



# TV Networks for College Sports: Implications for Institutional Subsidies

Jennifer A. Delaney<sup>1</sup> · Tyler D. Kearney<sup>2</sup>

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## Abstract

University athletics because of its reporting structure, regulation by the NCAA, and relationship to the academic enterprise of institutions, provides a unique look into postsecondary institutional behavior. Using a difference-in-difference design, this study tests the introduction of new television networks dedicated to college sports on institutional subsidy levels for athletics. Overall, our findings show that institutions are responsive to the introduction of new college-sports-dedicated television networks. When considering institutions in the Power Five athletic conferences, we find an average decline in subsidy levels of approximately \$1.2 million. When considering different types of subsidies, we find significant declines in direct subsidies and student fees, but no significant change for indirect subsidies.

**Keywords** Difference-in-difference · Athletic subsidies · College sports television networks

**JEL Classification** I23

## Introduction

University athletics because of its reporting structure, regulation by the National Collegiate Athletic Association (NCAA), and relationship to the academic enterprise of institutions, provides a unique look into postsecondary institutional behavior. Specifically, athletics finance provides a window into cross-subsidization behavior at universities, a practice generally obscured by traditional institutional budgeting practices. Our research explores the particular relationship between the introduction of new, dedicated television networks for

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✉ Jennifer A. Delaney  
delaneyj@illinois.edu

Tyler D. Kearney  
tkearney@lsu.edu

<sup>1</sup> Department of Education Policy, Organization and Leadership, University of Illinois at Urbana-Champaign, 362 Education, MC-708, 1310 South Sixth Street, Champaign, IL 61820, USA

<sup>2</sup> Finance & Administration, Louisiana State University, 330 Thomas Boyd Hall, Baton Rouge, LA 70803, USA

college sports and institutional subsidies supporting athletic programs. As a result of the sometimes controversial nature of college sports and athletic programs' position as one of many competing priorities for institutional resources, studying athletic finance can increase understanding of how different events or policies—like introducing a new revenue stream (i.e., a dedicated television network)—impact institutional behavior.

The relationship between universities and their athletic departments is complicated (Clotfelter, 2011). Athletic departments claim non-profit status as part of a broader institution. However, there are numerous ways in which athletic departments function independently from their institutions. Athletic departments often have separate fundraising bodies and have the ability to raise dedicated revenue streams through avenues like ticket sales. Often these separate revenue streams are not “taxed” by their host institutions and all funds remain within the athletic department. Institutions generally do not have complete control over athletic departments, since these auxiliary enterprises have substantial autonomy in many areas including budgetary decisions and operate under external governance rules from the NCAA. We view this autonomy as creating an environment in which multiple actors make decisions about the athletic enterprise and athletic subsidies.

The prevalence of financial subsidies is one aspect of the complex relationship between universities and their athletic departments. These subsidies have become controversial on some college campuses as various stakeholders view subsidies for athletics as problematic (Denhart & Vedder, 2010). For instance, faculty senates have passed resolutions calling for a reduction or the elimination of institutional subsidies for athletics, with recent examples of these controversies at Rutgers University and the University of California at Berkeley (Clotfelter, 2011; Mulhere, 2015). Interestingly, these concerns have been expressed for many years prior to the financial strains brought on by the COVID-19 pandemic, which highlights the on-going controversy around subsidies for college sports. Because of this unique viewpoint, our main focus is on athletic subsidies, and not other types of athletic revenues and expenditures.

## College Sports and Television

College sports are big money (Clotfelter, 2011) and, on September 1, 2006, a new era of athletic finances began. The Mtn. Network began broadcasting representing the first time that an athletic conference (The Mountain West Conference) created their own television network in which an entire television channel was devoted to college sports (Chi, 2014). More TV networks focused solely on college athletics followed, including the Big Ten Network, Longhorn Network (University of Texas-Austin), Pac-12 Network, and SEC Network. Reflecting the massive scope of dedicated TV networks, in 2014, the Big Ten Network reached more than 90 million (of 112 million total) U.S. households (Chi, 2014). While TV has been a part of university athletics since the dawn of television (NCAA, 1953), the introduction of athletic conference networks represents a new and different type of exposure for college sports, and a large new funding stream.

TV networks for college athletics differ in a number of important ways from prior TV exposure for university athletic teams. These college sports TV network deals represent much larger financial gains than single game or single institution airing rights. In addition, college athletic TV networks expand the scope and reach of colleges and universities with 24-hour programming in multiple regional and national markets. In particular, these networks offer exposure for non-revenue generating sports. As such, broadcast benefits

are broadly spread across athletic departments beyond the traditional revenue generating sports—men’s basketball and football.

In this work, we draw a clear distinction between dedicated TV Networks and non-linear “networks” or syndication packages. We argue that branding a game broadcast on an existing national or local network does not represent a new significant innovation or disruption to college sports. However, the introduction of new 24-7 networks dedicated exclusively to a conference’s athletic activities was novel. The introduction of a dedicated TV network is the phenomenon of interest in our study because, despite this significant change, there has not been much research on how institutions responded. In our research we are particularly interested in how the introduction of a new dedicated TV network for college sports changes institutional subsidies for university athletics. While athletic programs are large revenue producers, athletic programs are also immensely costly. In fact, in 2016–2017, only 14 campuses did *not* subsidize their athletic enterprises (USA Today, 2019).<sup>1</sup> Despite the perception of an abundance of money in college sports, institutional subsidies, often derived from student tuition or fee revenue, are commonplace (Clotfelter, 2011; Denhart & Vedder, 2010).

## Research Question and Paper Organization

Using a quasi-experimental difference-in-difference (DID) methodological design, this research asks the primary research question: *Does the introduction of a television network devoted exclusively to broadcasting college sports change the level of subsidy provided by an institution to its athletic department?*

This paper proceeds as follows. We first review related literature starting with a discussion of the literature on university athletics, then move to consider prior works on athletic subsidies, and end with an overview of the literature on college-sports-dedicated television networks. Next, we present our conceptual model and hypotheses. Following, we present the datasets that we use—the College Scorecard, the Integrated Postsecondary Data System (IPEDS), the USA Today NCAA Finances dataset, and the Department of Education’s Equity in Athletics Data Analysis (EADA) datasets. We then discuss our DID empiric approach including the covariates used in our models. We provide evidence that we have met the assumptions of a DID model by discussing parallel prior year trend assumptions and falsification tests in Appendix A.

Our results section presents results for institutions that are members of Power Five conferences. Power Five is a common term used to refer to the most elite college football conferences. Power Five conferences are comprised of only institutions from the NCAA Division I Football Bowl Subdivision (FBS).<sup>2</sup> The athletic conferences that are the members of the Power Five are: the Atlantic Coast Conference (ACC), Big Ten Conference, Big 12 Conference, Pac-12 Conference, and Southeastern Conference (SEC). Results for all Division I schools are presented in Appendix B. Institutions that compete in the NCAA

<sup>1</sup> In 2015, the NCAA added a data field for collecting transfers from the athletic department to the institution. This variable is capped at the amount of the subsidy transferred from the institution to the athletic department, resulting in a net subsidy of zero. Fourteen institutions reported a net subsidy of zero in 2016–2017.

<sup>2</sup> The FBS is comprised of 10 conferences, and the University of Notre Dame, the distinguishing feature of FBS institutions is that their football programs compete in bowl games. Only five of the FBS conferences comprise the Power Five conferences.

are divided into three divisions with Division I being the most elite division of college sports. Division I is comprised of 350 institutions that field more than 6,000 athletic teams and support 170,000 student-athletes in NCAA competitions (NCAA, 2021). Division I is divided into three parts: FBS institutions, the Football Championship Subdivision (FCS), and athletic programs without football teams.<sup>3</sup> We conclude by summarizing our results, discussing their policy implications, and offering our thoughts on future directions for research. Finally, Appendix C presents information on the conferences and how TV network start dates were coded in our dataset.

## Literature Review

This literature review first considers the broad body of literature on university athletics by considering the impact of athletic participation on students and institutional effects. Next, athletic subsidies are specifically considered as is the literature on college-sports-dedicated television networks and the history of broadcast rights for college athletics.

As the highly visible “front porch” of institutions that provides name recognition and increased institutional prominence along with increased enrollments and donations, the study of university athletics has resulted in a robust literature (Clotfelter, 2011; Desrochers, 2013). This literature explores many of the effects of intercollegiate athletics on student-athletes, higher education institutions, and other stakeholders. For student-athletes, the literature indicates many negative outcomes associated with athletic participation, including academic and cognitive deficits when compared to non-athlete peers (e.g., Astin, 1993; Comeaux & Harrison, 2011; Pascarella, et al., 1995, 1999; Rankin, et al., 2016). These effects are even more troubling among student-athletes of color (Cooper, et al., 2017; Edwards, 1984; Harper, 2016). Despite these findings, the literature also provides evidence that student-athletes earn more in their early careers than their non-athlete peers (Long & Caudill, 1991).

The literature considering the effects of intercollegiate athletics on institutions is also well developed. Some of this literature tests whether there is an “advertising effect” associated with athletics, finding some evidence that institutions benefit through increased student applications and average test scores following successful athletics seasons (McCormick & Tinsley, 1987; Mixon, 1995; Toma & Cross, 1998). Other studies have also provided evidence of potential financial benefits to institutions, including increased donations (Baade & Sundberg, 1996; Goff, 2000; Humphreys & Mondello, 2007; Sigelman & Bookheimer, 1983) and even higher state appropriations (Humphreys, 2006). The empiric evidence describing an advertising effect, increased donations to institutions (not athletic departments), and increases in state appropriations represents multiple positive externalities for higher education institutions that field athletic programs.

Less socially optimal outcomes of athletic programs have been explored through literature that considers the development of athletic programs as an “arms race” (Hoffer, et al., 2015; Wolverton et al., 2015). Past literature has considered the relationship between athletic expenditures and winning (Beaudin, 2018; Jones, 2013) and financial sustainability (Fort, 2010). Cheslock and Knight (2015) consider how revenue growth at top programs creates a spending cascade that increases the demand for spending among less well-funded

<sup>3</sup> FCS institutions compete in the football championships run by the NCAA, not bowl games.

sports programs and subsequent reliance on subsidies at these institutions. Likewise, Desrochers (2013) shows that the largest subsidy levels per student-athlete are found at institutions with the lowest spending per student-athlete reflecting the dependency on subsidies in less well-funded athletic programs. Taken together these studies indicate both “arms race” spending and institutional stratification across Division I athletic programs.

Not all researchers, however, are critical of subsidies. Goff (2000), for example, asserts that the existence of athletic subsidies does not necessarily indicate that athletics are a financial drain on institutions. He outlines a number of accounting adjustments that he believes need to be made when considering athletic department budgets. After making these adjustments, Goff (2000) suggests that athletic departments are net financial contributors to their institutions.

