THE EFFECT OF ADJUNCT FACULTY ON COLLEGE GRADUATES’ EARNINGS

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ABSTRACT

Over the past few decades, American colleges and universities have begun to rely increasingly on adjunct faculty given tighter budget constraints. Critics allege that students attending such schools face negative consequences, such as lower-quality classroom instruction and lower graduation rates, while others argue that students benefit from the professional labor market experience of adjunct faculty. This paper contributes to this debate on the quality of adjunct faculty and the consequences of attending a school that has a greater reliance on adjunct faculty. I use college graduates’ earnings data from PayScale, Inc. as well as data from IPEDS related to faculty composition and other institutional characteristics in order to estimate the impact of adjunct faculty on college graduates’ earnings. Initially, my results suggest that a greater share of both adjunct and tenured faculty at a school is associated with an earnings reward. There is also an earnings gap that slightly favors an increase in tenured faculty. There is, however, a negative although statistically insignificant effect of both adjunct and tenured faculty on earnings upon using institution fixed effects.
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Introduction

Trends in college education

As U.S. colleges strive to educate greater segments of the nation’s youth, maintaining the quality of education becomes a daunting task. Without an expansion of educational resources, this task is even more difficult. The relationship between these two goals—increasing educational attainment and expanding educational resources—has serious implications for educational outcomes. If the rate at which the number of enrolled college students grows outstrips the rate at which school resources grow, then the number of resources per student would diminish.

Two historical trends portend this outcome. Between 1997 and 2007, overall college enrollment in the U.S. increased from 14.5 million to 18.2 million, or roughly 26% (NCES 2009). Conversely, over the 1980s and 1990s, college graduation rates decreased from approximately 58% to about 52%. These two opposing trends—that is, increasing college enrollment rates and decreasing college graduation rates—should raise concerns about the quality of education as the number of enrolled students rises. Of course, it is fair to question whether graduation rates constitute an appropriate metric for assessing the quality of education. This issue aside, it is nevertheless worthwhile to examine the factors that modulate graduation rates.

The determinants of college quality

Judging the quality of U.S. institutions of higher education involves a multi-dimensional analysis of the quality and quantity of inputs and outputs that feed into and emerge from schools. While graduation rates constitute an important outcome, a comprehensive analysis of college quality must account for the interrelationships between various inputs and outputs. Scott, Bailey,
and Kienzl (2006) contend that raw graduation rates, by themselves, are an inappropriate measure for evaluating college quality. Indeed, in their analysis of public and private universities, they find that the graduation gap between them narrows substantially after controlling for student and institution characteristics.

Other factors impact graduation rates and therefore the quality of college education. College faculties, for example, comprise a fundamental set of inputs that determine schools’ output quality. It is therefore unsurprising that much research has been devoted to examining faculty quality and its impact on student outcomes, especially given the changing profile of faculties across the nation. Over the last several decades, there has been significant growth of non-tenure track faculty among U.S. colleges and universities (Anderson 2002). Between 1987 and 1999, the number of courses taught by such faculty increased by 50 percent at public research universities (NCES 1997). At public doctoral universities, the increase was substantially larger during the same period (NCES 2001). This trend has motivated a number of studies estimating the effects of such faculty—a group whom I hereafter call ‘adjunct faculty’—on academic outcomes, usually with respect to graduation rates. For example, research has shown that reliance on non-tenure track faculty is associated with lower graduation rates in four-year colleges and even community colleges (Bettinger and Long 2006; Jacoby 2006; Ehrenberg and Zhang 2005).

Given evidence of largely negative effects stemming from overreliance on adjunct faculty, schools may be tempted to scale back employment of adjunct faculty. Such a decision, however, is by no means simple, especially if there are benefits that accrue from adjunct faculty instruction. On the one hand, there are strong budgetary concerns that encourage reliance on
And on the other hand, there are qualities which adjunct faculty possess that full-time tenure track faculty may lack, qualities beneficial for student outcomes. In particular, adjunct faculty generally work in professional careers which provide them practical, experiential knowledge in their fields of expertise (Cantor 1997; Leslie and Gappa 1995). Students can serve as the beneficiaries of such knowledge under the tutelage of adjunct faculty.

Since research on the potentially positive effects of adjunct faculty on students—and, more specifically, post-graduate outcomes—has been scant, the present study evaluates whether there are non-budget-related benefits associated with using adjunct faculty. I focus on the effects of adjunct faculty on college graduates’ earnings and thereby address Scott, Bailey, and Kienzl’s (2006) concern about the overreliance of research literature on graduation rates in examining college quality. I hypothesize that adjunct faculty’s experiential knowledge serves as an important link between students’ school experience and employment upon graduation. To capture the quality and extent of this effect, I examine college graduates’ earnings, with the assumption that higher earnings indicate that graduates possess a more desirable set of employment characteristics.

I use panel data over a two-year period for four-year American colleges and universities to evaluate my hypothesis. The data are derived from the U.S. Department of Education’s Integrated Postsecondary Education Data System (IPEDS) and PayScale, Inc.’s annual survey of college graduates’ earnings. Before estimating the effects of adjunct faculty on college graduates’ earnings, I first document further the prior research related to the impact of adjunct faculty on graduation rates. Next, I discuss the theoretical and empirical body of literature explaining the positive effects of adjunct faculty on students. I then introduce my regression

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1 For a detailed discussion of the relationship between fiscal savings and student outcomes, see Bettinger and Long (2010). Donald Unger (2000) also provides a useful discussion of savings associated with hiring adjunct faculty but also offers an illustrative moral debate about adjunct faculty exploitation.
model and summarize the data assembled for this paper. Finally, I estimate the effect of adjunct faculty on college graduates’ earnings and address the statistical and political significance of the estimations. My initial analysis reveals that a higher proportion of tenured faculty is associated with an earnings reward while a higher proportion of adjunct faculty results in a smaller earnings reward. After incorporating institution fixed effects in my analysis, the earnings reward associated with adjunct faculty becomes negative and insignificant. The results also suggest that a higher share of tenured faculty is associated with an earnings penalty, although the relationship is not statistically significant.

