constant. Presumably many individuals with such long years of service would be contemplating retirement even in the absence of the program.

It is apparent in the bottom panel of the figure that much variation still exists in enrollment probabilities across employment units even after we control for individual's personal characteristics including age and years of service. Relative to the omitted group (Administration and Support), employees employed in the Academic Programs unit (AP) and the College of Arts and Sciences (ART) are less likely to enroll in the SRI, while individuals from the School of Industrial and Labor Relations (ILR) are more likely to enroll in the SRI.[10]

[10] The differences in the precision of the estimated coefficients of the employment unit variables are driven largely by differences in sample sizes. Some of the precisely estimated coefficients (for

In what follows we try to better understand this heterogeneity of enrollment rates among the employment units that persists even when conditioning on factors such as age, years of service, defined benefit, union status, and family characteristics. Specifically our focus is on individual's perceptions of their risk of being laid off and on whether they are paid less, or more, than average given their personal and job characteristics.

B.3 Econometric framework

We estimate models of the form $y_{ij} = F[\alpha + \mathbf{X}_i'\boldsymbol{\delta} + \gamma p_i + \beta z_j] + \epsilon_{ij}$ where F is a linear model or a logistic transformation, i indexes the individual and j indexes the employment unit. The outcome, y_{ij}, is 1 if individual i in employment unit j enrolled in the SRI and is 0 otherwise. Individual level controls are included in the vector $\mathbf{X}_i$, while p_i is a proxy for a measure of the employee's productivity, and z_j is an employment unit level factor that we hypothesize is associated with SRI enrollment. The vector $\mathbf{X}_i$ contains many of the variables found in panel A of Table 1.

In the absence of an observable measure of actual productivity, it is common in the literature to obtain a proxy for productivity by making some comparison of salaries across individuals.[11] If we can identify individuals who are performing roughly the same work and if we believe that the university's merit pay policies lead individuals' salaries to be roughly proportionate to their productivity, then we can use a measure of an individual's "relative" salary as a measure of his or her relative productivity. With our

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example those for academic programs (AP) and the College of Agriculture and Life Sciences (CALS)) have over 150 individuals in the eligible population, while some of the imprecisely estimated coefficients (for example those for the College of Architecture, Art and Planning (AAP) and the Hotel School (HOTEL)) have fewer than 15 individuals in the eligible population.

[11] See, e.g., Pencavel, (2001); Ashenfelter & Card (2002); Allen, Clark, & Ghent (2004); Kim (2003).

rich administrative data that provides us with information on pay bands, time in most recent position, and functional job categories, we are able to narrowly define groups of potentially substitutable workers and develop relative salary measures.

To construct our relative salary measure, p_i, we first estimate the following equation,

$$s_i = \sum_{k=1}^{n_k} \text{Band}_{ik}\delta_k + \sum_{m=1}^{n_m} \text{Fam}_{im}\gamma_m + \mathbf{X_i'}\boldsymbol{\psi} + \eta_i$$

where s_i is the log of 2009 fiscal year salary for individual i. Included on the right hand side are job band dichotomous variables ($Band_{ik}$, equal to 1 if individual i is in job band k and is 0 otherwise), as well as job family indicators, (Fam_{im} equal to 1 if individual i is in job family m and is 0 otherwise). The vector $\boldsymbol{X_i}$ is comprised of indicator variables for whether the employee is fulltime and non-academic staff, a continuous variable for years since job entry date, employment unit indicators, and years of service indicators at the same level of aggregation as described in Section B.2.[12]

Our relative salary measure is given by the portion of salary unexplained by this linear equation (the residual); this is normalized by its standard deviation for ease of interpretation. Formally, our proxy for relative salary is estimated as $p_i = \frac{p_i^*}{\sigma_{p^*}}$ where $p_i^* = s_i - \sum_{k=1}^{n_k} \text{Band}_{ik}\,\widehat{\delta_k} - \sum_{m=1}^{n_m} \text{Fam}_{im}\widehat{\gamma_m} - \mathbf{X_i'}\,\hat{\boldsymbol{\psi}}$ and σ_{p^*} is the standard deviation of p_i^*.[13] We interpret p_i as the difference in individual i's salary from the average salary of her closely substitutable coworkers and we will refer to p_i in what follows as 'relative pay'.

[12] Results are not dependent on this specification. Changing the aggregation cut-points, including age, age and age squared result in virtually no change in the second stage coefficient estimates.
[13] The standard deviation of the residual is 0.17.

This relative pay variable is estimated from a first stage equation; thus, it is subject to sampling variation and its inclusion in the SRI enrollment equation may bias conventional standard errors. Standard errors that do not account for this variation will be smaller than corrected standard errors if the disturbances are uncorrelated; however, if disturbances are correlated the direction is unknown. To show the impact on our standard errors from a bias correction for this variation in the relative pay variable we also compute standard errors that use the method proposed by Murphy & Topel (2002).

Another statistical issue that we face is the possibility of within employment unit correlation of disturbances. Because we do not observe phenomena such as management style, work environment, peer effects, or promotion structure, it is possible that employees within units are affected in similar ways by these unobservables. Uncorrected, standard errors could be smaller leading us to make incorrect claims about the significance of effects. A common correction for this is to use the method of Liang & Zeger (1986) which nonparametrically adjusts the covariance matrix to account for clustering as well as heteroskedasticity. The problem with applying this method to our research study is that it relies on group asymptotics and we have only 13 employment units. With a random effects framework, parametric adjustments and Generalized Estimating Equations (GEE) similarly are infeasible with such a small number of groups; however, a corrected GEE covariance matrix by the method of Bias Reduced Linearization (BRL) developed by Bell & McCaffrey (2002) is a possible solution for problems related to the small number of groups. Bell & McCaffrey show, with Monte Carlo methods, that BRL seems to generate statistical tests of the correct size when

applied to random effects models with normally distributed errors (Angrist & Lavy, 2009) even when the group size is small.

In practice, we find that the corrections we make for these statistical challenges with either the method of Murphy & Topel or Bell & McCaffrey lead to little adjustments on inference from robust standard errors. However, we do not simultaneously correct for both concerns and it could be argued that the bias from each statistical issue would, if combined, equal more than the sum of the differences we observe individually.

C Results

C.1 Adverse selection

Employers relying on a labor force reduction tool that shifts the discretion of exit to the employee need to be confident that the "right" employees choose to enroll. The risk is that highly productive employees would be more likely to opt into the SRI since the probability of obtaining a position elsewhere could be a less risky and a more lucrative prospect for these individuals. If the employer loses highly productive employees they may also have lost substantial investments in human capital that it has made.

To evaluate if the "right" type of employees enrolled in the SRI, we proceed in two steps. First, we investigate whether a low value of our relative pay variable, the proxy for productivity, is associated with being laid off. Specifically, did the university, when it used the discretionary tool of a layoff choose to terminate employees with low relative pay? Second, we test for whether low relative pay is associated with the decision to enroll in the SRI.