In addition to the handful of studies that address subsidies directly, there are some studies that acknowledge their existence and provide information on their relationship with athletic revenues and expenditures (Hoffer & Pincin, 2016) and academic spending (Desrochers, 2013). Hoffer and Pincin (2016) investigate how changes in total revenues impact expenditures across multiple expenditure categories including both student-related and coaches’ salaries. They also considered different types of revenue streams and how they impact total expenditures. They found that increases in athletic revenue increase expenditures, but unevenly across categories with 7.5 times more spending for coaches as compared to increased expenditures for student-athletes (Hoffer & Pincin, 2016).

In an issue brief using data from the Delta Cost Project, Desrochers (2013) provides descriptive evidence for both academic and athletic spending at Division I institutions. She finds higher spending levels for student-athletes than for full-time equivalent students (FTE) with six times higher spending on student-athletes in FBS institutions. In addition, this brief documents athletic costs increasing at least twice as fast as academic spending across all subdivisions of Division I institutions. Overall, there are few studies that consider how institutional behavior, represented by a budget allocation to athletics, is affected by external factors. We seek to expand literature in this area by investigating the impact of the introduction of dedicated TV networks.

For as little academic research as there is available on athletic subsidies, there is even less on college-sports-dedicated television networks. This is, at least in part, due to the fact that most of these networks are relatively new. There is, however, some historical context and some general evidence on sports broadcasting that suggest that these networks potentially have far reaching revenue, competitive, and exposure effects.

The groundwork for college sports TV networks was laid in the middle of the twentieth century. In 1961, after the NFL received a court opinion that the league’s control over teams’ television rights violated antitrust law, the US Congress adopted the Sports Broadcasting Act of 1961. This legislation provided an exemption for professional sports leagues from antitrust rules. However, it did not exempt collegiate leagues, namely the NCAA. In 1984, the University of Oklahoma and the University of Georgia sued the NCAA for limiting each school’s number of football game broadcasts to six every two years. The case was ultimately decided by the Supreme Court which ruled in favor of the universities (NCAA, 1984). The decision allowed individual universities to control their own broadcasts and retain associated revenue, rather than it being distributed evenly across all NCAA member institutions. The decision also effectively allowed institutions or conferences to choose to create dedicated television networks, but this innovation was still decades away.

The Sports Broadcasting Act of 1961 and the *NCAA v. Board of Regents of the University of Oklahoma* decision led to two distinct models of broadcasting rights: the NFL (and other professional sports leagues) and collegiate football (and other college sports,

generally). In the NFL, the league centrally negotiates and sells television rights on behalf of the teams, and then distributes the revenues back to the teams. College sports, on the other hand, are much more decentralized, with the broadcast rights negotiated by the individual institutions, or in some cases more recently, by conferences. Mitten and Hernandez (2012) compared the effects of these two models on the competitive balance in the respective leagues. They found that over the course of several decades, there was more competitive balance in the NFL than in college football.

The history, which includes lawsuits by institutions to retain more control and revenue, as well as evidence that suggests that broadcast rights can impact competitive balance show that institutions have a keen interest in how their athletics programs are broadcast. We would expect, then, that a change to the broadcast structure, like the introduction of a new television network, would influence institutional behavior and budget allocations, like athletic subsidies.

## Conceptual Model and Hypothesis

Television networks offer significant revenue streams for intercollegiate athletic departments. Institutions' broadcast revenues and conference distributions jumped by an average of 60% (Pac-12 Network), 38% (Longhorn Network), 36% (SEC Network), and 31% (Big Ten Network) in each of the conferences in the year that they created their TV network. In dollar terms, most of these increases resulted in several millions of dollars in additional revenue for each athletic program, although exact numbers are impossible to track since TV network contracts are proprietary, not available in any database, and not subject to public scrutiny.

In conjunction with tracking this increase in revenue, we also consider the direction of effect of this new revenue stream on institutional subsidies.<sup>4</sup> In our conceptual model we assume that multiple actors set subsidy levels for institutions and that there is not a unitary actor optimizing decisions. For conceptual clarity, we consider three potential outcomes of the relationship between the introduction of a TV network and institutional subsidies. These three outcomes all represent “stark cases”. Our expectation is that measured changes in subsidy values likely fall somewhere between these extremes, but we present the stark cases in our conceptual framework for intellectual clarity. Each case discusses an anticipated direction of effect, but not an anticipated magnitude of effect since we do not have theoretical guidance, evidence from prior scholarship, or empiric grounds for setting a priori expectations for the magnitude of changes. One of the contributions of our work is to provide initial estimates of the magnitude of effects of changes in revenues on subsidy values.

The first potential relationship is that subsidies will fall following the introduction of a dedicated TV network for college sports. In this instance, TV revenue is substituted for institutional subsidies. Because of the introduction of a new revenue stream, institutions reduce their investments in athletics from university sources. Any revenue beyond the value of the subsidy from the new TV network would be captured by the athletic department to increase overall spending.

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<sup>4</sup> We also ran models on total athletic revenue and expenditures using specifications that use the same control variables as in the main paper to enable comparison. These tables are available in Appendix D and are discussed in the conclusion.

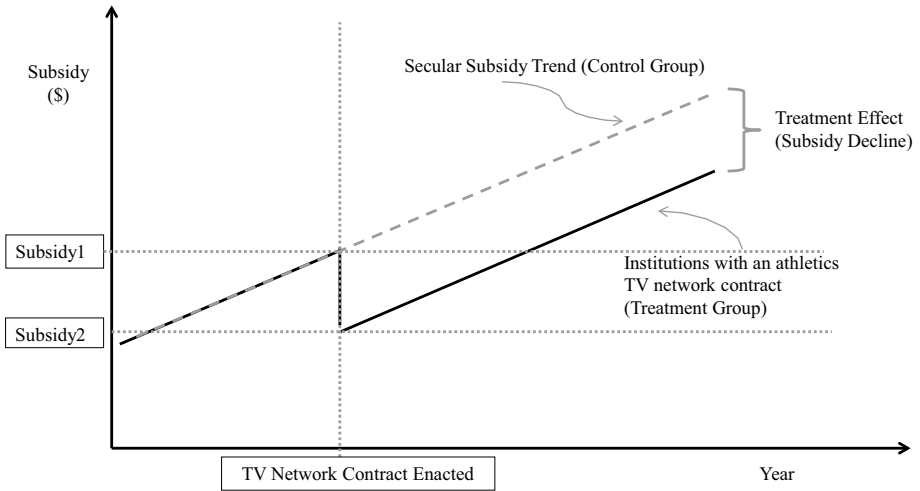
The second potential relationship is that subsidies will be maintained at current levels. In this instance, TV revenues are treated as compliments to institutional subsidies. Athletics revenues would increase by the total amount of the new TV revenues and prior year subsidy values would be maintained. As the “front porch” of the university intercollegiate athletics are one of the main ways that the general public, prospective students, alumni, and other stakeholders are exposed to the university (Clotfelter, 2011). In addition, athletic departments often wield significant influence and their advocates are likely resistant to reducing any revenue stream, including subsidies. This possible relationship would reflect a situation in which institutions value athletics at the price of the subsidy (perhaps reflecting the value of the spillovers received) regardless of other revenue streams.

The third possible relationship is that subsidies will increase. If subsidies represent compensation for externalities that athletics generate, the television networks may lead to additional subsidies. The conference networks now televise more and different sporting events live (like softball, volleyball, soccer, gymnastics, swimming, etc.). In addition, the networks offer news programs that provide commentary, game recaps, and highlights. The networks also replay old games and produce original programming to reach new audiences on a 24-hour platform. In short, these networks provide exponentially more content to viewers than was previously available. Because of this increased exposure, TV networks also have the potential to increase positive externalities from athletics. Increasing subsidies would indicate that athletic subsidies are treated as a Pigouvian subsidy (Pigou, 1947). If institutions subsidize athletics because of the spillover effects that athletics provides and television networks are expected to bring additional spillover effects to the institutions, then under a Pigouvian subsidy framework, an increase in the amount of television exposure (through the introduction of a dedicated TV network) would represent additional positive externalities produced by athletics, so institutions would increase subsidy levels.

While all three possibilities are plausible, additional context factors lead us to hypothesize that the first option (a decline in subsidy values) is the most likely outcome of the introduction of a new TV network. There has been considerable press and criticism of institutional athletic subsidies (e.g., Vedder, 2018; Vedder & Hartge, 2014; Wolverson, et al., 2015), which puts pressure on institutions to reduce subsidy values to zero. In addition, other auxiliary units—such as housing—are now generally entirely self-supporting (National Center for Education Statistics, 2019). To the extent that athletics are treated like other auxiliaries, this too puts pressure on institutions to reduce subsidy values to align athletics with other auxiliary functions at an institution. Because of the size and availability of a replacement revenue stream, we expect the pressures to reduce subsidies to be greater with television network introductions. As such we predict that institutions will reduce their subsidies to athletics in response to the introduction of new revenue from a dedicated TV network.

Figure 1 shows a general graphical representation of our hypothesis and the DID model used in this work. The line chart shows institutional subsidies for athletics over time. At the start of a TV network, the treatment group is expected to experience a decrease in subsidies in excess of any secular trend experienced by the control group (such that  $\text{Subsidy}_1 > \text{Subsidy}_2$ ). The difference in the subsidy levels after the beginning of a TV contract represents the treatment effect.





**Fig. 1** Difference-in-difference model: predicted effect of athletics TV network on institutional subsidy levels

## Data

The dataset for this study was constructed using the College Scorecard, which is administered by the U.S. Department of Education and includes data from multiple sources, including IPEDS, National Student Loan Data System, and the Department of Treasury. We supplemented the College Scorecard Data with institutional revenue data directly from IPEDS.

In addition to the College Scorecard and IPEDS, the USA Today NCAA Finances and the EADA datasets were used. The USA Today’s dataset is constructed annually by the newspaper using Freedom of Information Act requests to compel public institutions to release their NCAA finance reports (the NCAA does not make this information publicly available). It is the only known source for NCAA athletics finance data. The financial data reported to the NCAA is unaudited and, while the NCAA defines the data elements, there may be some variation in how individual institutions report data (for a detailed discussion of the data elements and limitations of the NCAA dataset, please see: College Athletics Financial Information Database, n.d.; Hoffman et al., 2009). The EADA dataset consists of athletics data that are reported to the US Department of Education as required by the Equity in Athletics Disclosure Act. EADA requires that all co-educational postsecondary institutions that receive Title IV funding and have an intercollegiate athletics program report athletics data annually.