**Background**

There has been an ongoing tendency to characterize adjunct faculty as being of lower quality relative to full-time, tenured college faculty. Critics allege that they devote less time to instruction, practice poor curricular development strategies, and provide limited instructional support for students (Jacoby 2006; MLA, 2003; Benjamin 2002; Palmer 1998; National Institute of Education 1984). These problems, if real, should raise serious concerns over schools’ ever-burgeoning reliance on adjunct faculty (Burgan, Weisbuch & Lowry 1999; Balch 1999).

In response to growing concerns about adjunct faculty, a number of studies have examined the impact of instructor type on student outcomes in higher education. Ehrenberg and Zhang (2005) examine the impact of institutional-level variation in part-time and full-time adjunct faculty on college graduation rates. Their results suggest that a higher share of adjunct faculty is associated with lower graduation rates, particularly among four-year public universities. Another study corroborates this finding by demonstrating how reliance on adjunct faculty lowers college graduation rates among public four-year colleges in Ohio (Bettinger and
Long 2006). Jacoby (2006) reveals a similar effect among community college students. He finds that, as the proportion of part-time faculty to full-time faculty increases, community college graduation rates decrease. All in all, these studies have demonstrated how adjunct faculty can negatively impact graduation rates in postsecondary education.

In spite of evidence revealing an overall negative impact of adjunct faculty on graduation rates, other studies point to the advantages of such faculty. Leslie and Gappa (1995) argue that adjunct faculty members’ private sector experience deepens their practical knowledge of particular technical fields and thereby enhances students’ educational experiences. For example, an adjunct professor working for a prominent financial consulting firm might provide students valuable knowledge about real-world finance and best-business practices. In a similar vein, Bettinger and Long (2010) suggest that adjunct faculty have a small positive effect on student enrollment patterns, particularly with respect to professional disciplines (e.g. business and engineering). In other words, students with adjunct professors who have professional careers—as, say, engineers—will enroll in more engineering classes on average. In effect, this enrollment pattern has a positive effect on graduation rates. Here, one could raise issue with the apparent contradiction between these findings and earlier ones related to graduation rates. That is, how could graduation rates decrease as the share of adjunct faculty increases at a higher education institution if adjunct faculty have a positive effect on enrollment patterns? One answer may be that adjuncts encourage subsequent enrollment in particular disciplines but not to an extent sufficient to overcome an overall negative effect on graduation rates.

Previous research demonstrates both positive and negative academic consequences when four-year colleges and universities rely on a greater share of adjunct faculty relative to tenured faculty. In tandem, the findings discussed raise the question of whether adjunct faculty impart
benefits to students that are not fully captured by measures of academic outcome like college graduation rates. My thesis delves deeper into this insight by estimating the effect of adjunct faculty on college graduates’ earnings. If adjunct faculties, for example, do encourage students to pursue further coursework in specialized fields of practice, these students may choose to pursue careers in related fields while benefiting from a higher likelihood of employment and higher earnings. Fitzgerald (2000) found that students with diffuse transcripts, i.e. transcripts with excessive subject diversity, had lower post-graduation earnings. He argues that highly diverse transcripts may signal to employers that prospective employees lack specialized experience in subjects that may matter for employers. Thus, his finding therefore implies that greater concentration in particular subjects may be associated with an earnings reward.

Prior to graduation, adjunct faculty may also provide college-employer links by offering valuable internship and networking opportunities. Given evidence of strong school-labor market connections among two-year community colleges, which rely heavily on adjunct faculty, it may be likely that adjunct faculty also provide a similar link for students attending four-year colleges (Rosenbaum and Person 2006; Deil-Amen and Rosenbaum 2004). Employers may also be able to discern students’ strong experiential and practical knowledge, particularly in specialized fields, and may therefore prefer hiring such students. Adjunct faculty therefore scaffold students’ school-to-labor-market transition by imparting valuable practical skills and knowledge during college while providing students more opportunities for gaining work experience through internships and networking than traditional tenured faculty. More importantly, these factors raise the prospects of employment and result in higher earnings for students (Pascarella and Terenzini 1991). It is, nevertheless, an empirical matter as to whether having a greater proportion of
adjunct faculty relative to tenured faculty is indeed associated with higher earnings. I explore this issue in the following sections.

**Data and Model**

Using two sources, I compile panel data for school years (SY) 2008-09 and 2009-10. I use postsecondary data from the Integrated Postsecondary Education Data System (IPEDS) collected by the National Center for Education Statistics (NCES). IPEDS provides a national set of institution-level data from U.S. colleges and universities pertaining to institutional and student characteristics such as faculty composition and graduation rates. Along with data from IPEDS, I use data from PayScale, Inc. that provides institution-level data about college graduates’ earnings. The data are collected through a voluntary survey conducted among full-time U.S. employees with bachelor’s degrees and five years of experience or less in their career. I focus on 2008-09 and 2009-10, as earnings data for 2007-08 are limited and earnings data are nonexistent for all preceding years. While having only two years of data available may be a potential limitation, it is still worth exploring earnings variation across time.

