Show Me the Money: Impact of NCAA's Student-Athlete Allowance Policy on Cost of Attendance Estimates

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Abstract: In 2015, the largest and most powerful college athletics programs in the United States voted to allow student-athletes to receive scholarships that included an allowance for miscellaneous expenses such as laundry and transportation, which allowed athletic scholarships to cover the full cost of attendance for the first time. Using generalized difference-in-differences and difference-in-differences-in-differences framework to compare NCAA Division I institutions to other nonadopting colleges, we found that colleges in the five most powerful athletic conferences significantly increased allowances for both miscellaneous expenses and textbooks/supplies. As these allowances were increased for all students and not just athletes, there are potential implications for perceived affordability, college choice, and student debt burdens.

Keywords: Athletics, student financial aid, cost of attendance

JEL codes: C23, I22, I23, Z28

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Introduction

Intercollegiate athletics have long served as a "front door" for colleges and universities (Toma, 1999, p. 81), providing an opportunity for institutions to enhance their reputation among prospective students, funders, donors, and the general public alike (Clotfelter, 2011). This is particularly true for colleges with athletics programs in Division I of the National Collegiate Athletic Association (NCAA), which represents the highest-profile level of intercollegiate sports competition in the United States. Although colleges must sponsor at least 14 sports to participate in Division I athletics (National Collegiate Athletic Association [NCAA], n.d.), football and men's basketball are the two sports that by far generate the most revenue for participating institutions (according to the authors' calculations using the Equity in Athletics Data Analysis database).

Researchers have documented the influence of big-time intercollegiate athletics on the organization and management of postsecondary institutions (e.g., Clotfelter, 2011; Kramer, 2016; Toma & Kramer, 2009), and a sizable body of research has examined the association between success in NCAA Division I football and men's basketball and important institutional outcomes. These effects include increases in alumni donations (Anderson, 2017; Bouchet, Laird, Troilo, Hutchinson, & Ferris, 2017; Humphreys & Mondello, 2007; Meer & Rosen, 2009; Stinson & Howard, 2007; Tucker, 2004; Turner, Meserve, & Bowen, 2001), increases in the numbers and academic profiles of the student applicant pool (Anderson, 2017; Murphy & Trandel, 1994; Pope & Pope, 2009), additional state appropriations (Alexander & Kern, 2010; Humphreys, 2006), improved public perception of an institution's academic quality (Goidel & Hamilton, 2006), and even higher faculty/administrator peer assessment scores in the annual *U.S. News & World Report* college rankings (Mulholland, Tomic, & Sholander, 2014).

The potential benefits of college sports success combined with the zero-sum nature of athletic competitions has resulted in a rapid growth in expenditures for college athletics at NCAA

Division I institutions. Between 2005 and 2015, athletics spending per athlete increased between 30% and 50% faster than inflation while academic expenditures per student increased by less than 20% (Knight Commission on Intercollegiate Athletics, n.d.). Research by Hoffer, Humphreys, Lacombe, and Ruseski (2015) documented that spending increases are likely due to an arms race in athletics spending; as one team in a conference increases spending levels or donations, other teams follow suit to remain competitive.

The financial gap between the highest-profile programs and the rest of Division I has continued to widen in recent decades as the so-called "Power Five" conferences (the Atlantic Coast, Big Ten, Big 12, Southeastern, and Pac-12 conferences) have continued to distance themselves financially from members of other conferences. Between 2008 and 2015, the revenue disparity between Power 5 conference members and the other five conferences in the Football Bowl Subdivision (the rest of the highest level in NCAA college football) grew from $43 million to $65 million (Lavigne, 2016), forcing non–Power Five teams to increasingly rely on student fees in an effort to generate additional revenue (Wolverton, Hallman, Shifflett, & Kambhampati, 2015).

The divide between Power Five and other Division I institutions became apparent in 2011 when the NCAA's effort to increase the value of athletic scholarships was blocked by 125 Division I programs (Associated Press, 2011). The NCAA had only allowed institutions to cover tuition and fees, room/board charges, and books/supplies for student-athletes although the full cost of attendance (COA) for financial aid purposes also includes a miscellaneous expenditures category for expenses such as travel, transportation, and personal care. The 2011 proposal would have allowed for a $2,000 miscellaneous expenses stipend, but it was put on hold due to cost concerns on the part of non–Power Five institutions.

After some discussion about breaking away from the rest of Division I (Grasgreen, 2013) and forming a new NCAA division, Power Five members received autonomy on certain issues in

2014 that allowed them to reconsider the cost-of-attendance decision (Hosick, 2014). Power Five members then voted in January 2015 to allow athletic scholarships to cover the miscellaneous expense portion of COA, beginning in the 2015–16 academic year (Berkowitz, 2015a). Non–Power Five programs were also free to adopt the same practice, and some did so in an effort to recruit top student-athletes (Berkowitz & Kreighbaum, 2015). The NCAA provided each Division I university with about $55,000 to support these new scholarships, which is a small fraction of what would be needed to cover all student-athletes (Berkowitz, 2015b).

Because colleges have the ability to set the cost of attendance components—including miscellaneous expenses—as they see fit (Kelchen, Goldrick-Rab, & Hosch, 2017), they have the ability to increase the size of the miscellaneous expense allowance in the effort to recruit prospective student-athletes by offering larger stipends. Indeed, some coaches immediately began talking about the size of their institution's stipend as a recruitment tool (New, 2015; Snyder, 2015). Some evidence indicates that increased stipends have already affected football players' college choice decisions; for example, Bradbury and Pitts (2017) estimated that increasing the miscellaneous expenses stipend by $1,000 per year was associated with improving a college's football recruiting ranking by between two and four positions.

On the other hand, since colleges must set cost of attendance components to be the same for both athletes and non-athletes, increasing the potential size of student-athlete stipends has the effect of increasing the overall cost of attendance for all students. This raises the net price (the COA less all grant aid received), which is a key accountability measure in higher education as affordability has become ever more important to prospective students and policymakers alike (Kelchen, 2018). Colleges must then choose between trying to recruit student-athletes through increasing the miscellaneous expense portion of the cost of attendance and trying to keep the overall cost of attendance low.

Research Questions

As few authors have directly tied NCAA legislation to changes in broader institutional decision-making, this study aims to link recent changes in student-athlete compensation to institutional cost of attendance estimates. Given the growing concerns over college affordability and the potential for this targeted policy to affect the broader student population, our study is guided by the following research questions:

1. To what extent does the NCAA's stipend policy for student-athletes influence the way institutions set their individual cost of attendance estimates?
2. Which components of the cost of attendance measures appear to be most influenced by implementation of the NCAA's policy

Data

In order to estimate the effect of the NCAA stipend policy on institutional decisions surrounding cost of attendance estimates, we created a panel dataset from a variety of publicly available datasets. Based on data availability, we limited our analytical sample time period to between the 2002-2003 and 2016-2017 academic years. The following section details our data sources.