The USA Today first collected data for the 2004–2005 academic year, and the most recent year for which all three data sources were available at the time of this research was the 2016–2017 academic year. Therefore, the constructed dataset for this study spans 13 years from 2004–2005 to 2016–2017, and is identified at the institution-year level. This



time period also captures most modern TV networks created by athletic conferences<sup>5</sup> (or individual institutions<sup>6</sup>). This time period also accounts for several conference realignments where some institutions changed conferences.<sup>7</sup>

A number of restrictions were introduced to clean the dataset. First, all major TV networks have been comprised only of non-profit four-year institutions, so community colleges and for-profit institutions are excluded from the analysis.<sup>8</sup> In addition, because financial reporting for athletic programs is not directly released from the NCAA, only data collected by USA Today for public institutions competing in the NCAA's Division I are available.<sup>9</sup> The EADA dataset does not include the military academies, so these institutions are also not included in the analysis.<sup>10</sup> We also addressed missing data and data errors in our dataset.<sup>11</sup>

## Defining Subsidies

The financial reporting that institutions provide to the NCAA identifies four revenue categories that, collectively, form athletic subsidies: direct institutional support, indirect facilities and administrative support, student fees, and direct government aid. The NCAA refers to these as “allocated revenues” (Fulks, 2015), but “subsidy” is the term more commonly used by researchers (see for instance, Denhart & Vedder, 2010). Because our research

<sup>5</sup> The ACC Network was launched in fall 2019 as a dedicated television network, which falls outside of our sample data and is therefore not included in our analysis. BYUtv is not included in the sample because data for private institutions is not collected in the USA Today dataset.

<sup>6</sup> The University of Texas alone created the Longhorn Network in 2012.

<sup>7</sup> Conference changes are coded at the institution level in the year that the change occurred. For the purposes of the TV Networks, institutions are only coded as belonging to the network in years that they were members of the conference and the TV Network was active. For example, even though the Big Ten Network began in 2008, Rutgers University, which joined the Big Ten Conference for the 2014–2015 academic year, is only coded as belonging to the Big Ten Network between 2015 and 2017. This is shown through multiple listings of institutions in Appendix . As a robustness check, we ran our analyses while excluding institutions that changed conference during the sample period and found the same general results presented in this paper. The results of these robustness checks are available from the authors upon request.

<sup>8</sup> Not all institutions participating in NCAA Division I athletics participate in football, but all participate in basketball. Therefore, basketball conference was used to assign conference, even in instances where an institution's conference affiliation may vary by sport.

<sup>9</sup> Three private institutions submitted data to The USA Today for selected years, but these observations were removed from the dataset.

<sup>10</sup> In combining datasets especially with IPEDS, there are often concerns about parent/child reporting issues (Jaquette & Parra, 2016). We carefully investigated this issue and did not find a concern in the unit measures used for identifying Division I schools or for any of our athletic-related variables. Since most parent/child issues apply to regional and branch campuses, if they are present, they would only apply to the IPEDS Finance variables that we use. In our case, we are using two IPEDS Finance variables in our models—instructional expenditures per FTE and total institutional revenue—as control variables. A possible concern with these variables would relate to institutions with financial data reported at the system level. Penn State is an example of this problem since they report financials at the system level. However, athletics are reported only for the main campus with the Nittany Lions the only Division I program at Penn State. In each of these cases, our models will be underestimates of the true effect for a single campus. To confirm this, we ran our models with no controls and, while the point estimates changed, the results were generally the same. We also reran the models excluding only the instructional expenditures per FTE and total institutional revenue variables, and again found no material changes to our results. Both of these sets of tables are available from the authors upon request.

<sup>11</sup> The cleaning that we did was to impute data for Maryland for the number of sports variable. This data was missing from the EADA dataset, but the number of sports did not change during the time period, so we used the same number for each year of the dataset.

focuses on institutional behavior, we exclude the direct government aid category because institutional leaders do not control this revenue stream.<sup>12</sup>

We consider the full range of all types of subsidy values including if an institution had a subsidy value of zero or not. With the NCAA reporting guidelines, no negative subsidy values are captured, so institutions with zero subsidy values would represent either institutions in which no funds flow from the institution to the athletic department, or institutions in which the athletic department made a positive net transfer to the institution. Consistent with prior literature and NCAA reports, our dataset reflects that very few institutions achieve zero subsidy values in any given year. Our dataset for Power Five conference institutions includes 83 institution-year observations of zero subsidy values. These occur at 11 institutions.<sup>13</sup> It is notable that most institutions that achieve zero subsidy values do so for only a few years, not as a matter of regular practice. There are five institutions with zero subsidy values in the year before a TV network was introduced.<sup>14</sup> By including institutions with zero subsidy values in the year before new TV contract revenues are received, our models are biased against finding significant results. As such our results likely underestimate true effects, especially for campuses that have large subsidy values.

In addition to an overall measure of subsidies, we also use measures of individual types of subsidies and run models for direct subsidies, indirect subsidies, and student fees. Direct subsidies include “support from the university, including state funds, tuition, tuition waivers etc. as well as Federal Work-Study amounts for student workers employed by athletics department” (USA Today, 2019). Indirect support “includes the value of university-provided support such as administrative services, facilities and grounds maintenance, security, risk management, utilities, depreciation and debt service that is not charged to the athletics department” (USA Today, 2019). Student fees are defined as “fees assessed to support athletics” (USA Today, 2019).<sup>15</sup>

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<sup>12</sup> Very few institutions outside of the military academies report direct government aid revenue in their NCAA financial reporting.

<sup>13</sup> Our dataset for all Division I institutions counts 84 institution-year observations of zero subsidy values. These are spread over 12 institutions. The only difference in zero subsidy values between the Power Five and all Division I models occurs at a non-Power Five institution, Youngstown State University. Schools with zero subsidy values for all observed years (2005–2017) are Louisiana State University and the University of Nebraska-Lincoln. Other universities with at least one year of a zero subsidy value are: Mississippi State University (2016–2017), Ohio State University (2006–2014), Pennsylvania State University (2005 & 2010–2017), Purdue University (2008–2017), Texas A & M (2010 & 2015–2017), University of Michigan-Ann Arbor (2005 only), University of Oklahoma-Norman Campus (2009–2017), University of Oregon (2007–2009 & 2017), The University of Texas at Austin (2009–2017), and Youngstown State University (2007 only).

<sup>14</sup> The five institutions that had zero subsidy values in the year prior to the introduction of a TV network are: Louisiana State University (2013), University of Nebraska-Lincoln (2011), Ohio State University (2006), University of Oklahoma-Norman Campus (2013), and University of Texas at Austin (2010).

<sup>15</sup> The type of student fee is not specified in the dataset (defined only as “fees assessed to support athletics”). Fees would therefore include mandatory fees imposed by university administration, optional fees, fees that the student body agrees to pay through an election process, and fees that allow enrolled students to view sporting events without paying an additional ticket charge.

## Methods

This study uses a DID empirical approach (Cellini, 2008). The analysis is focused on the year in which a new TV network was created. The dataset is a cross-sectional time series (panel), which means that each variable is identified by institution,  $i$ , and year,  $t$ . The independent variable of interest seeks to capture those observations (at the institution-year level) for which a TV network contract is in place. Appendix C contains tables with a list of start and end dates for each dedicated college sports TV network and the start and end years of each institution's affiliation with each of the TV networks.<sup>16</sup>

The variable of interest in this work is an interaction between those institutions with a TV network and the years after the start of the TV network ( $TVNetwork_{it}$ ). Most DID designs show this as an interaction term (e.g.,  $BigTen_i * Post2008_t$ ), but for parsimony, we have used a mathematically equivalent representation as shown in Eq. 1 below.

$$Subsidy_{it} = \beta_1 (TVNetwork_{it}) + \mathbf{X}_{it}\boldsymbol{\gamma} + \mu_i + \nu_t + \varepsilon_{it} \quad (1)$$

The specification in Eq. 1 also includes institutional fixed effects (represented by  $\mu_i$ ) and year effects (represented by  $\nu_t$ );  $\varepsilon_{it}$  is the error term.  $\mathbf{X}_{it}$  is a vector of time-varying control variables. The coefficient of interest is  $\beta_1$ . Within a DID model, fixed effects help to control for unobserved heterogeneity and common time trends in the data to better isolate the effect of TV networks on institutional athletic subsidy levels. Equation 1 shows only the model for all institutional subsidies for athletic programs, but similar models are also used in this work to test the impact of the introduction of a TV network on different types of subsidy values.

## Covariates

A number of control variables are used in each model. These covariates are included to increase the precision of the estimates reported and relate to institutional factors that might influence subsidy levels. In all models, we use a covariate for institutional size as measured by total undergraduate enrollment. We also use a measure of institutional expenditures on instruction per FTE. This control variable is meant to capture differences in demand for additional instructional expenditures. Institutions with lower expenditures per student might view athletic subsidies differently than peer-institutions with higher instructional expenditures per FTE. In addition, all models include a control for total institutional revenues to capture institutional size and resources available for subsidies. We also include a covariate for the number of competitive varsity sports fielded by each institution, since this

<sup>16</sup> At least two other athletic conferences had telecasts branded as “networks” during this time. The ACC Network and Big 12 Network, however, were not dedicated television channels, but rather were used to brand syndicated content on other networks. In other words, there were not ACC Network and Big 12 Network channels with 24-7 content available from household cable or satellite providers. The “networks” simply produced the game broadcasts and made them available as part of a different network's linear programming, like ESPN, for example. Their use of the term “network” did not represent a significant change in operating procedures or a meaningful policy innovation. For this reason, these two “networks” are not like dedicated networks and are not part of the treatment group in our study. The ACC implemented a dedicated network in Fall 2019 using the same ACC Network name. However, because this implementation date was after 2016–2017, and thus outside of our sample, ACC institutions are part of the control group in this study.

measure captures the size of the athletic enterprise at each institution.<sup>17</sup> Finally, ticket sales and athletic donations/contributions are used as covariates to capture an athletic department's ability to generate external funding. Donations/contributions include gifts or other amounts received directly from individuals, booster clubs, corporations, or other organizations designated specifically for the operation of the athletic department. Ticket sales are excluded as a covariate in the models using student fees as the outcome variable. This exclusion recognizes that some schools provide student tickets in exchange for the athletic fee assessed to students.<sup>18</sup> Throughout the analyses, all financial data are adjusted for inflation using the consumer price index (CPI) as measured by the U.S. Bureau of Labor Statistics. All values are adjusted such that 100=2017.

Table 1 presents descriptive statistics for our dataset. We have 672 observations over 52 institutions for the years 2005–2017.<sup>19</sup> Approximately 31% of institution-year observations were subject to any TV network. Mean subsidy levels were over \$5.5 million, with a range from \$0 to approximately \$49.4 million.<sup>20</sup> Direct subsidy levels averaged approximately \$2.3 million with a range from \$0 to \$39 million.<sup>21</sup> Indirect subsidy levels had a mean of approximately \$765,000 and ranged from \$0 to \$19 million.<sup>22</sup> Student fees used for athletics averaged approximately \$2.5 million and had a range of \$0 to \$14.1 million. Mean ticket sales yielded \$23.2 million with a range from approximately \$4.6 million to \$72.5 million.<sup>23</sup> Mean contribution and donation revenue to athletic departments was \$22.3 million with a range from \$0 to \$257 million. Undergraduate enrollment at Power Five institutions averaged nearly 25,000 students with a range from approximately 4,700 to 59,000. Instructional expenditures at these institutions averaged approximately \$13,000 per FTE (ranging from \$4,300 to \$47,300). Total institutional revenues at Power Five institutions averaged \$2 billion with a range from \$396 million to nearly \$9 billion. The total number of varsity sports fielded for these institutions averaged 16 with a range from 11 to 33.