To accomplish the first step we generate a new relative pay variable constructed from a combination of our SRI non-union eligible population with the population of 177 non-union individuals that suffered layoffs from January, 2005 to March, 2009. Layoffs for this population are for reasons defined as "lack of funds", "lack of work", or "reorganization". If low relative pay does indicate the "right" type of employee to enroll in the SRI we would expect that the employees laid off in these prior years were of lower relative pay.[14]

To calculate the relative pay variables on the combination of these two populations a few adjustments are necessary. First, we convert the last annual equivalent salary received by the laid off population into a 2009 equivalent using the between year salary growth rate from our SRI population. Second, we increase the years of service of the laid off population to reflect the amount should they have been employed to 2009.[15] Further, two variables, the statutory/endowed indicator (which we use to distinguish certain pay band differences within the AS and AP units) and the years since job entry date, are not available for our layoff population. Then, to construct this new relative pay variable, p^{new}, we exclude those variables from the regression. We are confident that this does not materially impact a comparison between the new relative pay variable and the relative pay variable calculated exclusively on the SRI non-union eligible population.

[14] Of course, the low relative pay could also serve as a proxy for something else.

[15] Concerned that our method of adjusting the laid off population's salary and years of service could contribute to the distributional differences we observe, we also make the comparison using the following alternative method. Using the historic salary information from our SRI population, we separately compute a value for the relative pay variable for each year an employee was laid off. For example, employees laid off in 2006 will be included in a regression with the SRI population (at their 2006 salary and years of service) to compute a value for the relative pay variable. This method leads to very similar distributional differences between the relative pay variable for the laid off and SRI populations, with the gap in means slightly more dramatic.

The correlation coefficient between p^{new} and p conditional on our SRI non-union eligible population is 0.978.

In Figure 3 we show kernel density plots of p^{new} for the SRI enrollment population and the layoff population using the epanechnikov kernel with a bandwidth of 0.17.[16] The density for the layoff population is shifted to the left with a mean of -0.29 while the SRI population is centered at 0.05. These means are significantly different with a t-statistic of over 3. There is observably much variation in the relative pay variable among the layoff population.

A possible explanation for this variation is that wide differences existed in how binding the sets of feasible employees under consideration for a layoff were for layoffs that occurred from 2005 to 2009. Although the university has discretion in choosing whom to layoff among workers not covered by a collective bargaining agreement, in effect it may be limited to selecting individuals from a pool attached to a particular project or program. We would anticipate that a reorganization would impose the lowest constraint on its behavior, while it is unclear whether a lack of funds for a position or a lack of work for an employee or group would be more binding on its actions. If funds are truly fungible a "lack of funds" might actually indicate an unwillingness of the university to make an allocation, perhaps because the set is not actually binding. Alternatively, a "lack of work" could imply an unwillingness of the university to reposition a valued employee, again indicating a non-binding constraint.

A further test then for the validity of the relative pay variable in serving as a proxy for productivity is to see how consistent it is with our expectations about how

[16] The bandwidth chosen is the minimum of the optimal bandwidths of each density computed as the bandwidth that would minimize the mean integrated squared error if the data were distributed Gaussian and a Gaussian kernel were used.

constrained each of the sets is above. It seems reasonable to assume that when using a layoff the university would want to minimize the average of the productivity lost. If we order the three groups of layoffs by the mean of the relative pay of the individuals laid off in each group, we have [Reorganization (-0.42), Lack of Funds (-0.19), Lack of Work (-0.17)] from low to high. This roughly indicates that the reorganization feasible set is the least binding, consistent with our expectation.

We will now evaluate how SRI enrollment is associated with the characteristic of low relative pay. Using our relative pay variable calculated only on the set of SRI non-union eligible individuals, we estimate linear probability and logit models of SRI enrollment on relative pay and subsets of the variables previously included in Appendix Table 1. The coefficients of the relative pay variable from each of the models are found in Table 2.

The coefficient on relative pay is stable across specifications, ranging from -0.032 to -0.034 with little difference between the OLS and logit marginal effects. Standard error adjustments do not change the conclusions drawn. Our model suggests that a one standard deviation decrease in relative pay is associated with a 3.22% increase in the probability of enrolling in the SRI.[17]

[17] A final test for interpreting our relative pay variable as a proxy for productivity was to estimate its effect on eligible employees' decisions to accept the retirement incentive offer in a sample of eligible employees who were covered by collective bargaining agreements (most of this paper is focused on the non-union population, the large majority of staff at Cornell). Inasmuch as these agreements do not provide for merit pay increases, we might expect that the coefficient of the relative pay variable would be statistically insignificantly different from zero when we estimate the relationship between SRI enrollment and relative pay for this sample (if the relationship in the nonunion sample is due to relatively low productive non union employees enrolling in the SRI). While the coefficient for the collective bargaining sample was statistically insignificantly different from zero at the .05 level of significance, it was negative and its absolute magnitude was larger than the similar coefficient from the sample of nonunion employees reported in the text. The magnitude of this coefficient in the collective bargaining sample reduces our confidence

C.2 Job related risk factors

We suspect that employees consider a distribution of possible future employment durations at the university when deciding whether to enroll in the SRI. Their perceptions of being involuntarily terminated from the university in the future surely influences their decision whether to accept the incentive offer. In the remainder of our paper we include variables that may be indicators of future job-loss risk into the equations that predict whether an individual will enroll in the SRI. Our research design makes use of the variation in layoffs, budgeted resources, and budgeted salary expenditures across employment units at the university from FY 2006 up until the SRI enrollment date of March 31, 2009. Each measure is deflated by the beginning of fiscal year employee count to convert raw layoff and budget change numbers to a per employee number; we believe that these measures will be the ones that employees will focus on when contemplating their likelihood of future layoff.

Of the indicators, layoffs are likely to be the most salient – a coworker's disappearance would be more troubling and apparent than a change in resources or budgeted salary expenditure. However, layoffs occur very infrequently in the data, approximately 200 between the start of FY 2005 and March 2009. The between unit standard deviation is only 5 per 1,000 employees. In contrast, the variation in per employee budgeted resources and salary expenditure is more substantial with a between unit standard deviation of $100,000 for per employee resources and half that for per employee salary expenditures. Of more importance to us, the difference in 2009 and 2008 per employee resources has a standard deviation of $15,000 among employment

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somewhat that our relative pay variable is a good proxy for relative productivity in the non collective bargaining sample.

units while the standard deviation of the difference for salary per employee over the same period is $4,000.

However, there are some drawbacks to using per employee budgeted resource or salary expenditure changes. A reduction in resources could indicate a reduction in facility expense or available supplies, or a failure to replace computers or peripherals and not actually suggest any immediate job loss risk to the employee. In this scenario, it might be that any effect we observe is motivated by a reduction in the quality of the employee's work environment and not from job loss related risk as we hypothesize. Our salary expenditure measure reflects the apportioned amount of resources available per employee and if it proves statistically significant, its effect may be directly due to job loss concerns

The layoff indicators we use are averages of layoffs per 1,000 employees by employment unit across a number of years. Similarly our budgeted resources and salary expenditure measures are changes in per employee amounts in units of $10,000 per employee by employment unit. The unconditional relationship between SRI enrollment probabilities and various indicators of job-loss risk are shown in Figure 4. In the top left panel we graph unit SRI enrollment probabilities against the 2006 to 2009 unit layoffs per 1,000 employees. The correlation is clearly positive. Because the observation for the School of Industrial and Labor Relations (ILR) appears to be an outlier, when we conduct multivariate analyses that include the layoff risk variables below, we will experiment with omitting ILR employees from our analyses to see if this omission materially alters any of our conclusions. Our results suggest their omission does not make a difference.