Independent / Policy Variable: As discussed previously, the Power 5 conferences voted in January 2015 to provide student-athletes on scholarships with a scholarship that would pay the total cost of attendance—compared to the previous limitations of payment to tuition/fees, books, and room and board.[4] This policy afforded all other Division I conferences with the flexibility to approve larger COA stipends to student-athletes if they wished to do so. Based on a comprehensive review of policy documents and media reports, it appears that all Power 5 and nearly all other FBS

[4] The Power 5 conferences (a subset of the FBS) adopted these cost of attendance scholarship provisions in January 2015, four months prior to the broader Division I-A leadership.

conferences implemented the provisions of the NCAA Stipend Policy along with some other Division I programs.

Dependent Variable: The U.S. Department of Education's Integrated Postsecondary Education Data System (IPEDS) annually collects information on the total cost of attendance for full-time, first-time degree/certificate–seeking in-district undergraduate students in three different living arrangements: on campus, off campus but not with family, and off campus with family. We also examined individual components COA estimates, including in-state and out-of-state tuition and fees, books and supplies, on-campus room and board, and miscellaneous expense allowances across all three living arrangements (the variable that was included in athletic scholarships for the first time in 2015).

Covariates: Kelchen, Goldrick-Rab and Hosch (2017) articulated that the setting of cost of attendance estimates is influenced by a variety of institutional and environmental factors. To this end, we included a number of institutional and broader factors that could affect a college's cost of attendance separate from its decision to offer additional scholarships for student athletes (see Table 1 for a comprehensive list of variables). We controlled for institutional characteristics such as size, the share of enrollments who are undergraduates, and student demographics using IPEDS data. We included admissions information from IPEDS including the number of applications, acceptance rate, and yield rate. To account for an athletic department's resources, we controlled for athletics revenue, the number of student-athletes, the presence of a football program (which all Power 5 programs have), and the reliance on football and men's basketball revenue using data from the U.S. Department of Education's Equity in Athletics Data Analysis Cutting Tool (EADA). Finally, we added state higher education funding effort and county-level housing prices from the Bureau of Economic Analysis (BEA) and the National Association of State Budget Officers (NASBO).

Empirical Strategy

Given the targeted nature of the NCAA stipend policy to Division I institutions (and particularly those institutions in Power Five conferences), we capitalized on the naturally occurring experiment to estimate the effect of the policy on cost of attendance measures by comparing the trends on likely adopting and likely non-adopting institutions. To this end, we applied a difference-in-differences (DiD) approach as follows:

$$\log(Y_{it}) = \beta_0 + \beta_1(post_t) + \beta_2(treat_i) + \beta_3(post_t * treat_i) + I'_{it} + S'_{st} + C'_{ct} + \tau_t + \gamma_i + \epsilon_{it} \quad (1)$$

where $\log(Y_{it})$ is the logged transformed measure of our cost of attendance–related outcomes. $\beta_1(post_t)$ is a binary indicator that is equal to one for all institutions within our sample in the years post NCAA stipend policy (2016 and beyond) and zero otherwise. $\beta_2(treat_i)$ is a binary indicator that is equal to one in all years for institutions that hold membership in an athletic conference in Division I-A (FBS) and zero otherwise. $\beta_3(post_t * treat_i)$ is our DiD causal coefficient of interest that is equal to one only for institutions under the NCAA stipend policy after the policy was adopted.

To increase the precision of the estimates, we also included a variety of time-varying vectors at the institution-level (I'_{it}), at the state-level (S'_{st}), and at the county level (C'_{ct}). To account for time-invariant factors that impact the outcomes across time and within institutions, we included both institutional fixed-effects (γ_i) and year fixed-effects (τ_t). Finally, we included robust clustered standard errors (ϵ_{it}) at the institution level to relax many of the assumptions associated with autocorrelation and heteroskedasticity.

The advent of this policy was driven primarily by members of the Power 5 conferences—a subset of highly athletic conferences at the highest level of an NCAA athletic conference. In fact, these Power 5 conference members approved the NCAA stipend a few months before the

remaining FBS members. This, combined with the heightened level of athletic competition along with competition for recruiting student-athletes, we postulated the possibility of heterogeneous effects of the policy adoption. To this end, we extended Eq. (1) to include an additional interaction term, thus turning our DiD into a difference-in-difference-in-differences (DDD) model:

$$\log(Y_{it}) = \beta_0 + \beta_1(post_t) + \beta_2(treat_i) + \beta_3(post_t * treat_i) + \beta_4(P5_i) + \beta_5(P5_i * post_t) + B_6(P5_i * treat_i) + \beta_7(post_t * treat_i * P5_i) + I'_{it} + S'_{st} + C'_{ct} + \tau_t + \gamma_i + \epsilon_{it} \quad (2)$$

Our DDD model is similar to our previously specific DiD (Eq. 1) with the addition of a third difference. Specifically, we included a number of interaction terms to account for institutional placement within a Power 5 athletic conference as these institutions were the ones that pushed for autonomy in order to increase the size of athletics scholarships. Specifically, we accounted for the general effects of being in a Power 5 conference, $\beta_4(P5_i)$, the interaction of being in a Power 5 conference in a post-adoption time period, $\beta_5(P5_i * post_t)$, and the interaction of our treatment indicator and Power 5 conference affiliation, $B_6(P5_i * treat_i)$. Finally, we added our DDD coefficient of interest by interacting our DD indicator with our indicator for Power 5 conference affiliation, $\beta_7(post_t * treat_i * P5_i)$. Thus, interpreting our DDD coefficient required us to include the additives of both β_3 and β_7 (our DiD and DDD coefficients).

Validation of Design Assumptions

Identifying the counterfactual in the absence of policy adoption is challenging in any quasi-experimental design. The combination of our DiD and DD analytical approaches, however, allowed us to approximate the impact of non-adoption by classifying institutions in non-adopting divisions of the NCAA as controls, thereby producing estimates of what could have occurred within the cost of attendance outcomes if the NCAA stipend policy had not been adopted. This counterfactual

approach assumed that treatment and control units would follow similar (or parallel) pre-policy patterns, and the resulting variations in outcomes could be attributed to policy adoption. While such an assumption is difficult to test, this study adopted two techniques to test the parallel assumption.