## Falsification Tests and Parallel Trend Assumptions

DID models assume that the treatment and control groups were similar prior to the policy intervention (in our case the introduction of a TV Network). We therefore first need to investigate if the outcome measures tested at institutions that received TV Networks were

<sup>17</sup> This variable is derived from participant data in the EADA dataset. EADA data includes the number of participants per sport, including an “Other Sports” category. The count of varsity sports by institutions was calculated by counting the number of sports with reported participants. Because the “Other Sport” category could include more than one sport, this variable may not be precise for all institutions, specifically those with participants reported in the “Other Sports” category.

<sup>18</sup> As a robustness check, all models were run with no covariates, and while the point estimates changed, the directions of effect and numbers of significant models were generally the same. These results are available from the authors by request.

<sup>19</sup> There are 4 years of missing data for Penn State in the NCAA data.

<sup>20</sup> Nearly all institutions transferred subsidies to their athletic departments, with only 12% of institution-year observations reflecting a zero subsidy value (only nine public institutions reported \$0 subsidy in 2017). The maximum subsidy value is found at Rutgers University in 2013. There was a great deal of press coverage of the institutional subsidies at Rutgers as it transitioned into the Big Ten conference (see for instance, Grasgreen, 2014; Sargeant & Berkowitz, 2014; and Segarra, 2014).

<sup>21</sup> The \$39 million direct subsidy value is found at Rutgers in 2013.

<sup>22</sup> The \$19 million indirect subsidy value is found at Oregon State University in 2006.

<sup>23</sup> The maximum value of ticket sales (\$72.5 million) was found in 2017 at the University of Texas at Austin.

**Table 1** Descriptive statistics power 5 conferences, 2005–2017

Variable	Obs	Mean	SD	Min	Max
Big 10 network	672	0.16	0.37	0	1
Longhorn network	672	0.01	0.09	0	1
Pac 12 network	672	0.07	0.26	0	1
SEC network	672	0.06	0.23	0	1
ANY network	672	0.31	0.46	0	1
Subsidy value including zeros (CPI adjusted)	672	5,514,206	5,645,821	0	49,437,200
Direct subsidy (CPI adjusted)	672	2,295,086	3,853,133	0	39,043,468
Indirect subsidy (CPI adjusted)	672	765,111	1,867,076	0	19,033,192
Student fees (CPI adjusted)	672	2,454,009	3,127,299	0	14,137,232
Ticket sales (CPI adjusted)	672	23,244,071	11,609,819	4,643,275	72,457,216
Contributions/donations (CPI adjusted)	672	22,320,027	15,473,236	0	256,577,360
Undergraduate enrollment	672	24,807	7765	4728	59,183
Instructional expenditures per FTE (CPI adjusted)	672	13,219	5338	4383	47,299
Total institutional revenues (CPI adjusted)	672	1,995,909,285	1,417,785,415	395,797,824	8,981,661,696
Total number of varsity sports fielded (per institution)	672	16	4	11	33

on a similar trend to other institutions prior to their creation. We do this using multiple approaches.

First, we present falsification tests to provide evidence that the observed changes are likely due to the treatment and not to unobserved "treatments" in the dataset. One way to directly test the assumption of parallel time trends is to create a dummy test prior to any network implementations. We are able to conduct this test because we have at least two years of data prior to the first conference network implementation. In this dummy test, we create a treatment group that includes those institutions that were eventually part of a TV network and we treat them as if they were all implemented in a year (2006) prior to any implementation. If there are significant differences between the treatment and control groups in this test, it would be evidence that the DID parallel trends assumption is violated. The results from this test are shown in Appendix A in Table 6. This table shows both a model that only considers the Power Five conferences (model 1) and a model (model 2) that uses all Division I institutions (see Appendix B for more information on the models for Division I institutions). In both cases, the results support the assertion that the parallel trends assumption is not violated.<sup>24</sup>

Second, we present evidence from event time figures.<sup>25</sup> We created figures that show time relative to implementation that plot coefficients (and standard errors) of a regression with indicator variables for each of the four prior years and each of the four years following the start of any TV Network (Angrist & Pischke, 2009). We run these figures both for the Power Five conferences only and for all Division I institutions. To ensure consistency between the models tested and the figures, we use the same control variables in these regressions as described in section V.I above. Figure 2 provides consistent evidence of parallel prior year trends for the Power Five conferences. Figure 3 is presented in the Appendix and provides evidence that is aligned with the falsification tests for the sample of all Division I institutions.

In addition to this supporting evidence, we are unaware of any other major policy changes in college sports during this time that would have systematically impacted our treated institutions. Because the conference networks were created in a number of different years, it is unlikely that a single policy change would have impacted the outcome variables in a way that would skew the results. That is not to say that there were not changes in college sports over the time period, just none that we are aware of that coincided with the creation of each of the conference TV networks that would violate an assumption of a DID model. Additionally, the decisionmakers that set subsidy values on each campus are likely different from the decisionmakers who decide if an athletic conference will start a television network, which indicates a clear separation of decisionmakers.

<sup>24</sup> We acknowledge the concerns in the field over the use of DID models, especially models that have time-varying effects in two-way fixed effects models (Baker et al., 2021; Callaway & Sant'Anna, 2021; Clarke & Tapia-Schyte, 2021; Goodman-Bacon, 2021; Schmidheiny & Siegloch, 2019), but to-date there is no consensus in the field about the best approach for addressing this. Prior literature has shown that including state-specific linear (or quadratic) time trends can matter to estimates produced in difference-in-difference models (see for instance, Friedberg, 1998; Jacobson et al., 1993). Therefore, as an extra precaution, we also ran the analyses while controlling for conference-specific linear time trends, as conferences are more meaningful conceptually than states for our analysis. These models result in findings similar in most models to those presented here and are available from the authors upon request.

<sup>25</sup> Descriptive plots of the data were also run but are excluded due to space concerns. These figures are available from the authors upon request.

## Results

Institutions in Power Five conferences have accounted for most of the network introductions. The Mtn. Network was the first conference network, but it remains the only network from outside of the Power Five conferences. However, not all Power Five conferences have implemented a dedicated network. The Big 12 conference has not yet introduced a dedicated network with 24-7 content, and the ACC Network was only recently introduced (after the time period used for this study). In the main paper, we present results for the Power Five conferences in Tables 2, 3, 4 and 5. In the appendix, we present results for all Division I conferences, including those not among the Power Five conferences, which adds the Mtn. Network to the analysis.

We present two types of models of the Power Five conferences: one model that considers the presence of any TV network and individual models for each of the Power Five TV networks. The “Any Network” model considers treatment to be the presence of a TV network in any conference. Conferences that never had a TV network during the time period of the study are the control group. This model is the most cleanly specified in terms of having clearly defined treatment and control groups. While we value this model within a DID approach, we also acknowledge that the treatment in the Any Network models is varied by conference and important nuances may be lost regarding differences across conferences, in the ways in which conference distributions are awarded among institutions, and in the nature of the TV contracts. As such we additionally present models for individual TV networks. In these models, the treatment is the TV network listed (i.e., the Big Ten Network, the Longhorn network, etc.). Control institutions are all institutions not treated by the identified network. This allows us to isolate the effect of each individual network, but does mean that institutions with different networks are included in the control group (so the Big10 network is in the control group for the later introduction of the Longhorn network). In these models the treatment is only for the network identified.

Considering all forms of subsidies, we find that the introduction of a television network is associated with significant declines ( $p < 0.05$ ) in subsidies for the Big Ten Network and Longhorn Network, compared to Power Five institutions without a television network. The magnitude of effect was approximately \$1.3 and 1.7 million, respectively, for each network (Table 2, Columns 1 and 2). When considering Any Network, we also find a significant decline of approximately \$1.2 million (Table 2, Column 5).

Table 3 shows the results of the direct subsidy models. We find significant decreases ( $p < 0.05$ ) for the Big Ten Network, Longhorn Network, and Any Network models. For institutions that are members of any TV network, we find a significant decline in direct subsidies of approximately \$755,000. Direct subsidy declines ranged from \$1.1 million in the Big Ten to \$621,000 following the introduction of the Longhorn Network. The indirect subsidy results are shown in Table 4. We find no significant changes in indirect subsidies associated with the introduction of television networks in the Power Five conference models. Finally, Table 5 shows the results of the student fee models, where we find significant declines ( $p < 0.05$ ) associated with the introduction of the Longhorn and SEC Networks with magnitudes of \$1.3 million and \$789,000, respectively. The results for all other networks, including Any Network, are insignificant.



## Discussion and Conclusion

Overall, our findings show that institutions are responsive to the introduction of a new television network dedicated to college sports. We find an average decline in subsidy levels of \$1.2 million for any TV network. We also find significant decreases in subsidies associated with the introduction of the individual networks for the Big Ten and Longhorn Networks. These findings align with our hypothesis that institutional subsidies would decline following the introduction of a new revenue stream.

To further explore possible explanations for this baseline finding, we ran our models using athletic revenues and total expenses as the outcome variables. While not the central focus of this paper, these results can be found in Appendix D. Consistent with prior literature (Hoffer & Pincin, 2016), we found that athletics-generated revenues (i.e., revenues other than subsidies) increased by \$8.6 million following the introduction of a TV network, while total expenses increased by \$3.0 million, in the Any Network models.<sup>26</sup> The fact that athletic revenues appear to increase by more than expenses is consistent with our primary findings of subsidy reductions. If the TV Networks are helping to reduce the deficit between athletics-generated revenue and athletic expenses, then it is intuitive that institutional subsidies would decrease.

When considering different types of athletic subsidies, we find significant declines in direct subsidy levels for Any Network, the Big Ten Network, and the Longhorn Network. Some individual conference networks (the Longhorn and SEC Networks) are associated with significant declines in student fees, but we did not find any significant declines in indirect subsidies.

Our results do not find significant declines in subsidies across all conference network introductions and types of subsidies. There are at least three possible explanations for this that are helpful to consider when interpreting our results. First, we use highly specified models with only 52 public institutions from the Power Five conferences. This decision results in a fairly small sample size and models that may be underpowered. We chose to use only the Power Five conferences as our primary analyses to increase our confidence that our treatment and control groups were as similar as possible in a DID framework. Appendix B presents results from models with all public institutions in Division I. These results offer larger sample sizes and greater power, but are less well-suited to a DID design.

Second, the structure and timing of television revenue increases should be taken into account when considering our findings. Our DID models reflect an average treatment effect in a staggered treatment adoption (Callaway & Sant'Anna, 2021). In reality, the network revenue bump and subsequent distribution to institutions could be contractually phased in over a period of time. This might also impact our ability to find significant results for late adopter-conferences (like the SEC). If it was possible to access the contractual details of each separate network's revenues and distributions, we could better assess the likelihood of a multi-year implementation phenomenon.