In the right panels we again graph unit SRI enrollment probabilities, but now with either 2009 minus 2008 budgeted resources per employee in $10,000 increments (top) or 2009 minus 2008 budgeted salary expenditures per employee in $10,000 increments (bottom). The correlation of each of these variables across units with the probability that the unit's non-union eligible employees enrolled in the SRI is negative; this suggests that reductions or smaller increases in available per employee resources are associated with SRI enrollment. These raw correlations do not account for the distribution of any of the individual level covariates that also are associated with SRI enrollment. So in the following sections we will estimate the effect of these unit resource variables holding constant the individual level variables, including relative pay.

C.2.i Layoffs as indicators

In Table 3 we report linear probability model coefficient estimates and logit model marginal effects for our relative pay and layoff variables in trying to predict SRI enrollment. The models reported in Panel A use unit layoffs per 1,000 employees averaged across the years 2006 to 2009. The models reported in Panels B and C are similar except that they use 3 and 2 year averages, respectively, for the layoff variables. Column (1) shows the coefficient estimates for relative pay and our various layoff measures, when we control for employees' age, years of service, full-time/part-time status and academic/nonacademic position status. Columns (2) through (5) add additional explanatory variables to the models to see how sensitive our relative pay and layoff variables are to their inclusion.

Looking first at the relative pay coefficients, their magnitudes are not significantly different across specifications and not significantly different from the estimates reported

in Table 2 from models that exclude the layoff probability variables. Similarly, the coefficients on the layoff variables show little change across specification within each panel. Finally, the effect size on each layoff variable construction differs little depending on which average we choose. Using the layoff variable constructed from a four year average subject to the largest number of covariates, (Column (5)), the coefficient of 0.0181 implies that an increase of 5 layoffs per 1,000 employees is associated with a 9 percentage point increase in the probability of enrolling in the SRI. This suggests that employees were responding to perceptions of job-loss risk when deciding to accept the SRI.

C.2.ii Resource deviations as indicators

We estimated similar models to those shown in Table 3 with deviations in resources in place of layoffs as potential measures of job-loss risk and the results are presented in Table 4. Panel A includes a variable constructed as the 2009 total budgeted resources per employee less the 2008 total budgeted resources per employee in units of $10,000. Panels B and C contain similar resource measure, with the deviations of the 2009 amounts from two and three year previous averages, respectively. The effect size diminishes from -0.022 for a one year deviation to approximately -0.008 for a deviation from a three year average, only significant at the 5% level for the one year deviation. This drop in effect size may reflect the limited time horizon employees consider when focusing on previous resource levels. Interpreting the coefficient on the one year deviation in resources reported in Column (5), a one standard deviation unit increase in resources of $15,000/employee is associated with a 3.3 percentage point decrease in the

probability of enrolling in the SRI. The one year budgeted resource deviation provides more support that employees were responding to perceptions of job loss risk.

C.2.iii Budgeted salary expenditure deviations as a risk measure

Our final measure of job-loss risk is reported in Table 5. Here we include three panels as in Table 4 with Panel A reporting results based on regressions that include 2009 per employee budgeted salary expenditures less 2008 per employee budgeted salary expenditures and the remaining panels report regressions that have a deviation from two or three previous year averages. Similar to the resource measures, the coefficient on the salary measure is consistently significant across specification only in the first panel. Because the movements and levels of the budgeted resources and budgeted salary measures per employee are highly correlated (Figure 1) we might expect each measure to essentially produce the same impact on employee acceptance of the incentive. Results from Panel A suggest that an increase in budgeted per employee salary expenditures of one standard deviation ($4,000/employee) is associated with a decrease in the probability of enrolling in the SRI ranging from 3.3 to 3.8 percentage points - almost identical to the impact we reported above of a one standard deviation increase in the resource variable. The one year budgeted salary expenditure deviation provides further support that employees responded to perceptions of job loss risk.

C.2.iv Do individuals of lower relative pay respond differently to job-loss risk and Does excluding individuals from the School of Industrial and Labor Relations Matter?

We have found that, on average, individuals with lower relative pay were more likely to accept the offer of the retirement incentive. A subsidiary issue is whether these lower relative pay individuals are more sensitive to the possibility of future layoff and thus more likely to weight such a possibility more heavily in their acceptance decision. Panel A of Table 6 presents estimated coefficients from models that test if this occurs; we estimate models in which we restrict the sample first to people with relative pay above the mean and then with relative pay below the mean. Recalling that the layoff and SRI acceptance rates for ILR were both much higher than for the rest of the university, we further restrict the sample in Panel B, excluding employees from ILR, to see if excluding the relatively small number of employees from this unit influences our estimated coefficients.

Effect sizes between Panels A and B are very similar suggesting that our estimated relationships were not driven by the one "outlier" unit. Moreover, we are not able to reject the hypothesis that employees whose relative pay variable is below or above average react differently to layoff probabilities or other measures of unit financial stress in making their decisions whether to accept the retirement incentive offer.

C.2.v Does one indicator dominate?

Finally, in Table 7 we simultaneously include our layoff risk indicator with the resource variable in Column 4, and with the salary variable in Column 5, to better assess which effect is more important in employees' decisions whether to accept the retirement incentive. The effects of these variables when they were included in the model one at a

time are shown in Columns 1 through 3 for comparative purposes. The coefficient on the layoff variable changes very little when either the salary or resource variable is also included in the model. In contrast, the salary and resource coefficients are approximately cut in half when the layoff variable is included in the model and their statistical significance is greatly reduced. These findings suggest that the disappearance of co-workers through layoffs is more relevant in a decision to accept early retirement than strictly financial indicators like resource or salary changes.

D Conclusion

The Cornell Staff Retirement Incentive (SRI) program helped the university to moderate the number of its employees that it subsequently laid off as it tried to restore its economic balance after the economic dislocation of 2008. We have provided evidence that employees' decisions to accept the incentive were conditioned on their perceptions of the economic stress that their units faced. In addition, to the extent that our relative pay variable is a proxy for employees' relative productivity, our results also suggest that adverse selection was not a problem for the university; on average it was the lower relative pay employees who accepted the retirement incentive offer.

