The Impact of College Campus on Campus Police Employment: Evidence from FBI's Uniform Crime Reports

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ECO375: Applied Econometrics
University of Toronto
Department of Economics
30 November 2022

Abstract

A lot of studies in the past aimed to observe how the number of police officers employed on campus is impacted by the amount of security funding of colleges (*Addington 2009*). However, little attention has been paid to addressing how the number of college police officers is associated with the number of campus crimes. In our study, we run regressions to study whether the total number of campus crimes is correlated with the number of police officers employed on campus after controlling for related factors, and we find that there is a positive correlation between the police officers employed on campus and total campus crime.

Introduction

As campus crimes became more prevalent in the US, many colleges have expressed their dedication to increase security funding (Colton, 2022). However, whether colleges with more campus crimes employ more campus police officers remains uncertain. To study whether the number of police officers is correlated with the number of campus crimes, we first ran a simple regression between the two variables. We show that there is a positive correlation between the two variables, and the result is both statistically and economically significant. However, the data shows significant signs of heteroscedasticity, and there might be other potential omitted variables, most notably the number of enrolments and whether the campus is private or public. Therefore, we improved the model by running a multiple regression and controlled for six more variables that might potentially relate to the dependent variable. The relationship between the number of campus crimes and the number of police officers derived from the multiple regression was also significant, which means that we are confident to say that a college with more campus crimes hires more police officers.

The Context and Data

We used cross-sectional, observational data from the FBI Uniform Crime Report (UCR). It captures information about US colleges in 1992, and each observation is one US college. In total, we have 97 observations corresponding to 97 colleges of different sizes across the United States.

The dataset has five variables, which capture five dimensions of the colleges. The three quantitative variables are the number of crimes on campus, the number of police officers employed on campus, and the number of enrolments, which is an important indicator of the size of the college. In addition, the dataset has one dummy variable that equals one when the college is private and zero when it is public. The data is purely observational and contains various confounding variables. Therefore, we were not able to derive any causal relationship between the independent and dependent variables.

Regression Analysis:

Simple Regression:

For our simple regression model, our input variable is the number of campus crimes, and the output variable is the number of police officers employed on campus. We derived a positive correlation between the two variables, with a slope coefficient of 0.025 and a standard error of 0.004. To find whether our result is statistically significant, we ran a t-test and found that the t-statistic for our slope coefficient is 6.25. As a result, we are able to reject the null hypothesis that says no relationship exists between the number of campus crimes and the number of police officers at an 1% significance level. In addition, we found that one standard error difference in the number of campus crimes is associated with 72% of one standard deviation change in the number of officers employed, which indicates that the result is economically significant.

Multiple Regression

To visualize our data and understand what might be causing this relationship, we ran a scatter plot between our Y and X variables but now adding into it, the dummy variable to differentiate between private and public colleges, as shown in *Figure 2*. Private colleges manage to have relatively low crime levels and therefore low campus police officers employed. On the other hand, public Universities do have a low level of crime, but all the higher crime rate is exclusively focused on public colleges. The data suggests there might be some income effect explaining these changes. According to many articles, lower-income communities tend to have more public

colleges and, as many studies show, there is a significant correlation between income and crime (E.Britt Patterson 1991). There is a similar effect when we look into whether a college is large or small, in terms of the number of enrolment. The mean of the number of enrolments is 16,076, we have decided any college with the number of enrolments smaller than 16,000 is considered small and larger than 16,000 is considered to be a large college. We can see that larger colleges tend to have more police officers employed therefore more crimes which we believe isn't strongly correlated with income effect, rather in colleges where there are more students will have higher an absolute number of crimes. This means there might be a positive correlation between the number of enrolments and the number of police officers employed.

Looking into the scatter plot, the data also show significant signs of heteroscedasticity. We can see that as the campus crime increases, so does the variance in the number of police officers employed on campus.

We also have the size of the college with the number of total enrolments per observation. Likewise, we also have the log of each variable apart from the dummy variable for whether the college is private or public.

In the multiple regression model, we introduced and controlled for six more variables, including campus crimes, campus crimes squared, log (campus crimes), enrolment, log (enrolment), an indicator variable whether the college has small or large enrolment, and an indicator variable whether the college is private or public.