In this paper, the variables of interest within IPEDS are those indicating faculty tenure status, SAT scores, and those related to racial demographics. With the exception of the SAT variable, I express all these variables as proportions. First, I express the count of all adjunct and tenured faculty separately as proportions of the total faculty count in order to derive the *proportion of adjunct faculty* and *proportion of tenured faculty* variables. I also combine the student count variables for all non-white racial groups and divide by the total student count in order to derive a *proportion of minority students* variable. Using these data, my analysis is divided broadly into two parts. The first part uses only year fixed effects, while the second part
uses year and institution fixed effects. Since I will analyze college earnings data for 2008 and 2009 graduates, I use the average of IPEDS data on faculty and institutional characteristics for the four years preceding students’ graduation in both 2008 and 2009. In particular, I exploit IPEDS data from 2004-2008 for 2008 graduates and 2005-2009 IPEDS data for 2009 graduates. I then combine the relevant IPEDS data above with graduates’ median starting salary data from PayScale, Inc.

Using the composite data from IPEDS and PayScale Inc, I use the method of ordinary least squares (OLS) to estimate the following model:

$$\log(W_{it}) = \alpha + \beta T_{it} + \varphi A_{it} + \gamma X_{it} + \lambda_i + \pi_t + \epsilon_{it}$$

where

1. $W_{it}$ is the median of college graduates’ starting earnings at institution $i$ in year $t$
2. $X_{it}$ is a set of institution characteristics including the a variable representing SAT scores of incoming freshman and the proportion of minority students at institution $i$ in year $t$
3. $A_{it}$ is the proportion of adjunct faculty at institution $i$ in year $t$
4. $T_{it}$ is the proportion of tenured faculty at institution $i$ in year $t$
5. $\pi_t$ represents a full set of school year fixed effects
6. $\lambda_i$ represents a full set of institution fixed effects
7. $\epsilon_{it}$ represents an error term

Within the set of institutional characteristic variables, I combined the averages of the 25th and 75th percentile of SAT scores of entering students for both the math and verbal sections to derive the SAT variable. Following Ehrenberg and Zhang (2005), I control for SAT scores given that SAT scores may be a proxy for schools’ academic quality. It is possible that higher SAT scores might be associated with higher post-graduate earnings. I also control for the
proportion of minority students, which may partly explain earnings differences (Fitzgerald 2000). Given that there are multiple observations per institution, I account for within-school error correlation by using clustered standard errors.

A few other variables are also of interest. I average full-time student enrollment over the four years preceding graduating for both the 2009 and 2010 cohorts and use this as a weighting variable in order to account for relative school size disparities. I also estimate my model separately for eight distinct geographic regions as specified within NCES.\(^2\) It is possible that adjunct faculty may produce differential impacts on student earnings depending on the region in which a student attends school. In particular, students attending schools in areas with high concentrations of employment opportunities may tend to have higher earnings.

Before I estimate the year and institution fixed effects model above, I first limit my analysis to year fixed effects. Although this renders the analysis more vulnerable to the effects of omitted variables, it allows us to exploit variation between institutions. Although analyzing variation within institutions over two years only makes uses of marginal variation, it is worthwhile undertaking in order to address potential bias from time-invariant omitted variables.

**Results**

*Across-institution analysis*

The first column of Table 1 presents summary statistics on the overall full-time equivalent student enrollment, proportion of adjunct faculty, proportion of tenured faculty, combined SAT Math and Verbal score, and proportion of minority students for the IPEDS/PayScale composite data panel. Columns 2 and 3 show averaged values for those variables for the four years preceding 2009 and 2010 graduation. We can see that full-time

\(^2\) See the appendix for geographic region codes.
equivalent enrollment increased between the years of 2005-2008 and 2006-2009 from 11049 to 11336 students. This is a small, yet appreciable, increase in the number of students. The proportion of minority students also increases incrementally from 0.333 to 0.341 across the two year periods. The other variables, however, are for the most part stable between the two four-year time periods. For example, the proportion of adjunct faculty is 0.242 for both 2009 to 2010 graduating cohorts. Likewise, Table 2 shows that the log of college graduates’ earnings between 2009 and 2010 is relatively stable, although there is a marginal decrease between 2009 and 2010 (i.e. 10.69 to 10.67). Again, the small magnitudes of these year-to-year changes motivate the across-institution analysis.

Table 3 includes estimates from an initial unweighted regression of log earnings on the average proportion of adjunct faculty, the proportion of tenured faculty, the combined SAT score on the Verbal and Math sections, the proportion of minority students, and year fixed effects. For model (1), the results indicate that, all else equal, a one percentage point increase in the share of adjunct faculty is associated with a 0.181 percent increase in earnings. This effect is statistically significant at the ten percent level. The results also show that, all else equal, a one percentage point increase in the proportion of tenured faculty is associated with a 0.267 percent increase in earnings. This estimate is statistically significant at the one percent level. Thus, there is a roughly 0.086 percentage point earnings gap between the effects of adjunct and tenured faculty. In other words, for a college graduate earning $40,000 annually, earnings would rise by $724 given a 10 percentage point increase in adjunct faculty compared to an additional $1068 for commensurate increase in tenured faculty, all else equal. Thus, the earnings disparity between the effects of adjunct and tenured faculty on earnings is somewhat marginal. These preliminary
results suggest that adjunct and tenured faculty do not have a significantly disparate impact on college graduates’ earnings.

The estimated coefficients for SAT scores and the proportion of minority students are worth mentioning briefly. Both variables have a highly statistically significant effect on earnings. A 100-point increase in SAT score is associated with a 1.07 percent increase in earnings. A one percentage point increase in the share of minority students is associated with 0.21 percent higher earnings. At first, one could argue that this may be due to the fact that schools with more minority students might be more selective. More selective schools may produce students who earn more than students graduating from less selective schools. The positive effect of SAT scores on earnings also appears to lend credence to this hypothesis. Of course, it may still be the case that SAT scores do not adequately capture the selectivity of schools. Or perhaps schools with higher proportions of minority students may graduate students who earn more than schools with lower proportions of minority students for reasons that operate through mechanisms other than selectivity.