First, we added an institution- and NCAA division-specific trend to the set of covariates (Angrist & Pischke, 2008; Kramer, Holcomb, & Kelchen, 2017). This inclusion controlled for the possibility that institutions in NCAA-approved divisions would experience differences in the outcomes of interest prior to the adoption of the NCAA stipend policy. To this end, we created state- and division-trend variables by regressing dummy time variables for the years prior to the adoption of the NCAA stipend policy on each of the dependent variables and multiplying the resulting coefficient by the year to create a unique division- and institutional-trend variable.

Figure 1 provides a visual representation of the pre- and post-trends in the three overall cost of attendance measures for treated and untreated institutions. Prior to the adoption of the NCAA stipend policy, all groups followed a similar trend across each of the three cost of attendance measures. Post adoption, most groups continued to follow a similar trend post-adoption. The one exception to this trend is institutions located within a Power 5 conference, which appear to show an upward trend in the post NCAA Stipend Policy era.

--- Figure 1 Here ---

Second, to further test the assumptions of this study's DiD design, we also ran our models using two different comparison groups (Meyer, 1995) to ensure that our estimates were not sensitive to the compositional effects of selecting institutions from non-implementing athletic conferences.[5] Descriptions of the two comparison groups are as follows:

[5] We excluded institutions from Division III and non–NCAA-supported divisions from any comparison groups given significant variations in the ways athletic competition is administered. In Division III, there are no athletic scholarships. Athletic departments in both Division III and non-NCAA conferences are primarily funded through institutional appropriations rather than generated revenues.

Group 1: Division I. Our primary comparison group consisted of other institutions who compete within the NCAA's Division I level. Since the policy adoption was concentrated in institutions located in the NCAA Division FBS, institutions in conferences associated with FCS and non-football Division I institutions served as the closest-comparison institutions in terms of athletic prevalence.

Group 2: Division I and II. To test the robustness of our results, we also included a specification that expanded our non-treated comparison group to Division II institutions. Currently, almost 300 institutions participate athletically through the NCAA's Division II. Although Division II schools offer athletic scholarships, there are fewer scholarships than in Division I. Full athletic scholarships are more common in Division I, yet most Division II athletes receive partial athletic scholarships. For example, Division II institutions can only offer 36 full scholarships for football players, while Division I FBS institutions can offer 85 full scholarships while FCS institutions can offer 63 full scholarships (NCAA, n.d.b.). Fiscal commitments to Division II athletic departments are typically smaller, and most of their athletic-based competition and travel are regionally based. While their athletic resources may be less, they exhibit similar trends for COA estimates and institutional factors as Division I institutions; see Table 1.

Table 1 displays descriptive statistics for the treated and comparison groups, similar to those in Figure 1.

--- Table 1 Here ---

Limitations

This study was limited in a number of ways. First, the adoption of the NCAA stipend policy may have been implemented simultaneously with other policies or economic considerations that influenced institutional estimates of the cost of attendance. Results of a falsification test relaxed this concern to some degree as no significant differences occurred in cost of attendance estimates and

individual components of cost of attendance estimates when we tested whether the effects persisted in testing the impact of falsely applying the implementation year of three, two, and one year prior to the actual adoption.

Second, despite the variances explained in each model, the potential for additional time-variant factors impacting the outcomes still exists but is missing from the analysis. The fixed-effects approach accounts for institutional factors that are consistent and immeasurable, but this approach does not account for covariates varying across time. Finally, Meyer (1995) argued that DiD estimations can be sensitive to the selected functional form. Specifically, DiD estimates can actually change their sign if a nonlinear transformation, such as a log, is applied to the dependent variable. To account for this potential limitation, we ran model specifications that included our dependent variables' non-logged forms. Results from these tests indicated that the variables are not dependent on our functional form choice; therefore, in keeping with Wooldridge's (2009) recommendation, we log transformed our dependent variables for efficiency and ease of interpretation.

Results

Table 2 provides our estimated main effects on the impact of the NCAA stipend policy on the primary COA outcomes. Model 1 provides our DiD point estimates, while Model 2 provides estimates from our DDD approach. Across each of our three outcomes, we find limited statistical evidence that the adoption of the NCAA stipend policy impacted FBS institutions as a whole; see Model 1. However, we find statistical evidence that institutions in Power 5 conferences respond to the adoption of the NCAA stipend policy by increasing each of their three COA estimates. Specifically, we estimate that NCAA stipend policy adoption statistically significantly ($p<0.05$) increased on-campus COA estimates by 3.7% (approximately $1,200 in constant 2016 dollars).

--- Table 2 Here ---

Focusing on the various components of cost of attendance estimates, Table 3 estimates the impact of the NCAA stipend policy on the four primary components of the cost of attendance for on-campus students: tuition and fees, room and board, books, and miscellaneous / other. As the results show, the primary movement related to the policy adoption was concentrated within two categories: books and miscellaneous expenses. This is an interesting result because the NCAA's cost of attendance policy change allowed colleges to provide scholarships to cover miscellaneous expenses for the first time, but the allowance for books and supplies was previously covered by athletic scholarships. This suggests that colleges may have reconsidered the allowance for textbooks while adjusting the miscellaneous expenses allowance, a finding that deserves additional study. Similar to our main effects in Table 2, we found that the entirety of the statistical effect is concentrated within Power 5 institutions. We estimated that in response to the NCAA stipend policy, Power 5 members significantly ($p<0.001$) increased their miscellaneous / other expenditures by approximately 23% (nearly $725). Additionally, Power 5 members significantly ($p<0.001$) increased their book allotment to scholarship student-athletes by 22% (or $275) after the adoption of the NCAA stipend policy.

--- Table 3 Here ---

We further tested the robustness of our results by estimating the response to the policy change on miscellaneous / other expenditures for each of the three cost of attendance estimates: on campus (Table 3), living with family, and living off campus without family. As with our previous results, we found consistent and significant effects across each of the three estimates for Power 5 conference members only. The largest of the effects were within COA estimates for students living off campus without parents, while we failed to find changes for non–Power 5 conferences.

--- Table 4 Here ---

Robustness Checks:

In order to ensure robustness of our results, we ran a battery of falsification test / placebo adoptions. First, we randomly assigned the policy falsely to institutions within the 2015 academic year. Meaning, instead of apply the 2015 policy systematically, we created an random number generation process and assigned the exact same number of the random institutions to receive the treatment indicator as there were actual treated Division I institutions in 2015. We do this to test if our results are product of factors impacting institutions in 2015. However, our random treatment placebo tests does not yield any statistically significant effects on our DiD or DDD coefficients. Additionally, we tested the potential that our effects are influenced by other exogenous factors. To this end, we conducted an event falsification test that examines any potential significant estimates prior to the adoption of the policy. Figure 2 provides our falsification test of on-campus cost of attendance estimates at three, two, and one year prior to the adoption of the new NCAA policy. If we can attribute our prior point estimates to the actual implementation of the policy, we would expect to see only significant effects during our post-adoption period and non-significant effects in the years prior.