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F Tables and figures

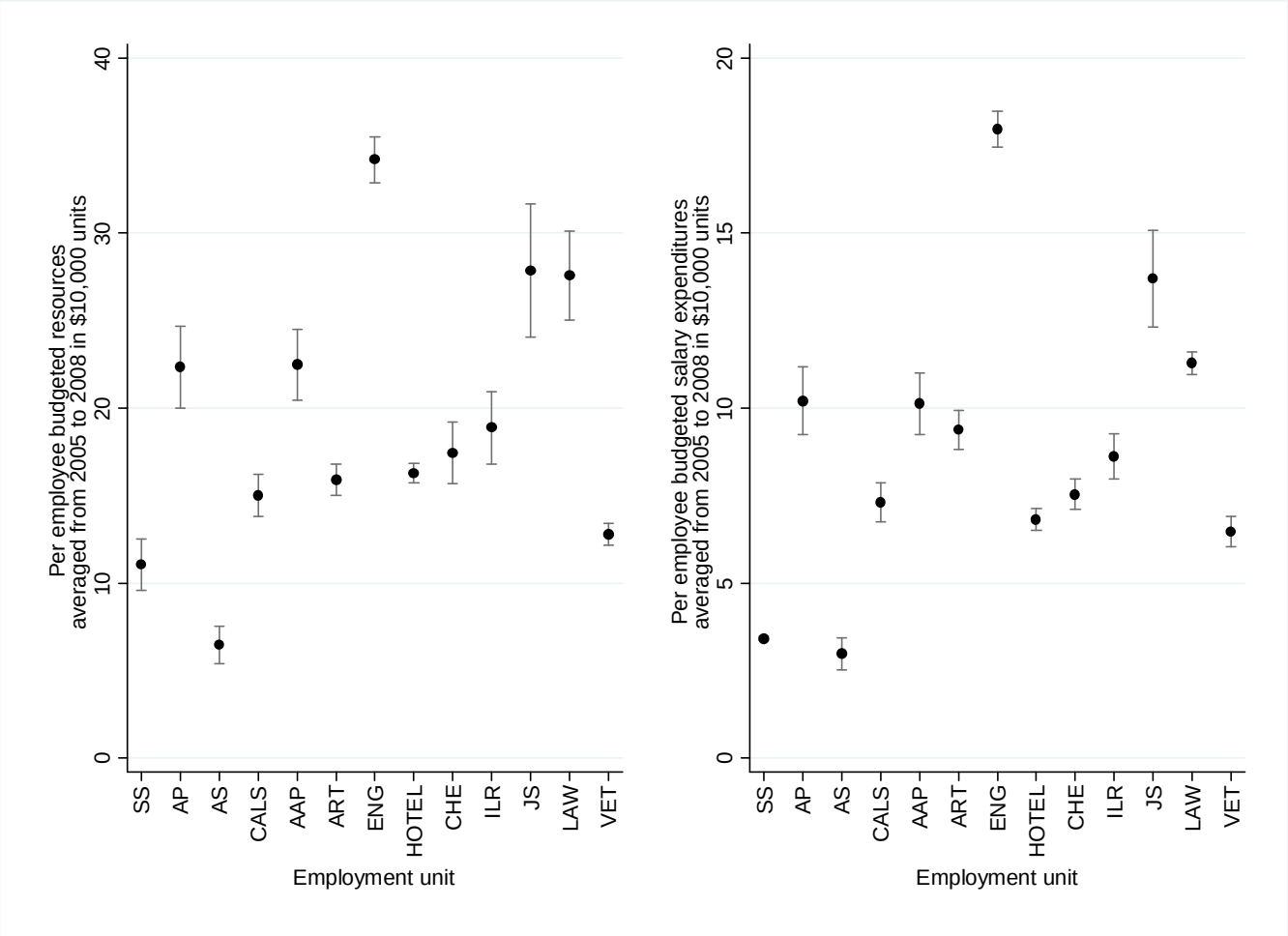

Figure 1: Depiction of the variation in budgeted per employee resource and salary levels among units: Per employee budgeted resource and salary levels are averaged from 2005 to 2008 in $10,000 units graphed against employment units with two standard error bands shown in grey

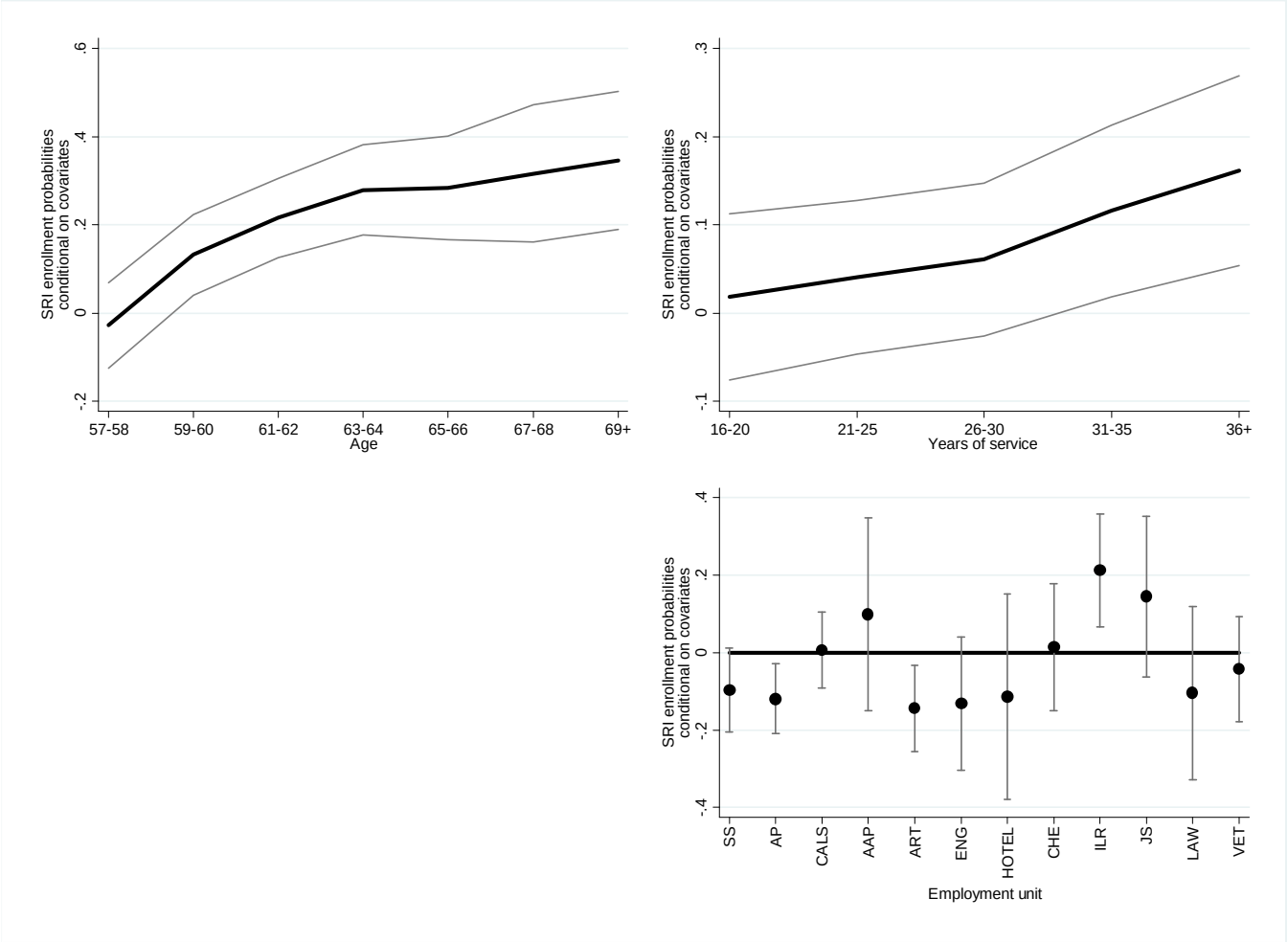

Figure 2: Coefficients on age, years of service, and employment unit dummies from a regression of enrollment in SRI (Yes = 1) on age, years of service, employment unit and other covariates with two standard error bands (See Appendix I). Age is in comparison to those aged 55-56, years of service to 10-15, and employment unit to AS.