Next, I estimate model (2), which adds a student enrollment weight to all variables. The direction and relative magnitudes of the estimated coefficients for the proportion of adjunct and tenured faculties are consistent with those from earlier. Both estimates are statistically significant at the one percent level and suggest that, after accounting for the relative differences in school sizes by enrollment, the effects of both adjunct and tenured faculties increase. Here again, the difference between the effects of adjunct and tenured faculties is not substantial (0.292 v. 0.373, respectively). Also, the effects of SAT and the proportion of minority students are roughly unchanged.
These initial findings from models (1) and (2), when taken together, illustrate how the earnings reward that obtains from increasing either the proportion of adjunct or tenured faculty is somewhat similar. One could here argue that, with respect to earnings, having more adjunct faculty does not negatively impact students. Even if one objects that the earnings differential represents a negative consequence of hiring more adjunct faculty, this difference is marginal.

Finally, Table 4 displays the results from analyzing the data by region using the IPEDS geographic region code. The codes principally divide schools into nine regions, eight of which I use in this paper: New England, Mideast, Great Lakes, Plains, Southeast, Southwest, Rocky Mountains, and Far West and outlying areas. After disaggregating the data by region, the direction of the effects for adjunct and tenured faculties remains largely consistent. The only exception arises with the New England region, wherein a one percentage point increase in adjunct faculty is associated with a 0.013 percent decrease in earnings. This effect, however, is statistically insignificant. The discrepancies between the effects of adjunct and tenured faculty, moreover, are also small in this analysis. For example, in the Southeast, a one percentage point increase in the proportion of adjunct faculty is associated with a 0.41 percent increase in earnings. Almost equivalently, the same increase in the share of tenured faculty is associated with 0.44 percent higher earnings. Both results are statistically significant at the one percent level. Also, the effects of SAT score and the proportion of minority students are also positive and are statistically significant for most regions.

From this regional analysis, it is tempting to claim that the effect of adjunct and tenured faculty does not vary substantially by region. Intuitively, however, one might believe that the region in which a school is located should matter. Consider, for example, the mid-Atlantic region, which includes highly-dense populations and large urban centers that provide a rich environment for higher education.

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3 The ninth category, ‘Outlying Areas,’ includes American territories.
source of professionals who might serve as adjunct faculty at nearby schools. Given both a considerable supply of such faculty and an already existing demand for labor in professional fields, it might be the case that adjunct faculty are better able to transmit essential practical knowledge about professional fields to students compared with adjunct faculty in other regions. Higher earnings associated with an increase in adjunct faculty relative to the earnings associated with the same increase in tenured faculty would reflect this potential mechanism. Although this is not the case, the results do not repudiate the possibility that faculty effects could vary by region. Using a more granular analysis—say, one in which data relating student enrollment by academic discipline is available—a more substantial differential effect may arise. That is, if the number of students enrolled in certain professional fields, like engineering, is relatively high in certain regions, then large urban centers with a high supply of adjunct faculty working in related fields could benefit students to an extent greater than where such a supply is absent. Unfortunately, the data used herein does not allow for such analysis, and so I do not here explore this issue.

Within-institution analysis

The preceding analysis represented an across-institution analysis which exploited variation across schools over a two-year period. Now, I turn to a within-institution analysis and thereby address the issue of time-invariant omitted variables. Table 5 shows the results of this analysis. After estimating the effect of adjunct and tenured faculty on earnings, the direction of the effect of tenured faculty shifts in the opposite direction. As with the first analysis, I first estimate the effect of adjunct faculty without a student enrollment weight. In this estimation, coefficients for both the proportion of adjunct and tenured faculty are both negative, although

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4 NCES refers to this region as ‘Mideast.’
practically and statistically insignificant. For instance, a one percentage point increase in the share of tenured faculty is associated with a 0.00517 percent decrease in earnings, other things equal. The effect of the proportion of minority students on earnings is also practically and statistically insignificant. And, as with earlier, SAT scores have an expected positive effect on earnings, but now the magnitude is smaller. Upon adding a student enrollment weight to the estimator, the ordinal relationship between the effects of adjunct and tenured faculty reverses. All else equal, a one percentage point increase in the share of adjunct faculty is associated with a 0.0134 percent decrease in graduates’ earnings, while the same increase in the proportion of tenured faculty is associated with a larger 0.0544 percent decrease. Indeed, this is a paradoxical result given that tenured faculty appear to be associated with an earnings penalty. In the absence of a theoretical explanation, I will shortly discuss some methodological limitations that may explain this finding.

Finally, I conduct the same analysis above by region. I show the results in Table 6.

Unlike with the first analysis, no meaningful pattern emerged relating to the direction of effects for adjunct and tenured faculty on earnings. In five of the eight regions (New England, Mideast, Plains, Southeast), a higher share of adjunct faculty is associated with lower earnings. In two of these five regions (Plains and Southeast), the estimated effects of tenured faculty are also negative and have magnitudes greater than those of adjunct faculty. For instance, in the Southeast, the estimated coefficient for the impact of adjunct faculty on earnings is -0.0146 compared to -0.316 for that of tenured faculty. It is unclear as to why these particular results emerge. Taken as a whole, it is difficult to make sense of these findings largely due to the absence of meaningful patterns consistent with earlier findings and previous research. Also,
aside from the statistically significant effect of adjunct faculty on earnings in the Rocky
Mountain region, I find that none of the other faculty effects are statistically significantly.