--- Figure 2 Here ---

As seen, we found no statistically significant effects on any of our COA outcomes for the three time periods prior to the implementation of policy. In fact, the only significant effects we found are isolated to post-adoption periods in total cost of attendance, books, and miscellaneous expenditures. We further conducted similar event falsification tests on cost of attendance with and without family and found consistent non-significant prior to adoption and post-adoption significance concentrated within books and miscellaneous expenditures. In combination, these falsification checks lead us to believe that our identified statistically significant effects are a product of the NCAA Stipend Policy and no other spurious relationships or simultaneous policy adoptions.

We further test the robustness of a significant results within each of three miscellaneous other COA estimates (Figure 3). Similar to our falsification for on-campus miscellaneous estimates, we find similar robust significant for COA miscellaneous estimates for students living off-campus with family and without family. The significant effects are only concentrated within Power 5 conferences in the post-policy period. This provided further evidence of a robust policy effect of institution setting of COA levels.

--- Figure 3 Here ---

Conclusion

Scholars have documented the influence of intercollegiate athletics on student experiences, applications, alumni engagement, donors giving, and institutional leaders (e.g., Borland, Goff, & Pulsinelli, 1992; Clotfelter, 2011; Goidel & Hamilton, 2006; Humphreys, 2006; Humphreys & Mondello, 2007; KCIA, 2009; Kramer, 2016; Lovaglia & Lucas, 2005; Murphy & Trandel, 1994; Pope & Pope, 2009; Toma & Cross, 1998; Toma, 2003; Toma & Kramer, 2009; Trenkamp, 2009). But at the same time, the price tag of intercollegiate athletics programs is also becoming a concern due to many FBS programs relying on student fees to help fund their operations (Wolverton et al., 2015) as tuition prices and student debt burdens also rise (Federal Reserve Bank of New York, 2018; Ma, Baum, Pender, & Welch, 2016). This means that any changes to the landscape of financing college athletics has potential ramifications for all students instead of just the small fraction involved in intercollegiate athletics.

Our research examined the implications of the NCAA's decision to allow Division I institutions to allow athletes to receive stipends for the full cost of attendance for the first time. We found that universities in Power 5 conferences (the largest and most prestigious intercollegiate athletic programs) significantly increased their cost of attendance after the NCAA policy change, with increases occurring in both the miscellaneous expenses category (which was included in

scholarships for the first time) and the books and supplies category (which was already included). Assuming that students take the typical five years to complete a bachelor's degree (Shapiro et al., 2016), the overall cost of attendance is likely to increase by $6,000 during the student's time at a Power 5 university.

One implication of our study is clear: Power 5 institutions are using cost of attendance stipends as a way to try to recruit top athletic talent to their institutions. Yet since this policy is still relatively new, the longer-term effects remain unclear. The size of these stipends could continue to increase as athletics programs attempt to outdo each other, or colleges could scale back the stipends if they are viewed as ineffective or if athletic budgets cannot support the additional expenditures. Additionally, the number of programs that are willing to increase stipends may change over time. Research on exactly how colleges determined these stipends and which stakeholders on campus (athletics offices, financial aid administrators, presidents, and/or students) were involved in the decision making process would help provide insight about potential future trends in cost of attendance stipends.

The implications for non-athlete prospective and current students are unclear at this point. One concern is that a higher listed cost of attendance (and thus a higher listed net price) could dissuade prospective students from considering a college, even though the increases are all in non-tuition estimated expenses that the student may not actually face. Prior research suggests that lower-income students in particular are sensitive to sticker prices (Grodsky & Jones, 2007; Hesel & Meade, 2012), so future research should examine whether the change to the cost of attendance estimates affects the socioeconomic or racial/ethnic makeups of Division I colleges' student bodies.

The effects of increasing the cost of attendance for enrolled students also remain to be determined. This change can allow students to receive additional financial aid to help them afford the full costs of attending college, which may be beneficial given how many colleges underestimate

living expenses relative to likely county-level costs (Kelchen et al., 2017). However, this increase in financial aid is probably in the form of additional PLUS or private loans due to the realities of grant aid and relatively low limits for federal subsidized and unsubsidized loans for undergraduate students. Some students may choose to take on additional debt with less favorable terms than most undergraduate student loans, while many students may not be affected since about one in five students has either a PLUS or private loan (authors' calculations using data from the National Postsecondary Student Aid Study). Nevertheless, it is important to examine the potential effects of this policy on student debt burdens and completion rates after several years of implementation as the availability of additional student loans could have both positive and negative effects (Darolia, 2016; Marx & Turner,2017).[6]

References

Alexander, D. L., & Kern, W. (2010). Does athletic success generate legislative largess from sports-crazed representatives? The impact of athletic success on state appropriations to colleges and universities. *International Journal of Sport Finance, 5,* 253-267.

Anderson, M. L. (2017). The benefits of college athletic success: An application of the propensity score design with instrumental variables. *Review of Economics and Statistics, 99*(1), 119-134.

Angrist, J. D., & Pischke, J. S. (2008). *Mostly harmless econometrics: An empiricist's companion*. Princeton University Press.

Associated Press (2011, December 16). NCAA shelves $2,000 athlete stipend. *ESPN*. Retrieved from http://www.espn.com/college-sports/story/_/id/7357868/ncaa-puts-2000-stipend-athletes-hold.

Berkowitz, S. (2015a, January 17). NCAA increases value of scholarships in historic vote. *USA Today*. Retrieved from https://www.usatoday.com/story/sports/college/2015/01/17/ncaa-convention-cost-of-attendance-student-athletes-scholarships/21921073/.

Berkowitz, S. (2015b, July 20). NCAA to distribute $18.9M to help pay cost-of-attendance scholarships. *USA Today*. Retrieved from https://www.usatoday.com/story/sports/college/2015/07/20/ncaa-18-million-help-pay-cost--attendance-scholarships/30428777/.

Berkowitz, S., & Kreighbaum, A. (2015, August 18). College athletes cashing in with millions in new benefits. *USA Today*. Retrieved from https://www.usatoday.com/story/sports/college/2015/08/18/ncaa-cost--attendance-meals-2015/31904839/.

Borland, M. V., Goff, B. L., & Pulsinelli, R. W. (1992). College athletics: Financial burden or boon? *Advances in the Economics of Sport,1*, 215-235.

[6] Unfortunately, the College Scorecard (the best source of institution-level debt data) excludes PLUS and private loans, likely understating potential effects on student loan debt.