Employment unit codes are as follows: SS "Student Services", AP "Academic Programs", AS "Administration and Support", CALS "College of Agriculture and Life Sciences", AAP "Architecture, Art & Planning", ART "Arts and Sciences", ENG "Engineering", HOTEL "Hotel Administration", CHE "College of Human Ecology", ILR "Industrial and Labor Relations", JS "Johnson School", LAW "Law School", VET "College of Veterinary Medicine".

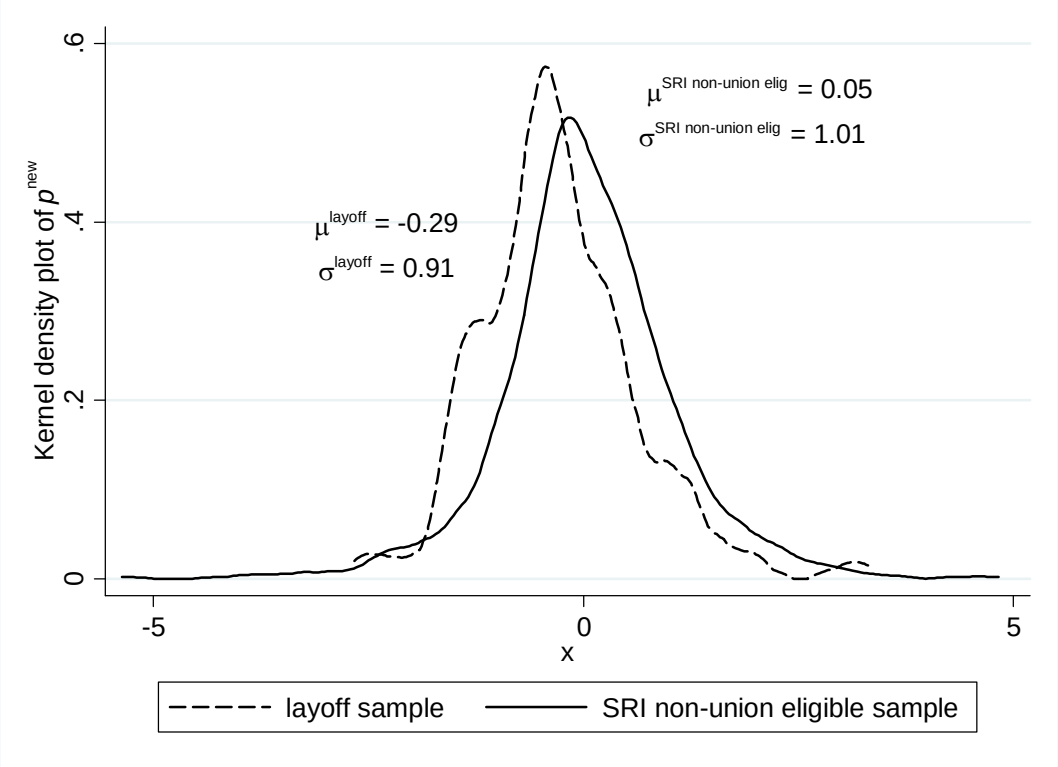

Figure 3: Kernel density plots of the relative pay variable calculated on the layoff and SRI non-union eligible combined sample shown for each sample separately

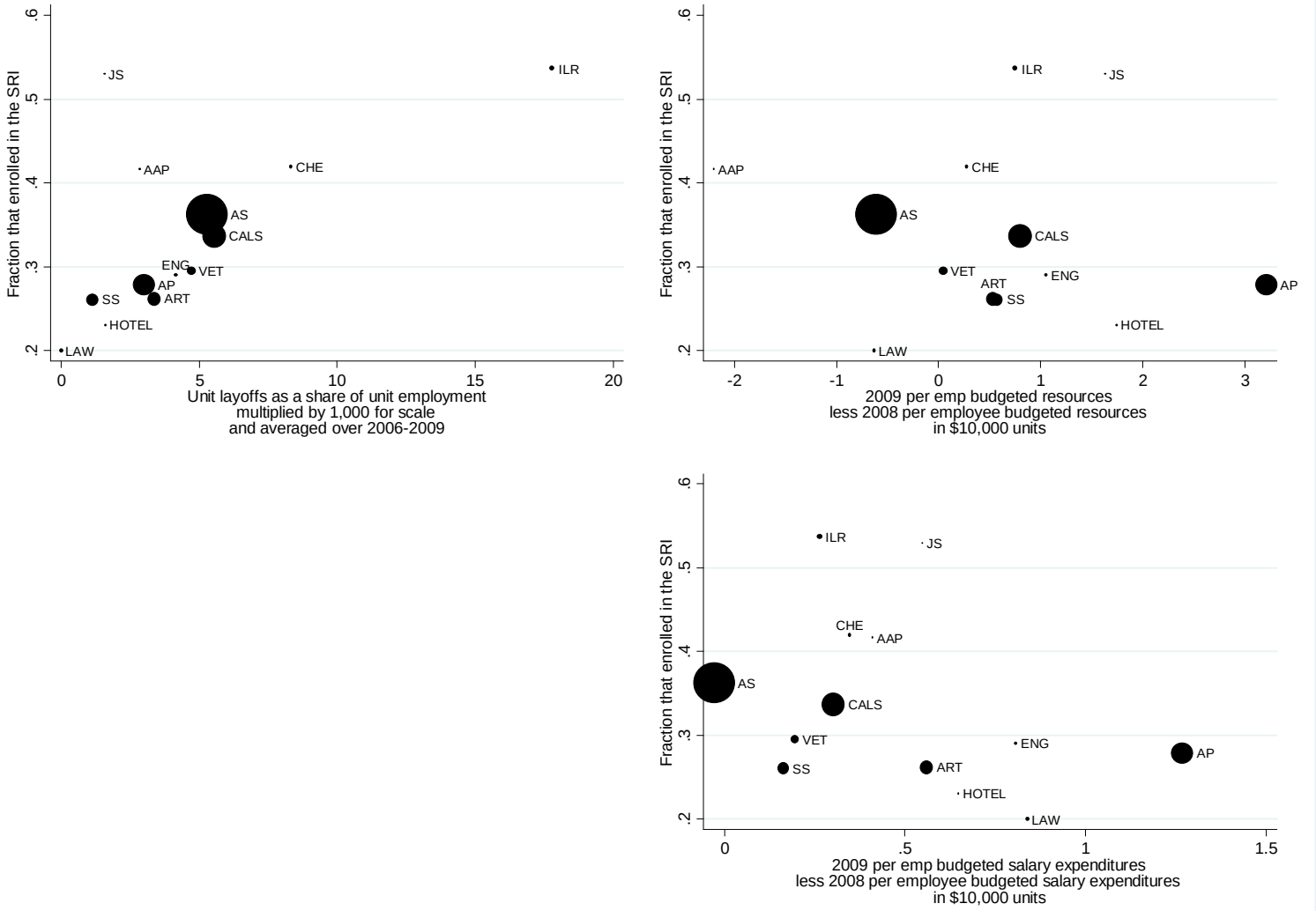

Figure 4: Unconditional relationship between SRI enrollment (Yes = 1) and unit layoffs, per employee salary and resource levels. Dot sizes are in proportion to the size of the non-union eligible population employed in that unit.