In light of the unexpected direction and magnitude of the relationships discussed above, it
is worthwhile examining methodological limitations which could explain the lack of consistent
findings in the preceding analysis. Specifically, I devote the next part of this discussion to the
limited variation in data within institutions across years and how this may have impacted the
present findings.

*Problem issues*

The last portion of the preceding discussion raises some important technical issues. First,
it may have been possible that using institution fixed effects significantly constrained the amount
of variation within the explanatory variables and thereby eroded the relationships that emerged in
the first analysis. For example, given that the faculty variables were obtained by first averaging
faculty counts over two overlapping four-year periods, the difference between the derived faculty
proportion variables is marginal.

Other more fundamental issues are worth addressing. First, the PayScale, Inc. salary
survey data are likely measured with error, which may lead to less precise estimates. Second, it
may be the case that there is sample selection bias in the underlying data. For example, adjunct
faculty and tenured faculty may have differential effects on graduates’ employment prospects,
and individuals are only included in the PayScale data if they are actually employed. Another
source of sample selection bias could derive from individuals’ greater likelihood of reporting
earnings if their earnings are higher. This would lead to an attenuation of the estimated effects of
adjuncts and tenured faculty on earnings.
Another issue is that the survey is representative only of undergraduate students and does not distinguish students by area of discipline. First, if it the case that adjunct and tenured faculty have differential impacts on undergraduate and graduate students, then it is not possible to fully evaluate the impact of adjunct faculty. In other words, if adjunct faculty significantly benefit graduate students (studying, say, subjects of professional expertise) relative to undergraduate students, institutions may be justified in hiring a greater proportion of adjunct faculty. This may be the case even in spite of research associating lower graduation rates with institutions that rely heavily on adjunct faculty and the results from the present study which point to an earnings gap. And second, it is likely that students studying computer engineering, for example, may benefit disproportionately from adjunct faculty with respect to earnings compared to, say, a student studying English literature. As I have argued earlier, being taught by adjunct faculty who have experience in certain professional fields, like engineering, promotes students’ interest in related academic fields. This helps students attain specialized knowledge, which may serve as a positive signal for employers and may therefore reap students an earnings reward. Unfortunately, the data used herein do not accommodate this analysis.

Conclusion

Summary

This thesis represents the first study to systematically evaluate the relationship between adjunct faculty and college graduates’ earnings. At a first cut, it provides some evidence that the return to having a higher share of tenured faculty at one’s college is only marginally greater than the return to having a higher share of adjunct faculty. These initial results can therefore help reject the notion that adjunct faculty have a negative impact on students, at least with respect to post-graduate earnings. These findings, however, should be interpreted with caution.
After adding institution fixed effects to the estimator, the direction of the effect of tenured faculty on earnings reversed. Similar results also obtained in the regional analysis, yet, overall, no meaningful and consistent pattern emerged. Though this may be largely a consequence of marginal variation in faculty composition within institutions across years, it is difficult to decisively discern the true effect of adjunct faculty on earnings. Even with data spanning a wider range of years, it may still be the case that there the estimated effects identified in the initial analysis do not reflect the true impact of adjunct faculty on earnings.

**Policy significance**

From this study, there are several policy issues worth mentioning. What do the results suggest about the costs of adjunct faculty? It appears that hiring more adjunct faculty has no decisively negative impact on college graduates’ earnings. And, moreover, the results suggest that an increase in the proportion of tenured faculty tends to be associated with only slightly higher earnings than a commensurate increase in the proportion of adjunct faculty. This result is also consistent in separate regional analyses. Upon accounting for institution fixed effects, however, the results become rather inconsistent at the regional level. Although there is still an earnings gap, it favors adjunct faculty in a few regions. The issue, however, is that it is difficult to extract any meaningful and statistically significant pattern between the effect of adjunct faculty and earnings by region.

Leaving aside tenuous findings which point to an earnings advantage stemming from a greater share of adjunct faculty, one can argue that, given the small magnitude of the earnings differential, schools’ decision to hire more adjunct faculty incurs a low cost. Nevertheless, even if one views these facts alongside prior research about the negative impacts of adjunct faculty on
other student outcomes, it is still unclear whether four-year universities should reconsider policies of hiring more adjunct faculty. Indeed, it is possible that earnings, like graduation rates, do not reflect the full value of adjunct faculty. Even if they do, the data used in this thesis cannot elucidate any such relationship given the absence of finer data linking students’ undergraduate majors to post-graduate earnings.

Now, one might reconsider whether the trend toward increasing reliance on adjunct faculty is as alarming as critics allege. In fact, one might reevaluate whether it is worthwhile investing more resources in adjunct faculty. If schools in certain areas, such as those in mid-Atlantic states, benefit more from adjunct faculty than from tenured faculty, they may be justified in hiring more adjunct faculty. In effect, schools would receive a ‘bigger bang for the buck”. And, indeed, adjunct faculty may simply be well-suited to the needs of students in particular geographical labor markets. If one takes the opposing view—namely, that adjunct faculty contribute to undesirable outcomes—greater investments in adjunct faculty may still be justified. Such a suggestion seems inconsistent at first. If schools are hiring more adjuncts in order to accrue savings, what factors might motivate them to invest more resources into their adjunct faculty?