The new variables introduced help in two ways: they not only deal with the non-linearity in our simple regression, but also accounted for more potentially omitted variables.

First, we regress total campus crimes on police officers employed but controlling for whether the college is private or public. This will allow us to see whether college being private or public has an impact on our regression and whether it is statistically significant. As seen in *Table 1* the college being private significantly lowers the number of police officers employed on campus. With a coefficient of -6.1 and a standard error of 2.262 the coefficient is statistically significant at 1% significance level and shows that for private colleges the number of police officers employed is 6.1 units lower than on public colleges on average 99% of the time. We can also observe in column 2 that the coefficient on total campus crimes also decreases by 0.1%.

In column 3 we include another dummy variable for whether the number of enrolment in college is high or not, as discussed earlier. We observe that the slope coefficient for total campus crimes now decreases even more to 0.020. It shows that some of the correlation between on campus officers employed and crimes on campus is now explained by the total number of enrolment and whether the college is private or public.

After controlling for these variables, we wanted to investigate whether there is a non-linear relationship between the number of police officers employed and total campus crimes. We first run an F-test to see whether crime squared and log crime are jointly significant. After an F-Stat of 2.24 with (2, 88) degrees of freedom, we are unable to reject the null hypothesis, which means that in our data including non-linear parameters of crime does not improve the model. We then run an F-test for log(enrol) and enrol squared and found an F-Stat of 0.95 with (2, 88) degrees of freedom. We draw the same conclusions as before, meaning including log enrolment and enrolment squared are not jointly significant and do not improve our model. Likewise, we find that there are no non-linear relationships between police officers employed and total campus crimes, nor between police officers employed and college enrolment. Looking into our regression model in column 4 and 5 does not actually improve our model, which is why we are observing unpredictable coefficients and intercepts with relatively high standard errors.

The overall results of our multiple regression *Table 1* imply that after controlling for the variables mentioned above, there is a significant correlation between the number of campus crimes and the number of police officers employed on campus. In particular, a college with 100 more crimes employs 4.2 more officers, after controlling for all the other variables.

Limitations of Results

There are three major limitations of our multiple regression results. First, we noticed that the most slope coefficients of all the other variables that we controlled for in the multiple regression are not statistically significant. This implies that we are not able to reject the null hypothesis that those variables are associated with the number of employed officers on campus. This is probably due to the small sample size that we have (n = 97). Therefore, to further improve the model in the future, we aim to gather more data to derive a more accurate relationship between the variables.

Second, since we only have limited variables in the dataset, the number of police officers employed on campus is very likely to relate to other variables that we did not control in our multiple models. As a result, we hope to test out the impact of other variables on the dependent variable.

Finally, we are not able to draw any causal relationship with the dataset we have, for that we would need a much larger data set and throughout different years to compare. In other words, we would have to study more in depth and have time series data, which was not feasible for this study.

Conclusion

There is a positive correlation between the number of campus crimes and employed officers, after controlling for six relevant variables, and the result is both economically and statistically significant. We have found that college being private or public and being small or large have an impact on our regression. However, we were not able to find any non-linear relationship in our regression model. Since the sample size is too small, we are not able to derive statistically significant relationships between the dependent variable and other controlled independent variables. Also, we would also like to explore the relationship between other relevant yet omitted variables and the number of police officers employed on campus.

Reference:

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Table and Figures:

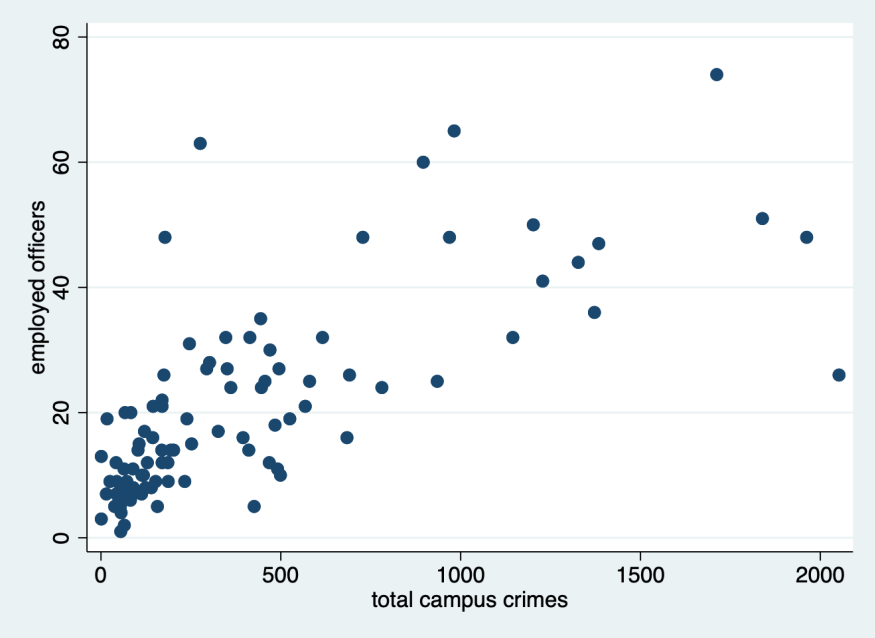

Figure 1

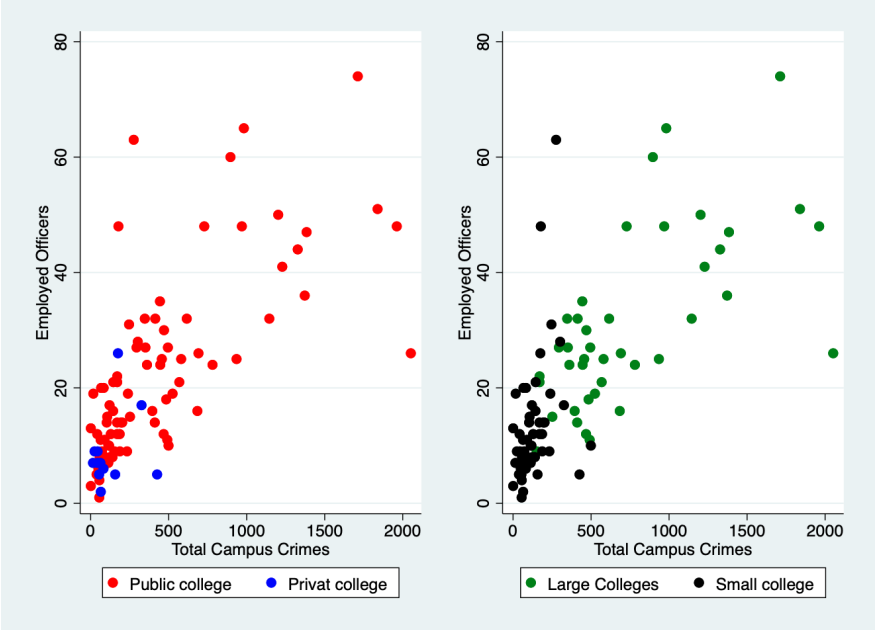

Figure 2

Regression of Police officers employed

	1	2	3	4	5	6
total campus crimes	0.025 **	0.024 **	0.020 **	0.050 **	0.014	0.042 **
	(0.004)	(0.004)	(0.005)	(0.016)	(0.007)	(0.013)
=1 if private college						
1		−6.100 **	−4.915 *	−4.755	−3.803	−4.041
		(2.262)	(2.408)	(2.579)	(2.516)	(2.583)
= 1 if total enrollment large						
1			4.451	−2.000	−4.384	−9.373
			(3.302)	(4.398)	(5.134)	(6.105)
log(crime)				−0.198		−0.071
				(1.195)		(1.244)
crime squared				−0.000		−0.000 *
				(0.000)		(0.000)
total enrollment					0.002	0.002
					(0.001)	(0.001)
log(enroll)					−6.767	−8.308
					(6.541)	(6.022)
enroll squared					−0.000	−0.000
					(0.000)	(0.000)
Intercept	10.817 **	11.956 **	11.152 **	8.683 *	58.352	69.122
	(1.412)	(1.597)	(1.644)	(4.101)	(50.373)	(46.113)
Number of observations	97	97	97	97	97	97

** p<.01, * p<.05

Table 1