Employment unit codes are as follows: SS "Student Services", AP "Academic Programs", AS "Administration and Support", CALS "College of Agriculture and Life Sciences", AAP "Architecture, Art & Planning", ART "Arts and Sciences", ENG "Engineering", HOTEL "Hotel Administration", CHE "College of Human Ecology", ILR "Industrial and Labor Relations", JS "Johnson School", LAW "Law School", VET "College of Veterinary Medicine".

Table 1: Mean comparisons for key explanatory variables

Variable	ALL	Enrolled	Declined	Difference	T-stat	
Panel A: Socioeconomic						
Age	60.071	61.544	59.352	2.192	8.92	***
Yrs of Service	24.437	25.958	23.694	2.264	4.32	***
Fulltime	0.893	0.881	0.899	-0.018	-0.9	
Non-academic staff	0.828	0.855	0.814	0.041	1.67	
Female	0.625	0.645	0.616	0.029	0.92	
Asian	0.02	0.009	0.025	-0.016	-1.83	
Black	0.021	0.02	0.021	-0.001	-0.1	
Hispanic	0.011	0.009	0.012	-0.003	-0.58	
Unknown	0.007	0.014	0.003	0.011	2.19	*
White	0.942	0.949	0.939	0.01	0.65	
Defined benefit plan	0.16	0.188	0.147	0.041	1.7	
Spouse or partner on health plan	0.445	0.435	0.451	-0.016	-0.5	
Dependent child on health plan	0.235	0.176	0.264	-0.088	-3.18	**
Salary 2006 to 2009 rel change	0.148	0.13	0.156	-0.026	-3.12	**
Log 2009 salary	11.022	10.978	11.044	-0.066	-2.29	*
Panel B: Employment units						
Student Services (SS)	0.086	0.068	0.094	-0.026	-1.44	
Academic Programs (AP)	0.154	0.131	0.165	-0.034	-1.47	
Administration and Support (AS)	0.291	0.321	0.276	0.045	1.52	
College of Agriculture and Life Sciences (CALS)	0.163	0.168	0.161	0.007	0.28	
Architecture, Art, & Planning (AAP)	0.011	0.014	0.01	0.004	0.66	
Arts and Sciences (ART)	0.096	0.077	0.105	-0.028	-1.5	
Engineering (ENG)	0.029	0.026	0.031	-0.005	-0.45	
Hotel Administration (HOTEL)	0.012	0.009	0.014	-0.005	-0.75	
College of Human Ecology (CHE)	0.029	0.037	0.025	0.012	1.1	
Industrial and Labor Relations (ILR)	0.038	0.063	0.026	0.037	2.91	**
Johnson School (JS)	0.016	0.026	0.011	0.015	1.78	
Law School (LAW)	0.019	0.011	0.022	-0.011	-1.23	
College of Veterinary Medicine (VET)	0.057	0.051	0.06	-0.009	-0.56	

Table 2: Coefficients on the relative pay variable from regressions of SRI enrollment (Yes = 1) on relative pay and hierarchical compositions of covariates

	(1)		(2)		(3)		(4)		(5)	
	OLS	**Logit**	**OLS**	**Logit**	**OLS**	**Logit**	**OLS**	**Logit**	**OLS**	**Logit**
Relative	-0.0332	-0.0331	-0.0336	-0.0336	-0.0339	-0.0343	-0.0337	-0.0341	-0.0322	-0.0296
Pay	(0.0136)*	(0.0138)*	(0.0136)*	(0.0138)*	(0.0136)*	(0.0138)*	(0.0137)*	(0.0139)*	(0.0138)*	(0.0137)*
	[0.0136]*		[0.0136]*		[0.0136]*		[0.0136]*		[0.0134]*	
	{0.0134}*		{0.0137}*		{0.0135}*		{0.0140}*			
Covariates included in the models above:										
Age, yrs of service, fulltime and academic staff dummies	YES		YES		YES		YES		YES	
Gender and ethnicity			YES		YES		YES		YES	
Defined benefit					YES		YES		YES	
Family characteristics							YES		YES	
Unit dummies and salary change									YES	

Sample size is 1073. P-values indicated by: * p<0.05, ** p<0.01, ***p<0.001. Robust standard errors shown in parenthesis for OLS with OIM for logit.
Standard errors calculated via Murphy & Topel (1985) shown in brackets.
Standard errors calculated using the method of biased reduced linearization proposed by Bell & McCaffrey (2002) shown in curly braces clustering on unit dummies.

Table 3: Layoff and relative pay coefficients from regressions of SRI enrollment (Yes = 1) on hierarchical compositions of covariates

	(1)		(2)		(3)		(4)		(5)	
	OLS	**Logit**	**OLS**	**Logit**	**OLS**	**Logit**	**OLS**	**Logit**	**OLS**	**Logit**
Panel A: 4 year average										
Relative pay	-0.0334	-0.0329	-0.0336	-0.0333	-0.0338	-0.0335	-0.0334	-0.0331	-0.0329	-0.0298
	(0.0136)*	(0.0136)*	(0.0136)*	(0.0136)*	(0.0136)*	(0.0136)*	(0.0137)*	(0.0137)*	(0.0136)*	(0.0139)*
Per unit layoffs	0.0199	0.0191	0.0194	0.0186	0.0187	0.0178	0.0188	0.0179	0.0189	0.0181
2009-2006 average	(0.0045)***	(0.0042)***	(0.0046)***	(0.0042)***	(0.0048)***	(0.0043)***	(0.0048)***	(0.0043)***	(0.0048)***	(0.0043)***
Panel B: 3 year average										
Relative pay	-0.0334	-0.0327	-0.0337	-0.0331	-0.0338	-0.0334	-0.0335	-0.0330	-0.0330	-0.0296
	(0.0136)*	(0.0136)*	(0.0136)*	(0.0136)*	(0.0136)*	(0.0136)*	(0.0137)*	(0.0137)*	(0.0136)*	(0.0139)*
Per unit layoffs	0.0148	0.0140	0.0145	0.0137	0.0139	0.0131	0.0139	0.0131	0.0140	0.0132
2009-2007 average	(0.0035)***	(0.0032)***	(0.0035)***	(0.0032)***	(0.0036)***	(0.0032)***	(0.0036)***	(0.0032)***	(0.0036)***	(0.0032)***
Panel C: 2 year average										
Relative pay	-0.0335	-0.0331	-0.0336	-0.0334	-0.0338	-0.0337	-0.0334	-0.0334	-0.0330	-0.0302
	(0.0136)*	(0.0136)*	(0.0136)*	(0.0136)*	(0.0136)*	(0.0136)*	(0.0137)*	(0.0137)*	(0.0136)*	(0.0139)*
Per unit layoffs	0.0145	0.0140	0.0140	0.0135	0.0133	0.0128	0.0134	0.0129	0.0134	0.0129
2009-2008 average	(0.0036)***	(0.0033)***	(0.0036)***	(0.0033)***	(0.0037)***	(0.0033)***	(0.0037)***	(0.0033)***	(0.0037)***	(0.0033)***
Covariates included in the models above:										
Basic[a]	YES		YES		YES		YES		YES	
Gender and ethnicity			YES		YES		YES		YES	
Defined benefit					YES		YES		YES	
Family characteristics							YES		YES	
Salary change									YES	

[a]Basic covariates include age, yrs of service, fulltime and academic staff dummies. P-values indicated by: * p<0.05, ** p<0.01, ***p<0.001.
Sample size is 1073. Robust standard errors shown in parenthesis for OLS with observed information matrix for logit.