Suppose first that a university faces a decision of whether or not to hire additional adjuncts. Imagine further that adjuncts are substantially cheaper to hire than tenured faculty. Given its budgetary constraints, the university elects to hire additional adjuncts. Several years later, the university, pleased with results of a study which uncovers favorable outcomes resulting from its earlier decision, faces a new decision juncture: Should it invest more in adjunct faculty? All else equal, its decision may now hinge on whether the costs incurred through additional training and instructional support on an adjunct are less than the costs of hiring an additional
tenured faculty member. Suppose that the university chooses to invest a greater amount of resources in its current adjunct faculty. If later an evaluation of this higher level of investment demonstrates that the effects of adjuncts on various outcomes are roughly commensurate to those of tenured faculty, then it suggests that additional adjuncts are not themselves problematic. Rather, the level of resources that faculty receive appears to be a primary determinant of their impact on students. Thus, the central question here is whether, by hiring adjunct faculty, it is possible to produce savings while attaining benefits similar to those associated with tenured faculty. Put differently, this implies that, if the effects of adjuncts on student outcomes are similar to those of tenured faculty, there are characteristics specific to adjunct faculty which may in fact drive those effects.

Although the hypothetical I have constructed requires empirical analysis to buttress whatever truth it may hold, it encourages one to consider how faculty expenditures relate to the impact of adjunct faculty on students. As my results suggest, the difference between earnings associated with an additional adjunct or tenured faculty member is not practically significant. Thus, with respect to earnings, the level of additional expenditures required in order to equalize the effects of adjunct and tenured faculty on earnings may not be prohibitive. Given that adjuncts cost universities as much as 80 percent less than full-time (mostly tenured) faculty, there is reason to believe that even if expenditures related to adjunct faculty increased, savings might still be substantial (CUPA-HR 2001).

Whether or not it is possible to spend additional resources on adjunct faculty is a related and important matter. Over the last two decades, state appropriations for public higher education have been declining given other priorities in states’ spending of tax revenues. Exacerbating this factors is a belief firmly-held among state legislatures, namely that in-state
tuition for public universities should be affordable (Ehrenberg 2002). Together, these two factors—lower state appropriations and low tuition—make unlikely the prospect of greater investments in existing adjunct faculty, such as professional development and instructional support. Thus, it is important that future research is aimed at elucidating the relationship between the costs and benefits associated with additional expenditures on adjunct faculty.

Absent increases in state appropriations for higher education or higher college tuitions, there are means by which students can either lean against the negative effects associated with adjunct instruction or leverage their positive attributes. Students are able to examine a school’s relative composition of tenured and adjunct faculty and have some degree of choice in enrollment based on that information. Once enrolled, they can enroll in classes taught by tenured faculty. Though, of course, the extent to which a student can exercise such choice will vary across and within institutions. Indeed, at universities with a particularly heavy reliance on adjunct faculty, such choice may be severely constrained.

New directions

This thesis illuminates the difficulty in capturing the full impact that adjunct faculty have on students. As I mentioned earlier, such an evaluation requires us not only to examine the effects of adjuncts on undergraduates but on graduate students as well. This represents one direction for further research. Other contributions to the extant literature might include limiting analysis of adjunct faculty to two-year colleges. Much research has been devoted to the strong school-labor market nexus among these schools. Since these schools also rely more heavily on adjunct faculty, there may be a different relationship between earnings and adjunct faculty for them. Aside from the issue of the type of student (i.e., graduate or community college student),
there is still room to explore the effect of adjuncts on earnings for students majoring in particular disciplines. While this thesis begins uncover insights in that direction, it is far from exhaustive.

And finally, more research must be devoted to exploring the interaction between education finance and adjunct faculty. Such research can offer insights into how the level of expenditures for universities affects student outcomes given different sets of institutional characteristics. All in all, the hope here is that this thesis inspires research in all these various directions while providing instructive scaffolding for higher education policy.
### Appendix

**Table 1: Summary Statistics of IPEDS Data**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Overall</th>
<th>2005-2008</th>
<th>2006-2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full-time Equivalent Enrollment</td>
<td>11192</td>
<td>11049</td>
<td>11336</td>
</tr>
<tr>
<td>σ</td>
<td>9611</td>
<td>9477</td>
<td>9750</td>
</tr>
<tr>
<td>N</td>
<td>1073</td>
<td>537</td>
<td>536</td>
</tr>
<tr>
<td>Proportion of Adjunct Faculty</td>
<td>0.242</td>
<td>0.242</td>
<td>0.242</td>
</tr>
<tr>
<td>σ</td>
<td>0.145</td>
<td>0.147</td>
<td>0.143</td>
</tr>
<tr>
<td>N</td>
<td>1073</td>
<td>537</td>
<td>536</td>
</tr>
<tr>
<td>Proportion of Tenured Faculty</td>
<td>0.520</td>
<td>0.520</td>
<td>0.520</td>
</tr>
<tr>
<td>σ</td>
<td>0.124</td>
<td>0.124</td>
<td>0.124</td>
</tr>
<tr>
<td>N</td>
<td>1073</td>
<td>537</td>
<td>536</td>
</tr>
<tr>
<td>SAT Verbal and Math, Combined</td>
<td>1026</td>
<td>1026</td>
<td>1027</td>
</tr>
<tr>
<td>σ</td>
<td>367</td>
<td>368</td>
<td>366</td>
</tr>
<tr>
<td>N</td>
<td>1073</td>
<td>537</td>
<td>536</td>
</tr>
<tr>
<td>Proportion of Minority Students</td>
<td>0.337</td>
<td>0.333</td>
<td>0.341</td>
</tr>
<tr>
<td>σ</td>
<td>0.184</td>
<td>0.185</td>
<td>0.183</td>
</tr>
<tr>
<td>N</td>
<td>1071</td>
<td>536</td>
<td>536</td>
</tr>
</tbody>
</table>