Bouchet, A., Laird, M. D., Troilo, M., Hutchinson, M., & Ferris, G. (2017). Effects of increased commitment on reputation and status: Evidence from NCAA Division I universities. *Sport Management Review, 20*, 395-407.

Bradbury, J. C., & Pitts, J. D. (2017). Full cost-of-attendance scholarships and college choice: Evidence from NCAA football. *Journal of Sports Economics*. doi: 10.1177/1527002517696958.

Clotfelter, C. T. (2011). *Big-time sports in American universities*. Cambridge, England: Cambridge University Press.

Darolia, R. (2016). An experiment on information use in college student loan decisions.

Federal Reserve Bank of New York (2018). *Quarterly report on household debt and credit.* New York, NY: Author.

Goidel, R. K., & Hamilton, J. M. (2006). Strengthening higher education through gridiron success? Public perceptions of the impact of national football championships on academic quality. *Social Science Quarterly, 87*(4), 852-862.

Grasgreen, A. (2013, October 4). Faculty on the NCAA's future. *Inside Higher Ed.* Retrieved from https://www.insidehighered.com/news/2013/10/04/faculty-advocate-new-ncaa-division-far-governance-plan.

Grodsky, E., & Jones, M. T. (2007). Real and imagined barriers to college entry: Perceptions of cost. *Social Science Research, 36*, 745-766.

Hesel, R. A., & Meade, Jr., D. C. (2012, September 14). A majority of students rule out colleges based on sticker price. *College Board and Art and Science Group StudentPOLL*. Retrieved from http://www.artsci.com/studentpoll/v9n1/index.html.

Lovaglia, M. J., & Lucas, J. W. (2005). High-visibility athletic programs and the prestige of public universities. *The Sport Journal, 8*(1).

Hoffer, A., Humphreys, B. R., Lacombe, D. J., & Ruseski, J. E. (2015). Trends in NCAA athletic spending: Arms race or rising tide? *Journal of Sports Economics, 16*(6), 576-596.

Hosick, M. B. (2014, August 7). Board adopts new Division I structure. *NCAA*. Retrieved from http://www.ncaa.org/about/resources/media-center/news/board-adopts-new-division-i-structure.

Humphreys, B. (2006). The relationship between big-time college football and state appropriations for higher education. *International Journal of Sport Finance, 1*(2), 119-128.

Humphreys, B. R., & Mondello, M. (2007). Intercollegiate athletic success and donations at NCAA Division I institutions. *Journal of Sport Management*, *21*(2), 265-280.

Kelchen, R. (2018). *Higher education accountability.* Baltimore, MD: Johns Hopkins University Press.

Kelchen, R., Goldrick-Rab, S., & Hosch, B. (2017). The costs of college attendance: Examining variation and consistency in institutional living cost allowances. *The Journal of Higher Education, 88*(6), 947-971.

Knight Commission on Intercollegiate Athletics (n.d.). *Athletic & academic spending database for NCAA Division I.* Retrieved from http://spendingdatabase.knightcommission.org/.

Knight Commission on Intercollegiate Athletics [KCIA]. (2009). *Quantitative and qualitative research with football bowl subdivision university presidents on the costs and financing of intercollegiate athletics.*Retrieved from https://eric.ed.gov/?id=ED535765

Kramer II, D. A. (2016). Motivations to switch: Refuting the public discourse on athletic conference realignment. *The Review of Higher Education, 39*(3), 339-370.

Kramer, D. A., Holcomb, M. R., & Kelchen, R. (2017). The costs and consequences of excess credit hours policies. *Educational Evaluation and Policy Analysis*, 0162373717709968.

Lavigne, P. (2016, September 6). Rich get richer in college sports as poorer schools struggle to keep up. *ESPN*. Retrieved from http://www.espn.com/espn/otl/story/_/id/17447429/power-5-conference-schools-made-6-billion-last-year-gap-haves-nots-grows.

Ma, J., Baum, S., Pender, M., & Welch, M. (2016). Trends in college pricing. New York, NY: The College Board.

Marx, B. M., & Turner, L. J. (2017). *Student loan nudges: Experimental evidence on borrowing and educational attainment*. Cambridge, MA: National Bureau of Economic Research Working Paper 24060.

Meyer, B. D. (1995). Natural and quasi-experiments in economics. *Journal of business & economic statistics, 13*(2), 151-161.

Meer, J., & Rosen, H. S. (2009). The impact of athletic performance on alumni giving: An analysis of microdata. *Economics of Education Review, 28*, 287-294.

Mulholland, S. E., Tomic, A., & Sholander, S. N. (2014). The faculty Flutie factor: Does football performance affect a university's US News and World Report peer assessment score? *Economics of Education Review, 43*, 79-90.

Murphy, R. G., & Trandel, G. A. (1994). The relation between a university's football record and the size of its applicant pool. *Economics of Education Review, 13*(3), 265-270.

NCAA (n.d.a.). *Divisional differences and the history of multidivision classification.* Retrieved from http://www.ncaa.org/about/who-we-are/membership/divisional-differences-and-history-multidivision-classification.

NCAA (n.d.b.). *Division II partial-scholarship model.* Retrieved from http://www.ncaa.org/about/division-ii-partial-scholarship-model.

New, J. (2015, August 12). More money…if you can play ball. *Inside Higher Ed*. Retrieved from https://www.insidehighered.com/news/2015/08/12/colleges-inflate-full-cost-attendance-numbers-increasing-stipends-athletes.

Pope, D. G., & Pope, J. C. (2009). The impact of college sports success on the quantity and quality of student applications. *Southern Economic Journal*, 75(3), 750-780.

Shapiro, D., Dundar, A., Wakhungu, P. K., Yuan, X., Nathan, A., & Hwang, Y. (2016). *Time to degree: A national view of the time enrolled and elapsed for associate and bachelor's degree earners.* Herndon, VA: National Student Clearinghouse Research Center.

Snyder, A. (2015, May 22). Franklin hopes to use Penn State's high cost-of-attendance stipend to his advantage. *Pittsburgh Post-Gazette*. Retrieved from http://www.post-gazette.com/sports/2015/05/22/Cost-of-attendance-still-a-hot-topic-at-Penn-State/stories/201505210106.

Stinson, J. L., & Howard, D. R. (2007). Athletic success and private giving to athletic and academic programs at NCAA institutions. *Journal of Sport Management, 21*, 235-264.

Toma, J. D. (1999). The collegiate ideal and the tools of external relations: The uses of high-profile intercollegiate athletics. *New Directions for Higher Education, 105*, 81-90.

Toma, J. D., & Cross, M. E. (1998). Intercollegiate athletics and student college choice: Exploring the impact of championship seasons on undergraduate applications. *Research in Higher Education, 39*(6), 633-661.