Table 4: Resource and relative pay coefficients from regressions of SRI enrollment (Yes = 1) on hierarchical compositions of covariates

	(1)		(2)		(3)		(4)		(5)	
	OLS	**Logit**	**OLS**	**Logit**	**OLS**	**Logit**	**OLS**	**Logit**	**OLS**	**Logit**
Panel A: Deviation from prior year										
Relative pay	-0.0333	-0.0335	-0.0334	-0.0339	-0.0337	-0.0345	-0.0335	-0.0343	-0.0330	-0.0317
	(0.0136)*	(0.0137)*	(0.0136)*	(0.0137)*	(0.0136)*	(0.0137)*	(0.0137)*	(0.0138)*	(0.0136)*	(0.0140)*
Res 2009 per emp dev from prior year	-0.0233	-0.0242	-0.0219	-0.0224	-0.0216	-0.0223	-0.0216	-0.0222	-0.0212	-0.0217
	(0.0106)*	(0.0109)*	(0.0106)*	(0.0110)*	(0.0106)*	(0.0110)*	(0.0106)*	(0.0110)*	(0.0106)*	(0.0110)*
Panel B: Deviation from 2 year avg										
Relative pay	-0.0332	-0.0333	-0.0334	-0.0338	-0.0337	-0.0345	-0.0335	-0.0343	-0.0331	-0.0315
	(0.0136)*	(0.0137)*	(0.0136)*	(0.0138)*	(0.0136)*	(0.0138)*	(0.0137)*	(0.0138)*	(0.0136)*	(0.0141)*
Res 2009 per emp dev from 2 year avg	-0.0190	-0.0195	-0.0180	-0.0181	-0.0198	-0.0202	-0.0197	-0.0201	-0.0194	-0.0199
	(0.0130)	(0.0126)	(0.0130)	(0.0127)	(0.0130)	(0.0127)	(0.0131)	(0.0127)	(0.0130)	(0.0127)
Panel C: Deviation from 3 year avg										
Relative pay	-0.0332	-0.0332	-0.0335	-0.0337	-0.0338	-0.0344	-0.0336	-0.0342	-0.0332	-0.0314
	(0.0136)*	(0.0138)*	(0.0136)*	(0.0138)*	(0.0136)*	(0.0138)*	(0.0137)*	(0.0139)*	(0.0136)*	(0.0141)*
Res 2009 per emp dev from 3 year avg	-0.0068	-0.0071	-0.0055	-0.0057	-0.0088	-0.0092	-0.0087	-0.0091	-0.0081	-0.0083
	(0.0109)	(0.0106)	(0.0110)	(0.0106)	(0.0111)	(0.0108)	(0.0111)	(0.0108)	(0.0111)	(0.0108)
Covariates included in the models above:										
Basic[a]	YES		YES		YES		YES		YES	
Gender and ethnicity			YES		YES		YES		YES	
Defined benefit					YES		YES		YES	
Family characteristics							YES		YES	
Salary change									YES	

[a]Basic covariates include age, yrs of service, fulltime and academic staff dummies. P-values indicated by: * p<0.05, ** p<0.01, ***p<0.001.
Sample size is 1073. Robust standard errors shown in parenthesis for OLS with observed information matrix for logit.

Table 5: Salary expenditures and relative pay coefficients from regressions of SRI enrollment (Yes = 1) on hierarchical compositions of covariates

	(1)		(2)		(3)		(4)		(5)	
	OLS	**Logit**	**OLS**	**Logit**	**OLS**	**Logit**	**OLS**	**Logit**	**OLS**	**Logit**
Panel A: Deviation from prior year										
Relative pay	-0.0333	-0.0336	-0.0334	-0.0339	-0.0337	-0.0344	-0.0334	-0.0341	-0.0329	-0.0317
	(0.0136)*	(0.0136)*	(0.0136)*	(0.0137)*	(0.0136)*	(0.0137)*	(0.0137)*	(0.0137)*	(0.0136)*	(0.0139)*
Sal 2009 per emp dev from prior year	-0.0918	-0.0950	-0.0881	-0.0901	-0.0834	-0.0859	-0.0837	-0.0860	-0.0830	-0.0846
	(0.0311)**	(0.0326)**	(0.0308)**	(0.0327)**	(0.0311)**	(0.0329)**	(0.0312)**	(0.0329)**	(0.0311)**	(0.0330)*
Panel B: Deviation from 2 year avg										
Relative pay	-0.0333	-0.0335	-0.0334	-0.0339	-0.0337	-0.0345	-0.0334	-0.0343	-0.0330	-0.0317
	(0.0136)*	(0.0137)*	(0.0136)*	(0.0137)*	(0.0136)*	(0.0137)*	(0.0137)*	(0.0138)*	(0.0136)*	(0.0140)*
Sal 2009 per emp dev from 2 year avg	-0.0778	-0.0792	-0.0737	-0.0745	-0.0702	-0.0716	-0.0703	-0.0715	-0.0706	-0.0709
	(0.0364)*	(0.0366)*	(0.0362)*	(0.0367)*	(0.0364)	(0.0369)	(0.0365)	(0.0369)	(0.0363)	(0.0369)
Panel C: Deviation from 3 year avg										
Relative pay	-0.0332	-0.0332	-0.0335	-0.0337	-0.0338	-0.0344	-0.0336	-0.0342	-0.0332	-0.0314
	(0.0136)*	(0.0138)*	(0.0136)*	(0.0138)*	(0.0136)*	(0.0138)*	(0.0137)*	(0.0138)*	(0.0136)*	(0.0141)*
Sal 2009 per emp dev from 3 year avg	-0.0388	-0.0395	-0.0331	-0.0341	-0.0368	-0.0383	-0.0365	-0.0378	-0.0357	-0.0359
	(0.0384)	(0.0371)	(0.0385)	(0.0372)	(0.0386)	(0.0375)	(0.0388)	(0.0375)	(0.0386)	(0.0374)
Covariates included in the models above:										
Basic[a]	YES		YES		YES		YES		YES	
Gender and ethnicity			YES		YES		YES		YES	
Defined benefit					YES		YES		YES	
Family characteristics							YES		YES	
Salary change									YES	

[a]Basic covariates include age, yrs of service, fulltime and academic staff dummies. P-values indicated by: * p<0.05, ** p<0.01, ***p<0.001.
Sample size is 1073. Robust standard errors shown in parenthesis for OLS with observed information matrix for logit.