Third, it is important to consider differences in our findings across the different types of subsidies. We find evidence of significant declines in total subsidies and direct subsidies in the Any Network models, but significant declines in student fees only in select network models, and no significant declines in indirect subsidies in any models. This may be

<sup>26</sup> Tables 14 and 15 show the results for the individual network models as well. These results are not completely consistent. Significant increases in athletic revenues and total expenses were found for the Longhorn Network and SEC Network, but not for the Big Ten Network or Pac-12 Network.

**Table 2** Difference-in-difference models for power five conference TV contracts 2005–2017, all subsidy values

Variables	(1)	(2)	(3)	(4)	(5)
	Big ten network	Longhorn network	Pac-12 network	SEC network	Any network
Big ten network (millions)	- 1.327** (0.506)				
Longhorn network (millions)		- 1.659*** (0.368)			
Pac-12 network (millions)			- 0.449 (0.958)		
SEC network (millions)				- 0.333 (0.859)	
Any network (millions)					- 1.196** (0.464)
Undergraduate enrollment	- 190.3* (98.10)	- 187.3* (96.22)	- 185.4* (99.61)	- 182.0* (98.89)	- 175.6 (107.5)
Instructional expenditures per FTE	- 8.980 (66.61)	0.124 (65.95)	0.324 (70.74)	- 13.15 (65.29)	7.974 (65.81)
Total institutional revenues	0.000626 (0.000374)	0.000542 (0.000369)	0.000598 (0.000378)	0.000544 (0.000347)	0.000632 (0.000390)
Ticket sales	0.00183 (0.0398)	0.0164 (0.0361)	0.00599 (0.0375)	0.0147 (0.0412)	0.0158 (0.0377)
Contributions/donations	- 0.00472 (0.00390)	- 0.00489 (0.00376)	- 0.00464 (0.00388)	- 0.00411 (0.00388)	- 0.00267 (0.00374)
Total number of varsity sports fielded (per institution)	- 388,585 (298,114)	- 385,223 (275,259)	- 381,495 (272,995)	- 390,243 (276,281)	- 407,434 (273,511)
Constant	1.594e+07*** (5.188e+06)	1.522e+07*** (4.670e+06)	1.528e+07*** (4.681e+06)	1.542e+07*** (4.687e+06)	1.570e+07*** (4.725e+06)
Institution fixed effects	Yes	Yes	Yes	Yes	Yes

**Table 2** (continued)

Variables	(1) Big ten network	(2) Longhorn network	(3) Pac-12 network	(4) SEC network	(5) Any network
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	672	672	672	672	672
R-squared	0.080	0.068	0.067	0.066	0.090
Number of Institutions	52	52	52	52	52

Dollar values adjusted for CPI. Robust standard errors in parentheses. \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table 3** Difference-in-difference models for power five conference TV contracts 2005–2017, direct subsidies

Variables	(1)	(2)	(3)	(4)	(5)
	Big ten network	Loughorn network	Pac-12 network	SEC network	Any network
Big ten network (millions)	- 1.120** (0.470)				
Loughorn network (millions)		- 0.621* (0.337)			
Pac-12 network (millions)			- 0.780 (0.660)		
SEC network (millions)				0.484 (0.404)	
Any network (millions)					- 0.755** (0.335)
Undergraduate enrollment	- 41.81 (57.88)	- 34.59 (59.28)	- 31.62 (62.68)	- 39.27 (58.14)	- 29.48 (63.72)
Instructional expenditures per FTE	44.66 (63.72)	47.38 (66.54)	64.58 (73.38)	49.62 (66.08)	59.95 (66.01)
Total institutional revenues	- 0.000181 (0.000242)	- 0.000221 (0.000253)	- 0.000172 (0.000235)	- 0.000196 (0.000247)	- 0.000188 (0.000238)
Ticket sales	0.0444 (0.0333)	0.0534 (0.0331)	0.0446 (0.0314)	0.0416 (0.0311)	0.0581* (0.0335)
Contributions/donations	- 0.00150 (0.00325)	- 0.00175 (0.00308)	- 0.00157 (0.00314)	- 0.00245 (0.00323)	- 0.000343 (0.00296)
Total number of varsity sports fielded (per institution)	- 8673 (137,448)	- 18,302 (119,707)	- 20,204 (118,728)	- 76.87 (124,945)	- 42,883 (119,686)
Constant	2.264e+06 (3.161e+06)	1.801e+06 (2.928e+06)	1.733e+06 (2.920e+06)	1.715e+06 (2.996e+06)	2.169e+06 (2.871e+06)
Institution fixed effects	Yes	Yes	Yes	Yes	Yes

**Table 3** (continued)

Variables	(1) Big ten network	(2) Longhorn network	(3) Pac-12 network	(4) SEC network	(5) Any network
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	637	637	637	637	637
R-squared	0.058	0.036	0.046	0.038	0.056
Number of institutions	52	52	52	52	52

Dollar values adjusted for CPI. Robust standard errors in parentheses. \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table 4** Difference-in-difference models for power five conferences TV contracts 2005–2017, indirect subsidies

Variables	(1)	(2)	(3)	(4)	(5)
	Big ten network	Loughorn network	Pac-12 network	SEC network	Any network
Big ten network (millions)	0.525 (0.328)				
Loughorn network (millions)		0.282 (0.246)			
Pac-12 network (millions)			- 0.120 (0.591)		
SEC network (millions)				- 0.191 (0.629)	
Any network (millions)					0.134 (0.188)
Undergraduate enrollment	- 26.76 (43.94)	- 30.15 (45.21)	- 30.10 (42.87)	- 28.34 (50.06)	- 31.24 (45.73)
Instructional expenditures per FTE	- 15.49 (30.48)	- 16.71 (31.90)	- 11.52 (35.78)	- 17.34 (35.82)	- 17.79 (29.50)
Total institutional revenues	0.000283 (0.000259)	0.000301 (0.000268)	0.000305 (0.000263)	0.000291 (0.000245)	0.000293 (0.000269)
Ticket sales	0.00859 (0.0148)	0.00442 (0.0145)	0.00488 (0.0120)	0.00924 (0.0153)	0.00441 (0.0156)
Contributions/donations	- 0.000696 (0.00443)	- 0.000577 (0.00433)	- 0.000601 (0.00429)	- 0.000307 (0.00437)	- 0.000852 (0.00435)
Total number of varsity sports fielded (per institution)	8622	13,094	11,112	5726	16,694
Constant	(36,831)	(40,542)	(40,747)	(50,059)	(44,240)
	310,609	527,148	491,839	558,573	450,442
Institution fixed effects	(1.206e+06)	(1.317e+06)	(1.244e+06)	(1.196e+06)	(1.332e+06)
	Yes	Yes	Yes	Yes	Yes

**Table 4** (continued)

Variables	(1) Big ten network	(2) Longhorn network	(3) Pac-12 network	(4) SEC network	(5) Any network
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	637	637	637	637	637
R-squared	0.036	0.030	0.030	0.030	0.030
Number of institutions	52	52	52	52	52

Dollar values adjusted for CPI. Robust standard errors in parentheses. \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1



**Table 5** Difference-in-difference models for power five conferences TV contracts 2005–2017, student fees

Variables	(1)	(2)	(3)	(4)	(5)
	Big ten network	Longhorn network	Pac-12 network	SEC network	Any network
Big ten network (millions)	- 0.421 (0.297)				
Longhorn network (millions)		- 1.281*** (0.161)			
Pac-12 network (millions)			0.593 (0.675)		
SEC network (millions)				- 0.789** (0.360)	
Any network (millions)					- 0.368 (0.259)
Undergraduate enrollment	- 148.3** (62.33)	- 144.6** (62.01)	- 145.4** (57.56)	- 132.6** (60.95)	- 141.7** (66.13)
Instructional expenditures per FTE	- 80.21* (44.97)	- 73.20* (43.42)	- 97.86* (56.81)	- 93.30** (46.44)	- 73.35 (48.69)
Total institutional revenues	0.000338 (0.000271)	0.000321 (0.000267)	0.000302 (0.000235)	0.000318 (0.000271)	0.000346 (0.000273)
Contributions/donations	- 0.00187 (0.00271)	- 0.00189 (0.00266)	- 0.00184 (0.00242)	- 0.000227 (0.00248)	- 0.00113 (0.00272)
Total number of varsity sports fielded (per institution)	- 75,632 (128,384)	- 79,718 (119,016)	- 71,296 (128,454)	- 95,025 (111,835)	- 88,522 (122,891)
Constant	8.177e+06*** (2.304e+06)	8.007e+06*** (2.139e+06)	8.159e+06*** (2.248e+06)	8.368e+06*** (2.017e+06)	8.230e+06*** (2.155e+06)
Institution fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	637	637	637	637	637

**Table 5** (continued)

Variables	(1)	(2)	(3)	(4)	(5)
	Big ten network	Longhorn network	Pac-12 network	SEC network	Any network
R-squared	0.107	0.109	0.113	0.122	0.110
Number of institutions	52	52	52	52	52

Ticket sales are excluded from the student fee models because some institutions include game tickets for registered students as part of the student fee charges. Dollar values adjusted for CPI. Robust standard errors in parentheses. \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$

explained by the characteristics of the different subsidy types. Indirect subsidies are often services provided on-behalf of the athletic department, like facilities maintenance, and may not be viewed as being a subsidy in the same way as a subsidy that requires a transfer of funds (as would be the case with direct institutional support). These on-behalf services may even be overlooked in campus environments where athletic subsidies come under scrutiny. The lack of change in any model for indirect subsidies indicates that indirect subsidy levels are already optionally set, and the infusion of additional resources to athletic departments will not change the allocation of these on-behalf services.

Direct subsidies and student fees are more visible subsidies and require fund transfers that could more easily be redirected to other priorities. These types of subsidies are more likely to be subject to pressure from institutional stakeholders who object to athletic subsidies. Thus, institutions might be more inclined to change direct subsidies and student fees in response to new revenue from a television network. Changes to student fees would primarily benefit students, rather than the institution. However, both types of subsidies are shown to decline by approximately the same magnitude in our results indicating similar treatment of these two more visible types of subsidies. The declines in direct subsidies and student fees reflect our hypothesis that subsidy levels would fall following the introduction of a dedicated TV network.

Overall, we find evidence that when university athletic departments receive increased exposure and financial gains through the introduction of a dedicated TV network, institutions reallocate institutional resources away from athletic subsidies. With decreased subsidies flowing from academic and instructional units in institutions to athletic programs, it seems possible that these funds could be made available for other student-related educational endeavors. Assuming that multiple actors decide athletic subsidy levels, we would expect that institutional leaders—rather than athletic directors—are redirecting funds made available by declines in subsidy levels to their priorities, which could vary by campus.