Toma, J. D. (2003). *Football U.: Spectator sports in the life of the American university.* Ann Arbor, MI: University of Michigan Press.

Toma, J. D., & Kramer II, D. A. (Eds.) (2009). The uses of intercollegiate athletics: Opportunities and challenges for the university. *New Directions for Higher Education*, *148*.

Trenkamp, B. A. (2009). Does the advertising effect of athletics impact academic rankings?. *Applied Economics Letters, 16*(4), 373-378.

Tucker, I. B. (2004). A reexamination of the effect of big-time football and basketball success on graduation rates and alumni giving rates. *Economics of Education Review, 23*, 655-661.

Turner, S. E., Meserve, L. A., & Bowen, W. G. (2001). Winning and giving: Football results and alumni giving at selective private colleges and universities. *Social Science Quarterly, 82*(4), 812-826.

Wolverton, B., Hallman, B., Shifflett, S., & Kambhampati, S. (2015, November 15). The $10-billion sports tab: How colleges are funding the athletics arms race. *The Chronicle of Higher Education.* Retrieved from https://www.chronicle.com/interactives/ncaa-subsidies-main.

Wooldridge, J. M. (2009). *Introductory econometrics a modern approach (4th ed).* Mason, OH: South-Western.

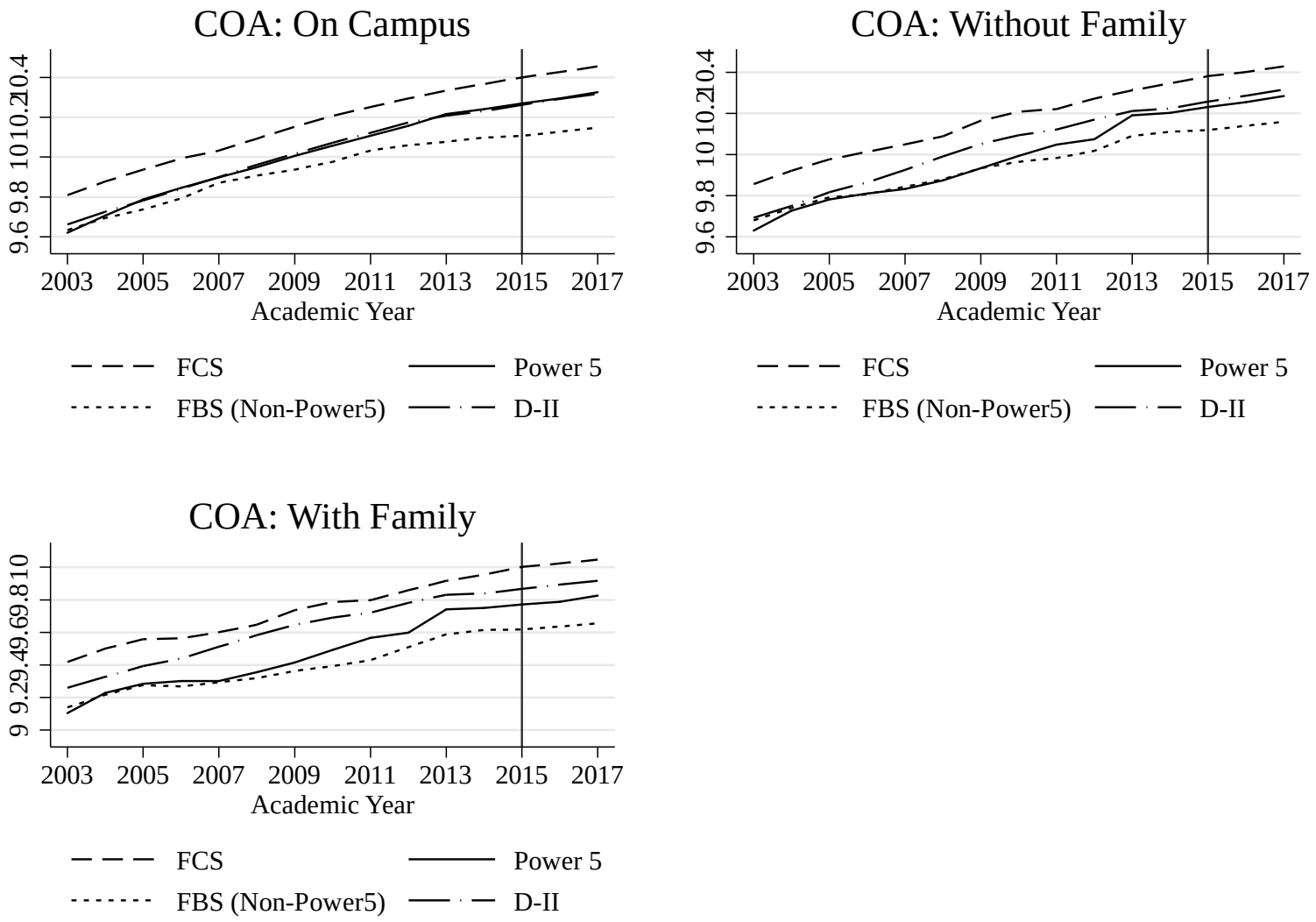

Figure 1: Pre and Post trends for Power 5 and Non Power Conferences by COA measures