Notes: Table shows means of variables by year. (1) contains averages for 2005-2009 while (2) and (3) show averages for four-year subsets. Below each mean is the corresponding standard deviation.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Overall (1)</th>
<th>2009 (2)</th>
<th>2010 (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earnings</td>
<td>43994.13</td>
<td>44518.25</td>
<td>43469.03</td>
</tr>
<tr>
<td>σ</td>
<td>6000.08</td>
<td>6142.46</td>
<td>5812.41</td>
</tr>
<tr>
<td>log(earnings)</td>
<td>10.68</td>
<td>10.69</td>
<td>10.67</td>
</tr>
<tr>
<td>σ</td>
<td>0.13</td>
<td>0.13</td>
<td>0.13</td>
</tr>
<tr>
<td>N</td>
<td>1073</td>
<td>537</td>
<td>558</td>
</tr>
</tbody>
</table>

Notes: Table shows the mean and standard deviation for earnings by year. (1) contains the averages for 2009 and 2010 while (2) and (3) show averages for 2009 and 2010 separately. The natural log of earnings is also shown.
<table>
<thead>
<tr>
<th>Variable</th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of Adjunct Faculty</td>
<td>0.181</td>
<td>0.292</td>
</tr>
<tr>
<td></td>
<td>[0.0934]*</td>
<td>[0.0721]***</td>
</tr>
<tr>
<td>Proportion of Tenured Faculty</td>
<td>0.267</td>
<td>0.374</td>
</tr>
<tr>
<td></td>
<td>[0.119]**</td>
<td>[0.0961]***</td>
</tr>
<tr>
<td>SAT, Verbal and Math Sections, Combined</td>
<td>0.0107</td>
<td>0.0116</td>
</tr>
<tr>
<td>(in hundreds)</td>
<td>[0.00149]***</td>
<td>[0.00141]***</td>
</tr>
<tr>
<td>Proportion of Minority Students</td>
<td>0.211</td>
<td>0.196</td>
</tr>
<tr>
<td></td>
<td>[0.0287]***</td>
<td>[0.0276]***</td>
</tr>
<tr>
<td>N</td>
<td>1071</td>
<td>1071</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.245</td>
<td>0.326</td>
</tr>
</tbody>
</table>

Notes: Equation (1) is a fixed effects model wherein year effects are held fixed. The variables on the right-hand side of the equation represent institutional characteristics averaged over the four years preceding graduation in either 2009 or 2010. Equation (2) is the same as Equation (1) except that all right-hand side variables have been weighted by average full-time equivalent student enrollment. Standard errors are also clustered at the school level. A single asterisk denotes statistical significance at the 10% level. A double asterisk denotes statistical significance at the 5% level. A triple asterisk denotes significance at the 1% level.
### Table 4: Effect of Adjunct Faculty on College Graduates’ Earnings

<table>
<thead>
<tr>
<th>Variable</th>
<th>New England (1)</th>
<th>Mid-est (2)</th>
<th>Great Lakes (3)</th>
<th>Plains (4)</th>
<th>Southeast (5)</th>
<th>Southwest (6)</th>
<th>Rocky Mountains (7)</th>
<th>Far West (8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of Adjunct Faculty</td>
<td>-0.0130 [0.149]</td>
<td>0.199 [0.177]</td>
<td>0.0765 [0.182]</td>
<td>0.170 [0.204]</td>
<td>0.414 [0.0742]**</td>
<td>0.150 [0.132]</td>
<td>0.0447 [0.340]</td>
<td>0.128 [0.272]</td>
</tr>
<tr>
<td>Proportion of Tenured Faculty</td>
<td>0.0911 [0.188]</td>
<td>0.185 [0.222]</td>
<td>0.131 [0.241]</td>
<td>0.285 [0.236]</td>
<td>0.446 [0.134]**</td>
<td>0.547 [0.177]**</td>
<td>0.0318 [0.448]</td>
<td>0.156 [0.294]</td>
</tr>
<tr>
<td>SAT, Verbal and Math, Combined (in hundreds)</td>
<td>0.0299 [0.00942]**</td>
<td>0.0279 [0.00719]**</td>
<td>0.00761 [0.00172]**</td>
<td>0.00335 [0.00226]</td>
<td>0.0154 [0.00342]**</td>
<td>0.0226 [0.00314]**</td>
<td>0.00177 [0.00504]</td>
<td>0.0251 [0.00205]</td>
</tr>
<tr>
<td>Proportion of Minority Students</td>
<td>0.362 [0.116]**</td>
<td>0.267 [0.0621]**</td>
<td>0.250 [0.0855]**</td>
<td>0.319 [0.162]**</td>
<td>0.104 [0.0534]*</td>
<td>0.0435 [0.0610]</td>
<td>0.0618 [0.426]</td>
<td>0.170 [0.0642]**</td>
</tr>
<tr>
<td>N</td>
<td>106</td>
<td>214</td>
<td>188</td>
<td>94</td>
<td>216</td>
<td>79</td>
<td>44</td>
<td>130</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.586</td>
<td>0.454</td>
<td>0.316</td>
<td>0.188</td>
<td>0.305</td>
<td>0.694</td>
<td>0.0158</td>
<td>0.27</td>
</tr>
</tbody>
</table>