Regardless of the purpose, our results suggest a financial benefit for institutions (not only athletic departments) of the receipt of new revenue from the introduction of conference television networks. At the same time, these new TV revenues also appear to increase overall athletic spending since not all subsidy value declines are significant nor are all subsidy levels reduced to zero. This provides evidence of an athletics arms race that ratchets up total athletic spending, which is in line with prior literature (Bowen, 1968; Cheslock & Knight, 2015; Hoffer, et al., 2015).

We find this relationship between conference television networks, which on the surface seem like a purely athletic phenomenon, and broader university finance to be very intriguing. The one area of the university in which subsidies are plainly identified and can be clearly viewed is athletics. Athletics because of its reporting structure, regulation by the NCAA, and relationship to the academic enterprise of institutions, provides a unique look into subsidies that is not available elsewhere in postsecondary institutions. Our research offers important insights about general cross-subsidization practices and the “stickiness” of subsidies, especially indirect subsidies, even when an auxiliary unit receives a substantial increase in revenue from a source external to the institution.

While our results provide insights into the use of cross-subsidization throughout universities, we are also aware of related arguments about moving away from broad use of cross-subsidization towards more “business-like models” which can undermine public goods at institutions (like libraries) and value revenue-generating fields over fields that produce greater social benefits (like the humanities and liberal arts) (Newfield, 2016). Research has indicated that this shift has led to increased reliance on tuition revenue,

out-of-state students, institutions placing greater emphasis on private fundraising, or preferring investments in fields of study that have been shown to be revenue generating (McMahon & Delaney, 2021; Cheslock & Gianneschi, 2008; Jaquette, 2019; Jaquette & Curs, 2015; Jaquette, et al., 2018). For example, “cash cow” masters’ degree programs have increased in fields like Masters’ in Business Administration and not in non-revenue generating fields (Jaquette, 2019). The long-term implications of preferences for majors and degree programs that are more likely to generate revenue, which also tend to be more focused on labor market outcomes for students, likely exacerbates the vocationalization of higher education (Newfield, 2016). Our hope is that our work also provides a reflection on these trends and the importance of external funding environments (like the introduction of TV network contracts) in shaping institutional behavior towards internal budgeting decisions.

We encourage future research to further explore the relationship between intercollegiate athletics and institutional behavior. Future directions for research should include more nuanced investigations about TV network contracts, since there is much that is not known about contract terms and payout rates. Likewise, other large revenue sources for institutions like single game broadcast rights and licensing contracts should be explored. We also hope scholars will investigate how college sports dedicated networks impact ticket sales for non-revenue generating sports. It may be that the increases in ticket sales do not reflect increased prices or attendance at revenue-generating sporting events, but rather that the TV networks have helped institutions reach new fans for sports, which did not previously draw large crowds. Further investigation is also needed to better understand the elasticities of athletic subsidies. Additionally, future exploration is needed to test if the impact of an infusion of new revenue from a dedicated TV network is most likely to be observed in the year in which the network started or in a lagged pattern.

We have recently seen another round of conference realignments, with the Universities of Oklahoma and Texas leaving the Big 12 Conference for the SEC. Interestingly, the Big 12 is currently the only Power Five conference without a dedicated television network (after the ACC Network began in 2019). This realignment also has implications for the Longhorn Network at the University of Texas, which the university president told lawmakers is expected to wind down as the university switches conferences (Talty, 2021). The fact that the university president is discussing the conference switch and the television network with state lawmakers indicates just how high profile these decisions are and their likelihood to have far reaching effects that are not confined strictly to a university’s athletics enterprise. In general, we hope that scholars will continue to use athletics as a window to better understand institutional behavior, to build our understanding of institutional budgeting practices, and to better understand how institutions respond to changes in intercollegiate athletics.

## Appendix A

See Fig. 2, 3 and Table 6.

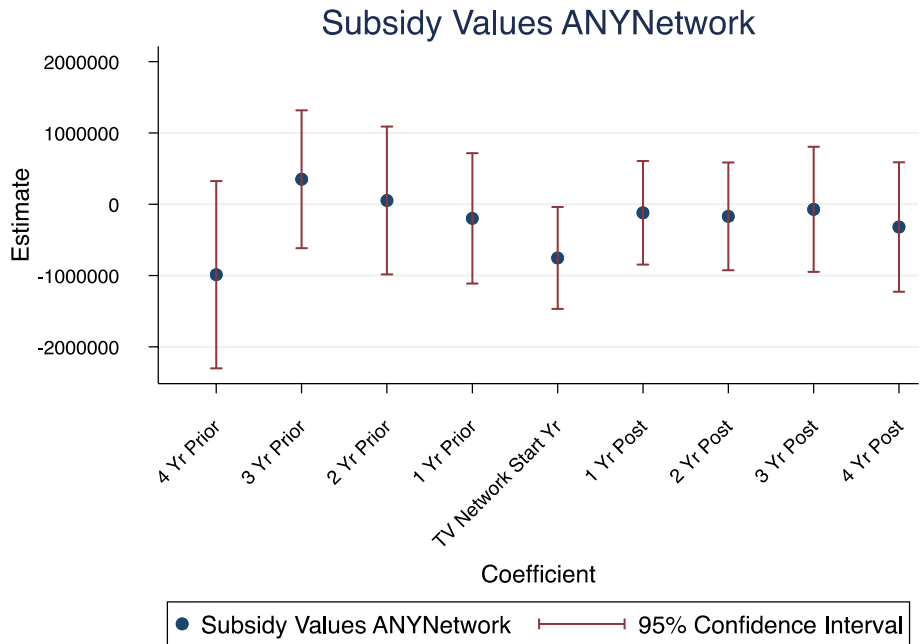


Fig. 2 Event time figure: all subsidy values for any network, power five conferences only

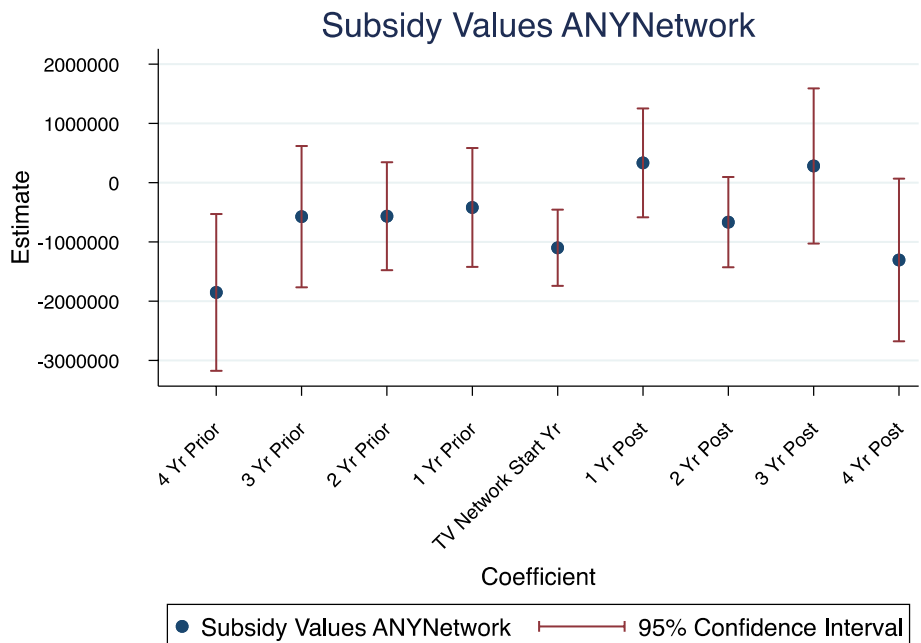


Fig. 3 Event time figure: all subsidy values for any network all division I conferences

**Table 6** Falsification tests difference-in-difference models, 2006

Variables	(1)	(2)
	Power five conferences only	All division I institutions sample
	No network in 2006 if ever any network	No network in 2006 if ever any network
No network in 2006 if ever any network	211,883 (830,434)	246,202 (612,667)
Undergraduate enrollment	− 169.8 (115.5)	20.31 (117.0)
Instructional expenditures per FTE (CPI adjusted)	42.03 (175.9)	137.1 (240.0)
Total institutional revenues (CPI adjusted)	− 0.00982* (0.00505)	− 0.00323 (0.00358)
Ticket sales (CPI adjusted)	0.187** (0.0770)	0.158* (0.0855)
Contributions/donations (CPI adjusted)	0.000665 (0.00280)	− 0.000694 (0.00224)
Total number of varsity sports fielded (per institution)	630,126** (242,170)	493,847** (199,548)
Constant	1.148e+07 (1.170e+07)	992,378 (4.709e+06)
Institution fixed effects?	Yes	Yes
Year fixed effects?	Yes	Yes
Observations	103	410
Number of institutions	52	210
R-squared	0.138	0.124

Dollar values adjusted by CPI. Robust standard errors in parentheses. \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$

## Appendix B

In this appendix, we present results for all Division I conference public institutions. These analyses add the Mtn. Network, a network produced by the Mountain West conference, which is not a Power Five conference and is therefore not included in the results presented in the main text. Table 7 presents descriptive statistics for this larger sample, which includes the Mtn. Network. In this larger sample, there are 2,810 observations over 228 institutions for the years 2005–2017. Approximately 9% of institution-year observations were subject to any TV network. Mean subsidy levels were over \$9.98 million, with a range from \$0 to approximately \$49.4 million.<sup>27</sup> Direct subsidy levels averaged approximately \$4.5 million with a

<sup>27</sup> Nearly all institutions transferred subsidies to their athletic departments, with only 3% of institution-year observations reflecting a zero subsidy value (only nine public institutions reported \$0 subsidy in 2017). The exceptionally large maximum subsidy value is found at Rutgers University in 2013 (see footnote 23 for further discussion).

range from \$0 to \$39 million.<sup>28</sup> Indirect subsidy levels had a mean of approximately \$1 million and ranged from \$0 to \$19 million. Student fees used for athletics averaged \$4.5 million and had a range of \$0 to \$37.1 million.<sup>29</sup> Mean ticket sales yielded \$6.6 million with a range from approximately \$63 to \$72.5 million.<sup>30</sup> It is interesting to note that across the dataset average subsidy values are higher (approximately 33% higher) than average ticket sales, indicating how important this revenue stream is for athletic departments. Mean contribution and donation revenue to athletic departments was \$6.7 million with a range from \$0 to \$257 million. Undergraduate enrollment at all Division I institutions averaged over 16,000 students with a range from approximately 1,400 to 59,000. Instructional expenditures at these institutions averaged approximately \$9,700 per FTE (ranging from \$3,400 to \$47,300). Total institutional revenues at Division I institutions averaged \$837 million with a range from \$54.7 million to nearly \$9 billion. The total number of varsity sports fielded for these institutions averaged 14 with a range from 8 to 33.