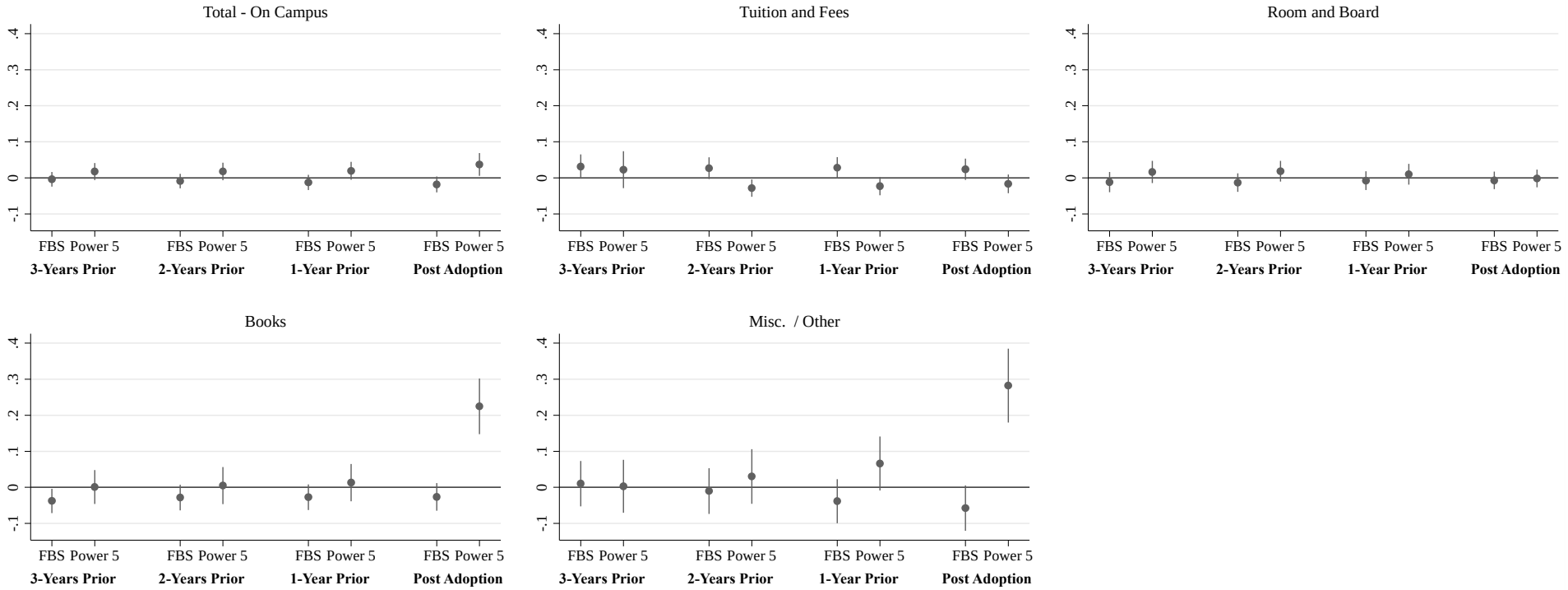

Figure 2: Falsification Test for On-Campus COA

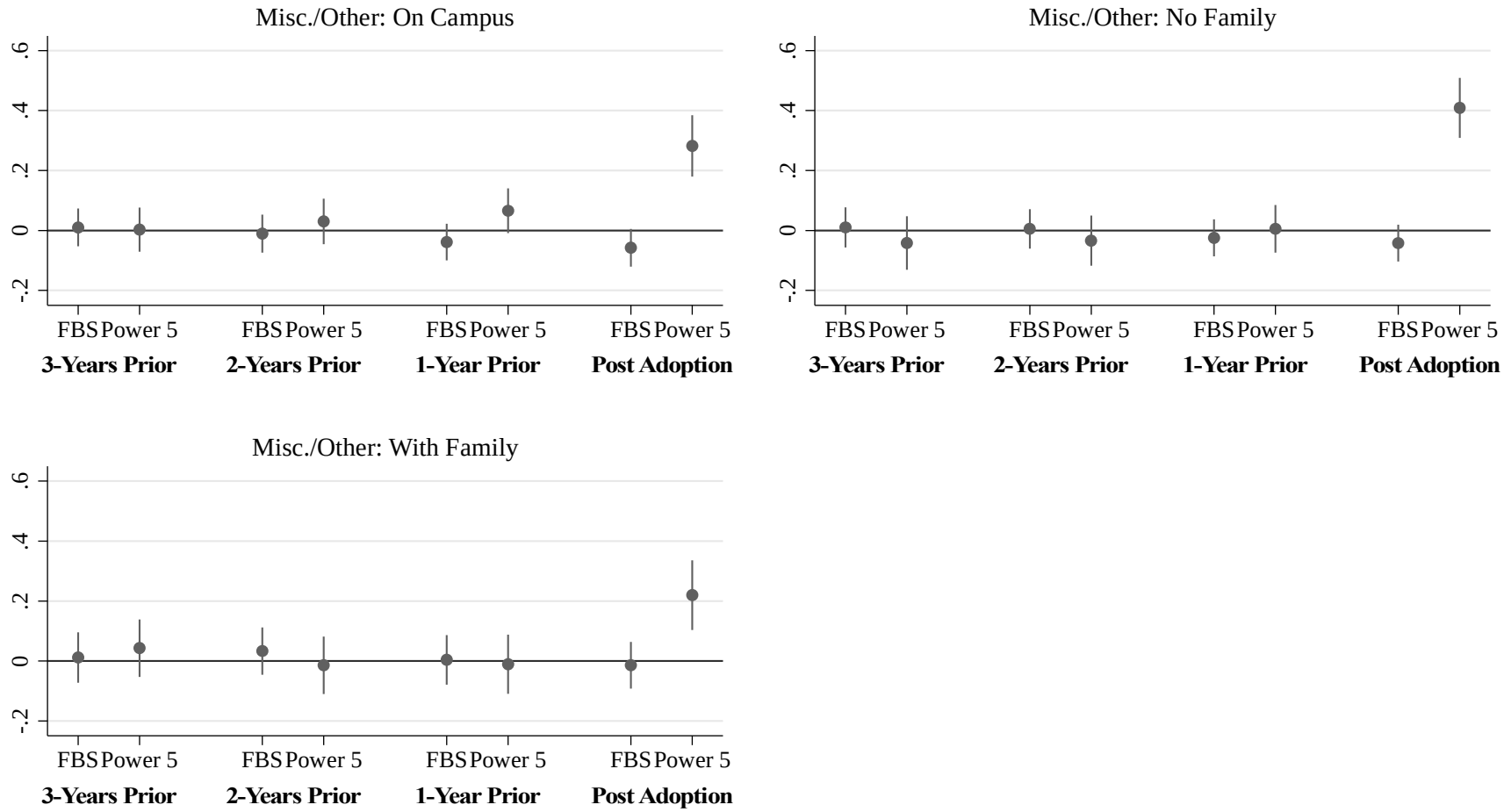

Figure 3: Falsification Test for Three Misc./Other COA Estimates

Table 1: Descriptives on Outcomes and Predictors - AY 2015

	Academic Year 2015				
	Treated			**Untreated**	
	Power 5	*FBS*	*Division I-A*	*FCS*	*Division II*
Outcomes					
COA: On Campus	31968.27	27014.22	25725.85	37507.89	31798.39
	(14241.11)	(12050.29)	(11731.40)	(16803.49)	(12184.04)
COA: Without Family	30261.99	27172.65	25491.38	36523.40	31515.25
	(12145.22)	(11543.30)	(10355.88)	(16044.59)	(11901.74)
COA: With Family	20061.96	17452.02	16051.89	26712.89	22704.41
	(11447.29)	(10787.28)	(9623.80)	(14884.70)	(11390.36)
Institution Level Covariates					
Fall Total Headcount	32053.52	23548.87	23144.05	11961.58	5817.59
	(12028.69)	(11341.38)	(10976.52)	(9598.92)	(5615.63)
Undergraduate Percentage (%)	73.98	79.64	77.96	78.74	83.60
	(9.93)	(9.52)	(9.18)	(13.14)	(13.88)
Undergraduate Minority Percentage (%)	35.46	42.29	43.26	44.68	43.41
	(13.46)	(21.37)	(27.03)	(24.78)	(24.59)
Undergraduate Full-Time (%)	91.70	81.11	83.05	86.01	80.74