Table 6: Regression of SRI (Yes = 1) on models with layoff, resource and salary change by relative pay

	Relative pay >= 0 + Relative pay < 0		**Relative pay >= 0**		**Relative pay < 0**	
	OLS	**Logit**	**OLS**	**Logit**	**OLS**	**Logit**
Panel A: Everyone						
Dependent variable mean	0.3281		0.2832		0.3700	
A.1: Models with layoff						
Layoff per emp 2006-2009 avg	0.0190 (0.0049)***	0.0183 (0.0043)***	0.0108 (0.0068)	0.0111 (0.0069)	0.0232 (0.0067)***	0.0222 (0.0059)***
A.2: Models with resources						
Resource 2009 per emp deviation from 2008	-0.0214 (0.0106)*	-0.0211 (0.011)	-0.0060 (0.0147)	-0.0064 (0.0153)	-0.0360 (0.0151)*	-0.0353 (0.0156)*
A.3: Models with salary						
Salary 2009 per emp deviation from 2008	-0.0838 (0.031)**	-0.0828 (0.033)*	-0.0560 (0.0435)	-0.0590 (0.0462)	-0.1032 (0.0452)*	-0.0996 (0.0468)*
Sample size	1073		519		554	
Panel B: Without ILR employees						
Dependent variable mean	0.3198		0.2809		0.3566	
B.1: Models with layoff						
Layoff per emp 2006-2009 avg	0.0196 (0.0089)*	0.0193 (0.0088)*	0.0211 (0.0121)	0.0209 (0.0125)	0.0156 (0.0132)	0.0158 (0.0125)
B.2: Models with resources						
Resource 2009 per emp deviation from 2008	-0.0223 (0.0106)*	-0.0218 (0.0109)*	-0.0068 (0.0148)	-0.0073 (0.0153)	-0.0375 (0.0151)*	-0.0364 (0.0153)*
B.3: Models with salary						
Salary 2009 per emp deviation from 2008	-0.0785 (0.0313)*	-0.0763 (0.0328)*	-0.0584 (0.0443)	-0.0611 (0.0464)	-0.0942 (0.0452)*	-0.0887 (0.0461)
Sample size	1032		502		530	

Robust standard errors shown in parenthesis for OLS with observed information matrix for logit. All models contain age, yrs of service, fulltime and academic staff dummies, gender and ethnicity, defined benefit, family characteristics, and salary change. Not included are relative pay or unit dummies.
P-values indicated by: * p<0.05, ** p<0.01, ***p<0.001.

Table 7: Regression of SRI (Yes = 1) on models with job loss indicators given individually and in combination[a]

	(1)	(2)	(3)	(4)	(5)
Panel A: OLS models					
Relative pay	-0.0329 (0.0136)*	-0.0330 (0.0136)*	-0.0329 (0.0136)*	-0.0328 (0.0136)*	-0.0328 (0.0136)*
Layoff per emp 2006-2009 avg	0.0189 (0.0048)***			0.0178 (0.0049)***	0.0168 (0.0051)***
Resource 2009 per emp deviation from 2008		-0.0212 (0.0106)*		-0.0125 (0.0109)	
Salary 2009 per emp deviation from 2008			-0.0830 (0.0311)**		-0.0465 (0.0329)
Panel B: Logit models					
Relative pay	-0.0298 (0.0139)*	-0.0317 (0.0140)*	-0.0317 (0.0139)*	-0.0303 (0.0139)*	-0.0304 (0.0139)*
Layoff per emp 2006-2009 avg	0.0181 (0.0043)***			0.0170 (0.0044)***	0.0160 (0.0046)***
Resource 2009 per emp deviation from 2008		-0.0217 (0.0110)*		-0.0130 (0.0112)	
Salary 2009 per emp deviation from 2008			-0.0846 (0.0330)*		-0.0485 (0.0343)

[a] The correlation between the salary and resource indicators is high (0.90). Consequently, they are not included in the same regression.
Robust standard errors shown in parenthesis for OLS with observed information matrix for logit. All models contain age, yrs of service, fulltime and academic staff dummies, gender and ethnicity, defined benefit, family characteristics, and salary change. Not included are unit dummies.
P-values indicated by: * $p<0.05$, ** $p<0.01$, ***$p<0.001$.

Appendix Table 1: Regression of enrolled in SRI (Yes = 1) on socioeconomic characteristics and employment unit dummies

	OLS	**LOGIT**
Aged 57-58	-0.0199	-0.0277
	(0.0375)	(0.0484)
Aged 59-60	0.1271**	0.1324**
	(0.0438)	(0.0457)
Aged 61-62	0.2242***	0.2156***
	(0.0466)	(0.0450)
Aged 63-64	0.2939***	0.2791***
	(0.0551)	(0.0512)
Aged 65-66	0.3010***	0.2832***
	(0.0664)	(0.0586)
Aged 67-68	0.3321***	0.3165***
	(0.0873)	(0.0780)
Aged 69+	0.3749***	0.3453***
	(0.0955)	(0.0781)
Yrs Srv 16-20	0.0167	0.0184
	(0.0459)	(0.0470)
Yrs Srv 21-25	0.0400	0.0409
	(0.0421)	(0.0435)
Yrs Srv 26-30	0.0580	0.0608
	(0.0430)	(0.0434)
Yrs Srv 31-35	0.1180*	0.1157*
	(0.0515)	(0.0487)
Yrs Srv 36+	0.1829**	0.1615**
	(0.0614)	(0.0537)
Fulltime	-0.0148	-0.0051
	(0.0513)	(0.0472)
Non-academic staff	0.0550	0.0604
	(0.0404)	(0.0429)
Female	0.0157	0.0196

	(0.0304)	(0.0300)
Asian	-0.1804*	-0.2202
	(0.0776)	(0.1248)
Black	0.0233	0.0228
	(0.0966)	(0.0943)
Hispanic	-0.0195	-0.0097
	(0.1417)	(0.1356)
Unknown	0.3602	0.3140
	(0.2015)	(0.1620)
Defined benefit plan	-0.0096	-0.0068
	(0.0507)	(0.0481)
Spouse or partner on health plan	0.0031	0.0048
	(0.0296)	(0.0288)
Dependent child on health plan	-0.0226	-0.0238
	(0.0330)	(0.0370)
SS	-0.0995	-0.0970
	(0.0534)	(0.0542)
AP	-0.1234**	-0.1191**
	(0.0438)	(0.0453)
CALS	0.0047	0.0063
	(0.0496)	(0.0487)
AAP	0.0923	0.0984
	(0.1507)	(0.1249)
ART	-0.1478**	-0.1445**
	(0.0532)	(0.0553)
ENG	-0.1346	-0.1319
	(0.0826)	(0.0858)
HOTEL	-0.1162	-0.1133
	(0.1029)	(0.1326)
CHE	0.0124	0.0137
	(0.0963)	(0.0822)

ILR	0.2280**	0.2120**
	(0.0850)	(0.0729)
JS	0.1648	0.1445
	(0.1165)	(0.1039)
LAW	-0.1055	-0.1043
	(0.0982)	(0.1117)
VET	-0.0518	-0.0434
	(0.0671)	(0.0681)
Salary 2006 to 2009 rel change	-0.2086*	-0.3144*
	(0.1029)	(0.1517)
Log 2009 salary	-0.0934*	-0.0866*
	(0.0376)	(0.0368)
Constant	1.2053**	
	(0.4133)	

Sample size is 1073. Robust standard errors shown in parenthesis for OLS with observed information matrix for logit.
Employment unit codes are as follows: SS "Student Services", AP "Academic Programs", AS "Administration and Support", CALS "College of Agriculture and Life Sciences", AAP "Architecture, Art & Planning", ART "Arts and Sciences", ENG "Engineering", HOTEL "Hotel Administration", CHE "College of Human Ecology", ILR "Industrial and Labor Relations", JS "Johnson School", LAW "Law School", VET "College of Veterinary Medicine".