Notes: The results above are from a fixed effects model wherein year effects are held fixed. The variables on the right-hand side of the equation represent institutional characteristics averaged over the four years preceding graduation in either 2009 or 2010. All right-hand side variables have been weighted by average full-time equivalent student enrollment. (1) - (8) all use the same model but rely on sample differing by region. Standard errors are clustered at the school level. A single asterisk denotes statistical significance at the 10% level. A double asterisk denotes statistical significance at the 5% level. A triple asterisk denotes statistical significance at the 1% level.
<table>
<thead>
<tr>
<th>Variable</th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of Adjunct Faculty</td>
<td>-0.0252</td>
<td>-0.0134</td>
</tr>
<tr>
<td></td>
<td>[0.0632]</td>
<td>[0.0779]</td>
</tr>
<tr>
<td>Proportion of Tenured Faculty</td>
<td>-0.00517</td>
<td>-0.0544</td>
</tr>
<tr>
<td></td>
<td>[0.139]</td>
<td>[0.119]</td>
</tr>
<tr>
<td>SAT, Verbal and Math Sections, Combined</td>
<td>0.00280</td>
<td>0.00377</td>
</tr>
<tr>
<td>(in hundreds)</td>
<td>[0.00170]*</td>
<td>[0.00111]***</td>
</tr>
<tr>
<td>Proportion of Minority Students</td>
<td>0.0834</td>
<td>0.0726</td>
</tr>
<tr>
<td></td>
<td>[0.153]</td>
<td>[0.131]</td>
</tr>
<tr>
<td>N</td>
<td>1071</td>
<td>1071</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.968</td>
<td>0.987</td>
</tr>
</tbody>
</table>

Notes: Equation (1) is a fixed effects model wherein year and institution effects are held fixed. The variables on the right-hand side of the equation represent institutional characteristics averaged over the four years preceding graduation in either 2009 or 2010. Equation (2) is the same as Equation (1) except that all right-hand side variables have been weighted by average full-time equivalent student enrollment. Standard errors are clustered at the school level. A single asterisk denotes statistical significance at the 10% level. A double asterisk denotes significance at the 5% level. A triple asterisk denotes statistical significance at the 1% level.
### Table 6: Effect of Adjunct Faculty on College Graduates' Earnings Using Institution Fixed Effects

<table>
<thead>
<tr>
<th>Variable</th>
<th>New England (1)</th>
<th>Mideast (2)</th>
<th>Great Lakes (3)</th>
<th>Plains (4)</th>
<th>Southeast (5)</th>
<th>Southwest (6)</th>
<th>Rocky Mountains (7)</th>
<th>Far West (8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of Adjunct Faculty</td>
<td>-0.53</td>
<td>-0.012</td>
<td>0.151</td>
<td>-0.0514</td>
<td>-0.0146</td>
<td>0.406</td>
<td>-0.175</td>
<td>0.0846</td>
</tr>
<tr>
<td></td>
<td>[0.617]</td>
<td>[0.120]</td>
<td>[0.162]</td>
<td>[0.402]</td>
<td>[0.275]</td>
<td>[0.271]</td>
<td>[0.0897]*</td>
<td>[0.172]</td>
</tr>
<tr>
<td>Proportion of Tenured Faculty</td>
<td>-0.453</td>
<td>0.193</td>
<td>0.272</td>
<td>-0.316</td>
<td>-0.327</td>
<td>0.371</td>
<td>0.184</td>
<td>-0.203</td>
</tr>
<tr>
<td></td>
<td>[0.581]</td>
<td>[0.320]</td>
<td>[0.323]</td>
<td>[0.721]</td>
<td>[0.227]</td>
<td>[0.459]</td>
<td>[0.468]</td>
<td>[0.361]</td>
</tr>
<tr>
<td>SAT, Verbal and Math, Combined (in hundreds)</td>
<td>0.0247</td>
<td>-0.0811</td>
<td>-0.00203</td>
<td>0.00276</td>
<td>0.00523</td>
<td>-0.123</td>
<td>-0.0892</td>
<td>-0.0519</td>
</tr>
<tr>
<td></td>
<td>[0.0849]</td>
<td>[0.0538]</td>
<td>[0.00174]</td>
<td>[0.00245]</td>
<td>[0.000]**</td>
<td>[0.0829]</td>
<td>[0.185]</td>
<td>[0.0557]</td>
</tr>
<tr>
<td>Proportion of Minority Students</td>
<td>-0.132</td>
<td>0.218</td>
<td>-0.0621</td>
<td>0.424</td>
<td>-0.166</td>
<td>0.392</td>
<td>1.403</td>
<td>0.393</td>
</tr>
<tr>
<td></td>
<td>[0.463]</td>
<td>[0.324]</td>
<td>[0.614]</td>
<td>[0.729]</td>
<td>[0.289]</td>
<td>[1.114]</td>
<td>[1.357]</td>
<td>[0.910]</td>
</tr>
<tr>
<td>N</td>
<td>106</td>
<td>214</td>
<td>188</td>
<td>94</td>
<td>216</td>
<td>79</td>
<td>44</td>
<td>130</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.982</td>
<td>0.989</td>
<td>0.982</td>
<td>0.974</td>
<td>0.988</td>
<td>0.990</td>
<td>0.983</td>
<td>0.985</td>
</tr>
</tbody>
</table>

Notes: The results above are from a fixed effects model wherein year and institution effects are held fixed. The variables on the right-hand side of the equation represent institutional characteristics averaged over the four years preceding graduation in either 2009 or 2010. All right-hand side variables have been weighted by average full-time equivalent student enrollment. (1) - (8) all use the same model but rely on sample differing by region. Standard errors are clustered at the school level. A single asterisk denotes statistical significance at the 1% level. A double asterisk denotes statistical significance at the 5% level. A triple asterisk denotes statistical significance at the 1% level.
Geographic Region Codes

1 - New England CT ME MA NH RI VT
2 - Mid East DE DC MD NJ NY PA
3 - Great Lakes IL IN MI OH WI
4 - Plains IA KS MN MO NE ND SD
5 - Southeast AL AR FL GA KY LA MS NC SC TN VA WV
6 - Southwest AZ NM OK TX
7 - Rocky Mountains CO ID MT UT WY
8 - Far West AK CA HI NV OR WA
References