Tables 8, 9, 10 and 11 present the results when considering all Division I public institutions. Each table shows models for each of the five TV networks tested plus a model that captures treatment from any of the networks. While the individual network models may provide useful insights, they treat the implementation of each network as a unique treatment condition. For this reason, the “Any Network” models are of particular interest since they place all TV networks in the treatment group.

Table 8 presents our results for all subsidy values. In Table 8, we find significant decreases in subsidy values for all of the TV networks tested ( $p < 0.05$  or smaller), except for the Mtn. Network, which has an insignificant result. Declines in institutional subsidies range from an average drop of approximately \$3.4 million in subsidies at Big Ten institutions (Table 2, Model 2) to a decline of \$2.2 million at the University of Texas following the introduction of the Longhorn Network (Table 2, Model 3). When considering the effect of having any TV network (Table 2, Model 6), we find an average decline in institutional subsidy values of \$2.6 million, as compared to institutions who did not have a TV network.

Next, we consider specific types of subsidies—direct subsidies, indirect subsidies, and student fees. Table 9 presents results for direct subsidies only. We find significant declines in direct subsidies for the Big Ten, Longhorn, Pac-12 Networks, and Any Network ( $p < 0.01$  or smaller). The magnitude of the effect ranges from a decline in direct subsidies of approximately \$2.7 million in the Big Ten to a decline of over \$1.0 million at the Longhorn Network. We did not find a significant change in direct subsidy values for the SEC or Mtn. Networks. When considering the results for any network, we find a significant decline in direct subsidies of approximately \$1.6 million.

When considering indirect subsidy values, as shown in Table 10, we do not find significant changes associated with any network, except for the Longhorn Network. At the University of Texas, we find a significant increase in indirect subsidy levels ( $p < 0.1$ ), with a magnitude of approximately \$183,000. However, when considering membership in any network we do not find a significant difference in indirect subsidy levels.

Table 11 presents results for student fees earmarked for athletics. In this table we find significant declines in student fees at all networks ( $p < 0.01$ ), except for the Pac-12 Network. The magnitude of the effect ranges from a decline of \$2.2 million in student fees at the University of Texas at Austin following the introduction of the Longhorn Network to a decline of

<sup>28</sup> The \$39 million direct subsidy value is found at Rutgers in 2013.

<sup>29</sup> The \$37.1 million in student fees was collected at James Madison University in 2017. Student fees for athletics were such a concern in Virginia that the governor signed a bill in 2015 limiting how much of an institution’s athletic budget can be funded by student fees (Minium, 2015).

<sup>30</sup> The minimum value of ticket sales (\$63) was found at Chicago State University in 2010.



**Table 7** Descriptive statistics all division I conferences, 2005–2017

Variable	Obs	Mean	SD	Min	Max
Mtn. Network	2810	0.01	0.11	0	1
Big 10 network	2810	0.04	0.19	0	1
Longhorn network	2810	0.00	0.05	0	1
Pac 12 network	2810	0.02	0.13	0	1
SEC network	2810	0.01	0.12	0	1
ANY network	2810	0.09	0.28	0	1
Subsidy value including zeros (CPI adjusted)	2810	9,985,235	6,492,482	0	49,437,200
Direct subsidy (CPI adjusted)	2810	4,464,454	4,564,018	0	39,043,468
Indirect subsidy (CPI adjusted)	2810	1,005,251	1,609,533	0	19,033,192
Student fees (CPI adjusted)	2810	4,515,531	4,913,873	0	37,072,700
Ticket sales (CPI adjusted)	2810	6,629,619	11,054,144	63	72,457,216
Contributions/donations (CPI adjusted)	2810	6,696,872	11,727,613	0	256,577,360
Undergraduate enrollment	2810	16,262	8964	1362	59,183
Instructional expenditures per FTE (CPI adjusted)	2810	9743	4395	3412	47,299
Total institutional revenues (CPI adjusted)	2810	836,653,277	1,041,450,518	54,715,128	8,981,661,696
Total number of varsity sports fielded (per institution)	2810	14	3	8	33

**Table 8** Difference-in-difference models for all athletic conference TV contracts 2005–2017, all subsidy values

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Mtn. Network	Big ten network	Longhorn network	Pac-12 network	SEC network	Any network
Mtn. Network (millions)	0.755 (1.316)					
Big ten network (millions)		- 3.375*** (0.448)				
Longhorn network (millions)			- 2.231*** (0.336)			
Pac-12 network (millions)				- 3.022** (1.312)		
SEC network (millions)					- 2.487*** (0.894)	
Any network (millions)						- 2.627*** (0.661)
Undergraduate enrollment	181.9 (110.7)	182.6 (111.2)	181.5 (110.7)	186.1 (115.5)	197.4* (112.4)	202.1* (116.6)
Instructional expenditures per FTE	41.67 (97.37)	52.03 (96.15)	47.53 (97.38)	68.01 (94.36)	32.53 (97.89)	70.19 (90.53)
Total institutional revenues	- 0.000622 (0.000593)	- 0.000380 (0.000559)	- 0.000637 (0.000593)	- 0.000224 (0.000611)	- 0.000594 (0.000588)	- 8.08e-05 (0.000571)
Ticket sales	- 0.227*** (0.0555)	- 0.214*** (0.0542)	- 0.220*** (0.0557)	- 0.233*** (0.0528)	- 0.188*** (0.0572)	- 0.172*** (0.0502)
Contributions/donations	- 0.0254 (0.0171)	- 0.0243 (0.0169)	- 0.0256 (0.0174)	- 0.0232 (0.0164)	- 0.0205 (0.0152)	- 0.0178 (0.0142)
Total number of varsity sports fielded (per institution)	200,244 (154,163)	198,676 (159,082)	201,060 (153,722)	208,010 (152,508)	188,061 (151,706)	194,871 (152,059)
Constant	8.057e+06***	7.810e+06***	7.962e+06***	7.362e+06***	7.872e+06***	6.943e+06**

**Table 8** (continued)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Mtn. Network	Big ten network	Longhorn network	Pac-12 network	SEC network	Any network
Institution fixed effects	(2.717e+06) Yes	(2.737e+06) Yes	(2.718e+06) Yes	(2.742e+06) Yes	(2.729e+06) Yes	(2.700e+06) Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2810	2810	2810	2810	2810	2810
R-squared	0.346	0.360	0.346	0.357	0.353	0.374
Number of institutions	228	228	228	228	228	228

Dollar values adjusted for CPI. Robust standard errors in parentheses. \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table 9** Difference-in-difference models for all athletic conference TV contracts 2005–2017, direct subsidies

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Mtn. Network	Big ten network	Longhorn network	Pac-12 network	SEC network	Any network
Mtn. Network (millions)	0.945 (1.229)					
Big ten network (millions)		- 2.652*** (0.512)				
Longhorn network (millions)			- 1.054*** (0.312)			
Pac-12 network (millions)				- 2.392*** (0.765)		
SEC network (millions)					- 0.528 (0.463)	
Any network (millions)						- 1.559*** (0.497)
Undergraduate enrollment	- 34.59 (53.57)	- 34.02 (53.75)	- 34.76 (53.63)	- 31.25 (54.12)	- 31.29 (54.11)	- 22.59 (54.94)
Instructional expenditures per FTE	134.1 (89.19)	142.5 (88.35)	137.3 (89.49)	155.2* (86.27)	132.7 (89.57)	151.4* (85.23)
Total institutional revenues	- 0.000459 (0.000528)	- 0.000272 (0.000514)	- 0.000472 (0.000529)	- 0.000148 (0.000523)	- 0.000462 (0.000528)	- 0.000143 (0.000510)
Ticket sales	- 0.102*** (0.0509)	- 0.0914* (0.0491)	- 0.0991* (0.0514)	- 0.106*** (0.0487)	- 0.0943* (0.0516)	- 0.0693 (0.0470)
Contributions/donations	- 0.0163 (0.0136)	- 0.0155 (0.0134)	- 0.0165 (0.0138)	- 0.0146 (0.0129)	- 0.0154 (0.0134)	- 0.0119 (0.0120)
Total number of varsity sports fielded (per institution)	25.123 (104.107)	24.673 (106.901)	26.819 (104.039)	32.042 (102.703)	24.282 (103.850)	23.043 (102.319)
Constant	6.025e+06***	5.823e+06***	5.967e+06***	5.467e+06***	5.969e+06***	5.354e+06***

**Table 9** (continued)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Mtn. Network	Big ten network	Longhorn network	Pac-12 network	SEC network	Any network
Institution fixed effects	(2.055e+06)	(2.061e+06)	(2.058e+06)	(2.034e+06)	(2.056e+06)	(2.017e+06)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2810	2810	2810	2810	2810	2810
R-squared	0.179	0.192	0.178	0.189	0.178	0.194
Number of institutions	228	228	228	228	228	228

Dollar values adjusted for CPI. Robust standard errors in parentheses. \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table 10** Difference-in-difference models for all athletic conference TV contracts 2005–2017, indirect subsidies

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Mtn. Network	Big ten network	Longhorn network	Pac-12 network	SEC network	Any network
Mtn. Network (millions)	0.180 (0.589)					
Big ten network (millions)		0.119 (0.263)				
Longhorn network (millions)			0.183* (0.099)			
Pac-12 network (millions)				- 0.294 (0.540)		
SEC network (millions)					- 0.399 (0.558)	
Any network (millions)						- 0.121 (0.266)
Undergraduate enrollment	3.466 (22.76)	3.442 (22.76)	3.497 (22.76)	3.878 (21.84)	5.959 (23.80)	4.395 (21.98)
Instructional expenditures per FTE	- 36.44** (17.53)	- 36.67** (17.73)	- 36.76** (17.67)	- 33.81* (18.06)	- 37.87** (18.72)	- 35.03** (17.15)
Total institutional revenues	4.04e-05 (0.000113)	2.95e-05 (0.000111)	3.88e-05 (0.000114)	7.79e-05 (0.000125)	4.43e-05 (0.000116)	6.36e-05 (0.000142)
Ticket sales	- 0.0192** (0.00895)	- 0.0199** (0.00918)	- 0.0200** (0.00906)	- 0.0198** (0.00916)	- 0.0129 (0.0106)	- 0.0168 (0.0102)
Contributions/donations	- 0.00134 (0.00310)	- 0.00139 (0.00307)	- 0.00134 (0.00310)	- 0.00114 (0.00337)	- 0.000571 (0.00332)	- 0.00101 (0.00340)
Total number of varsity sports fielded (per institution)	- 27,153 (31,872)	- 26,638 (31,933)	- 26,682 (31,874)	- 26,161 (31,923)	- 28,978 (33,036)	- 27,076 (32,032)
Constant	1.722e+06**	1.726e+06**	1.724e+06**	1.652e+06**	1.691e+06**	1.668e+06**

**Table 10** (continued)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Mtn. Network	Big ten network	Longhorn network	Pac-12 network	SEC network	Any network
Institution fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2810	2810	2810	2810	2810	2810
R-squared	0.025	0.025	0.025	0.026	0.026	0.025
Number of institutions	228	228	228	228	228	228
	(666,617)	(671,236)	(669,462)	(629,299)	(667,230)	(637,638)