	(5.39)	(12.38)	(11.35)	(11.30)	(14.76)
Admit Rate (%)	58.45	65.32	66.35	62.70	68.61
	(22.59)	(18.81)	(18.55)	(19.92)	(15.81)
Admissions Yield Rate (%)	36.83	37.56	41.40	30.08	31.40
	(9.54)	(12.18)	(13.81)	(13.82)	(13.49)
Number of Applications	26911.79	15324.54	13544.57	12172.49	4229.11
	(14608.92)	(10177.55)	(10015.94)	(12484.09)	(5914.82)
Institution Level Athletic Covariates					
Total Athletic Revenue ($)	1.0e+08	3.7e+07	3.5e+07	1.7e+07	5.8e+06
	(2.9e+07)	(2.3e+07)	(2.6e+07)	(7.6e+06)	(2.7e+06)
Total Athletes (#)	565.75	407.58	431.59	379.95	320.27
	(147.58)	(125.11)	(131.57)	(155.52)	(138.58)
Men's Football (Y/N)	0.98	0.93	0.95	0.57	0.54
	(0.13)	(0.26)	(0.21)	(0.50)	(0.50)
Athletic Revenue from Revenue Sports (%)	24.72	29.89	29.33	19.68	22.66
	(6.09)	(8.41)	(7.95)	(14.35)	(16.23)
State & County-Level Covariates					
Percentage of State Budget for Higher Ed (%)	12.35	10.45	10.14	10.35	10.78
	(5.91)	(5.04)	(4.89)	(5.26)	(5.84)

Total State Expenditures ($1mil)	62360.15	60316.74	52728.54	72040.32	62974.67
	(60314.91)	(53576.97)	(46553.43)	(66958.72)	(61239.05)
County-Level Housing Price Index	501.83	435.62	432.86	517.62	426.43
	(273.46)	(224.52)	(210.57)	(295.61)	(270.06)
Number of Observations	61	71	1106	219	317

Table 2: Effects of NCAA Stipend Policy on COA Estimates (logged)

	COA: On Campus		COA: Without Family		COA: With Family	
	(1)	*(2)*	*(1)*	*(2)*	*(1)*	*(2)*
FBS * Post	-0.008	-0.018	0.001	-0.014	0.001	-0.005
	(0.008)	(0.011)	(0.009)	(0.010)	(0.012)	(0.015)
FBS * Post * Power 5		0.037*		0.119***		0.141***
		(0.016)		(0.017)		(0.023)
Pre-Treatment Outcome Mean	32,574.68	32,574.68	31,429.75	31,429.75	22,987.36	22,987.36
Number of Observations	0.934	0.934	0.913	0.914	0.878	0.879
Number of Groups	4,848	4,848	3,938	3,938	3,944	3,944
R-squared	344	344	344	344	344	344
State-Level Time Varying Covariates	Yes	Yes	Yes	Yes	Yes	Yes
County-Level Time Varying Covariates	Yes	Yes	Yes	Yes	Yes	Yes
Institution-Level Time Varying Covariates	Yes	Yes	Yes	Yes	Yes	Yes
Post Time by Power 5 Fixed Effects	No	Yes	No	Yes	No	Yes
Treat by Power 5 Fixed Effects	No	Yes	No	Yes	No	Yes
Institution Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes

*Notes. Institution clustered robust standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$*

Table 3: Effects of NCAA Stipend Policy on COA Category Estimates: On Campus (logged)

	Overall		Tuition and Fees		Misc / Other		Room & Board		Books	
	(1)	*(2)*	*(1)*	*(2)*	*(1)*	*(2)*	*(1)*	*(2)*	*(1)*	*(2)*
FBS * Post	-0.009	-0.018	0.021	0.020	-0.012	-0.058	-0.002	-0.007	-0.038*	-0.027
	(0.008)	(0.011)	(0.012)	(0.016)	(0.028)	(0.032)	(0.008)	(0.012)	(0.018)	(0.020)
FBS * Post * Power 5		0.037*		0.095		0.282***		-0.073		0.225***
		(0.016)		(0.085)		(0.052)		(0.078)		(0.039)
Pre-Treatment Outcome Mean	32,536.85	32,536.85	19,120.41	19,120.41	2,779.62	2,779.62	9,127.04	9,127.04	1,210.72	1,210.72
R-squared	0.934	0.934	0.904	0.904	0.207	0.209	0.875	0.876	0.468	0.469
Number of Observations	4,842	4,842	4,842	4,842	4,842	4,842	4,842	4,842	4,858	4,858
Number of Groups	343	343	343	343	343	343	343	343	343	343
State-Level Time Varying Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County-Level Time Varying Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Institution-Level Time Varying Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Post Time by Power 5 Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Treat by Power 5 Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Institution Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes. Institution clustered robust standard errors in parentheses; * p < 0.05, ** p < 0.01, *** p < 0.001*

Table 4: Effects of NCAA Stipend Policy on Miscellaneous / Other Estimates (logged)

	Misc./Other: On Campus		Misc./Other: Without Family		Misc./Other: With Family	
	(1)	*(2)*	*(1)*	*(2)*	*(1)*	*(2)*
FBS * Post	-0.014	-0.060	-0.028	-0.044	-0.008	-0.016
	(0.028)	(0.032)	(0.027)	(0.031)	(0.032)	(0.040)
FBS * Post * Power 5		0.283***		0.410***		0.220***
		(0.052)		(0.051)		(0.059)
Pre-Treatment Outcome Mean	2,777.83	2,777.83	3,324.73	3,324.73	3,659.62	3,659.62
Number of Observations	4,853	4,853	3,939	3,939	3,943	3,943
Number of Groups	344	344	343	343	343	343
R-squared	0.207	0.209	0.250	0.252	0.192	0.192
State-Level Time Varying Covariates	Yes	Yes	Yes	Yes	Yes	Yes
County-Level Time Varying Covariates	Yes	Yes	Yes	Yes	Yes	Yes
Institution-Level Time Varying Covariates	Yes	Yes	Yes	Yes	Yes	Yes
Post Time by Power 5 Fixed Effects	No	Yes	No	Yes	No	Yes
Treat by Power 5 Fixed Effects	No	Yes	No	Yes	No	Yes
Institution Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes

*Notes. Institution clustered robust standard errors in parentheses; * p < 0.05, ** p < 0.01, *** p < 0.001*