Dollar values adjusted for CPI. Robust standard errors in parentheses. \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table 11** Difference-in-difference models for all athletic conference TV contracts 2005–2017, student fees

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Mtn. network	Big ten network	Longhorn network	Pac-12 network	SEC network	Any network
Mtn. Network (millions)	- 0.330* (0.191)					
Big ten network (millions)		- 0.955*** (0.316)				
Longhorn network (millions)			- 2.160*** (0.173)			
Pac-12 network (millions)				- 0.295 (0.796)		
SEC network (millions)					- 1.910*** (0.393)	
Any network (millions)						- 1.094*** (0.304)
Undergraduate enrollment	196.3** (95.32)	197.2** (95.48)	197.2** (95.40)	196.7** (96.48)	213.1** (95.96)	208.4** (99.99)
Instructional expenditures per FTE	- 54.65 (44.42)	- 52.16 (44.10)	- 49.82 (43.95)	- 52.36 (47.99)	- 62.70 (44.54)	- 43.53 (44.93)
Total institutional revenues	- 0.000399 (0.000376)	- 0.000316 (0.000369)	- 0.000386 (0.000377)	- 0.000356 (0.000320)	- 0.000310 (0.000374)	- 0.000122 (0.000346)
Contributions/donations	- 0.0128 (0.00961)	- 0.0122 (0.00944)	- 0.0126 (0.00950)	- 0.0126 (0.00951)	- 0.00752 (0.00677)	- 0.00847 (0.00744)
Total number of varsity sports fielded (per institution)	188.628 (145,022)	187,540 (145,610)	188,081 (144,866)	188,472 (144,727)	181,230 (144,556)	188,000 (145,354)
Constant	245,787 (2.444e+06)	190,541 (2.443e+06)	182,096 (2.444e+06)	186,771 (2.502e+06)	143,049 (2.437e+06)	- 189,205 (2.485e+06)
Institution fixed effects	Yes	Yes	Yes	Yes	Yes	Yes



**Table 11** (continued)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Mtn. network	Big ten network	Longhorn network	Pac-12 network	SEC network	Any network
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2810	2810	2810	2810	2810	2810
R-squared	0.181	0.185	0.183	0.181	0.194	0.196
Number of institutions	228	228	228	228	228	228

Ticket sales are excluded from the student fee models because some institutions include game tickets for registered students as part of the student fee charges. Dollar values adjusted for CPI. Robust standard errors in parentheses. \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$

approximately \$330,000 at institutions that are members of the Mtn. Network. When considering institutions that are members of any network, we find a significant decline ( $p < 0.01$ ) with a magnitude of approximately \$1.1 million. Taken together, it is notable that significant declines in subsidy levels for institutions that are members of Any Network are found for direct subsidies and student fees, but not for indirect subsidies. Largely these results align with the results for the Power Five conference-only models and provide an even more consistent story about the impact of the introduction of a new college sports dedicated TV network on institutional subsidy levels for college athletics.

## Appendix C

See Tables 12 and 13.

**Table 12** Start and end dates for college sports TV networks

TV network	Network start date	Network end date
BYUtv <sup>a</sup>	January, 2000	
The Mtn. Network	September, 2006	June, 2012
Big ten network	August, 2007	
Longhorn network	August, 2011	
Pac-12 network	August, 2012	
SEC network	August, 2014	
ACC network <sup>b</sup>	August, 2019	

<sup>a</sup>As a private institution BYU is not required to report subsidy values to USA Today. Therefore, this institution (and network) is not included in our dataset

<sup>b</sup>The ACC Network began in August of 2019. Because its start date is outside of our data range, it is not included in our dataset

**Table 13** Institutions associated with TV networks as coded in dataset

TV network start year	TV network end year	Unitid	Institution name	Mtn. Network	Big ten network	Longhorn network	Pac-12 network	SEC network	Any network
2013	2017	104151	Arizona State University-Tempe	0	0	0	1	0	1
2015	2017	100858	Auburn University	0	0	0	0	1	1
2012	2012	142115	Boise State University	1	0	0	0	0	1
2007	2012	126818	Colorado State University-Fort Collins	1	0	0	0	0	1
2008	2017	151351	Indiana University-Bloomington	0	1	0	0	0	1
2015	2017	159391	Louisiana State University and Agricultural & Mechanical College	0	0	0	0	1	1
2008	2017	171100	Michigan State University	0	1	0	0	0	1
2015	2017	176080	Mississippi State University	0	0	0	0	1	1
2008	2017	204796	Ohio State University-Main Campus	0	1	0	0	0	1
2013	2017	209542	Oregon State University	0	0	0	1	0	1
2008	2017	214777	Pennsylvania State University-Main Campus	0	1	0	0	0	1
2008	2017	243780	Purdue University-Main Campus	0	1	0	0	0	1
2015	2017	186380	Rutgers University-New Brunswick	0	1	0	0	0	1
2007	2012	122409	San Diego State University	1	0	0	0	0	1
2015	2017	228723	Texas A & M University-College Station	0	0	0	0	1	1
2015	2017	100751	The University of Alabama	0	0	0	0	1	1
2015	2017	221759	The University of Tennessee-Knoxville	0	0	0	0	1	1
2012	2017	228778	The University of Texas at Austin	0	0	1	0	0	1
2013	2017	104179	University of Arizona	0	0	0	1	0	1
2015	2017	106397	University of Arkansas	0	0	0	0	1	1
2013	2017	110635	University of California-Berkeley	0	0	0	1	0	1
2013	2017	110662	University of California-Los Angeles	0	0	0	1	0	1
2013	2017	126614	University of Colorado Boulder	0	0	0	1	0	1
2015	2017	134130	University of Florida	0	0	0	0	1	1
2015	2017	139959	University of Georgia	0	0	0	0	1	1

Table 13 (continued)

TV network start year	TV network end year	Unitid	Institution name	Mtn. Network	Big ten network	Longhorn network	Pac-12 network	SEC network	Any network
2008	2017	145637	University of Illinois at Urbana-Champaign	0	1	0	0	0	1
2008	2017	153658	University of Iowa	0	1	0	0	0	1
2015	2017	157085	University of Kentucky	0	0	0	0	1	1
2015	2017	163286	University of Maryland-College Park	0	1	0	0	0	1
2008	2017	170976	University of Michigan-Ann Arbor	0	1	0	0	0	1
2008	2017	174066	University of Minnesota-Twin Cities	0	1	0	0	0	1
2015	2017	176017	University of Mississippi	0	0	0	0	1	1
2015	2017	178396	University of Missouri-Columbia	0	0	0	0	1	1
2012	2017	181464	University of Nebraska-Lincoln	0	1	0	0	0	1
2007	2012	182281	University of Nevada-Las Vegas	1	0	0	0	0	1
2007	2012	187985	University of New Mexico-Main Campus	1	0	0	0	0	1
2013	2017	209551	University of Oregon	0	0	0	1	0	1
2015	2017	218663	University of South Carolina-Columbia	0	0	0	0	1	1
2007	2011	230764	University of Utah	1	0	0	0	0	1
2013	2017	230764	University of Utah	0	0	0	1	0	1
2013	2017	236948	University of Washington-Seattle Campus	0	0	0	1	0	1
2008	2017	240444	University of Wisconsin-Madison	0	1	0	0	0	1
2007	2012	240727	University of Wyoming	1	0	0	0	0	1
2013	2017	236939	Washington State University	0	0	0	1	0	1

## Appendix D

See Tables 14 and 15.

**Table 14** Difference-in-difference models for power five conferences athletic revenue and athletic conference TV contracts 2004–2017

Variables	(1)	(2)	(3)	(4)	(5)
Big10Network (millions)	Big10Network 0.464754 (3.224)	LonghornNetwork 21.20*** (2.053)	Pac12Network	SECNetwork	ANYNetwork
LonghornNetwork (millions)					
Pac12Network (millions)			- 1.555 (4.627)	18.29*** (4.605)	
SECNetwork (millions)					
ANYNetwork (millions)					8.645*** (2.807)
Undergraduate enrollment	1223 (825.7)	1217 (827.8)	1220 (829.4)	934.1 (665.5)	1124 (749.3)
Instructional expenditures per FTE	196.2 (543.1)	87.35 (501.0)	233.8 (528.6)	507.1 (543.3)	57.11 (524.2)
Total institutional revenues	0.00429* (0.00219)	0.00446** (0.00219)	0.00441* (0.00233)	0.00451** (0.00198)	0.00376* (0.00222)
Total number of varsity sports fielded (per institution)	1.790e+06** (844,594)	1.785e+06** (825,703)	1.790e+06** (851,539)	2.068e+06*** (756,335)	1.935e+06** (820,470)
Constant	3.774e+07 (3.008e+07)	3.888e+07 (2.966e+07)	3.737e+07 (2.994e+07)	3.136e+07 (2.674e+07)	3.537e+07 (2.816e+07)
Institution fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	672	672	672	672	672
R-squared	0.605	0.610	0.606	0.630	0.618
Number of institutions	52	52	52	52	52

Dollar values adjusted for CPI. Robust standard errors in parentheses. Institutional Subsidies are excluded from Athletic Revenues. \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

**Table 15** Difference-in-difference models for power five conferences total expenses and athletic conference TV contracts 2004–2017

Variables	(1)	(2)	(3)	(4)	(5)
	Big10Network	LonghornNetwork	Pac12Network	SECNetwork	ANYNetwork
Big10Network (millions)	-0.219 (2.908)				
LonghornNetwork (millions)		20.75*** (1.505)			
Pac12Network (millions)			-0.292 (2.810)		
SECNetwork (millions)				5.121* (2.761)	
ANYNetwork (millions)					3.021* (1.607)
Undergraduate enrollment	357.1 (391.8)	354.5 (393.8)	358.1 (394.4)	278.0 (362.5)	324.3 (369.8)
Instructional expenditures per FTE	58.24 (402.9)	-49.67 (351.0)	64.66 (410.9)	144.6 (407.1)	8.853 (391.2)
Total institutional revenues	0.00462*** (0.00171)	0.00476*** (0.00172)	0.00463*** (0.00182)	0.00467*** (0.00173)	0.00442*** (0.00181)
Total number of varsity sports fielded (per institution)	1.103e+06 (794,746)	1.102e+06 (788,458)	1.105e+06 (791,213)	1.183e+06 (783,764)	1.156e+06 (806,439)
Constant	7.287e+07*** (2.172e+07)	7.376e+07*** (2.111e+07)	7.269e+07*** (2.151e+07)	7.096e+07*** (2.070e+07)	7.191e+07*** (2.135e+07)
Institution fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	672	672	672	672	672
R-squared	0.806	0.813	0.806	0.809	0.808
Number of institutions	52	52	52	52	52

Dollar values adjusted for CPI. Robust standard errors in parentheses. \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.1

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