Christina Bell

Iannaconne

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The Economics of College Sports: Building an Athletic Empire

Introduction

Consider a university a profit-maximizing corporation. The corporation is composed of various franchises—academics, athletics, performing arts, etcetera—in which the college invests in to generate revenue. Firms accrue wealth through incoming students, donations, and contracts with sponsors. Each franchise contains its own agents that strive to maintain the division's profitability and compete with franchises of other corporations. Given the stakes and intensity of competition within the market, a university's success depends not only upon the franchise's performance but also upon the performance of other university's franchises. Modeling a firm's utility maximization function demonstrates how the multilayered system prompts numerous economic decisions that define a college's position in the market.

Once the pinnacle of critical thought, universities face scrutiny for diversifying into the athletic franchise. As the popularity and value associated with college sports increases, administrators struggle maintaining harmony with the increasingly marginalized realm of academia. Large schools, now powerhouses, rely on successful teams to promote the university and encourage donations. Yet, the high cost of investment and the infrequency in returns challenges the logic behind the athletic-academic tradeoff. Although the investment process mirrors several market economic principles in maximizing quantifiable outputs success and

wealth, the financially detrimental push towards athletics is justified through nonmarket behavior, specifically the difficult to quantify outputs of pride and communal wellbeing.

Household Production and Profit Maximization

In analyzing utility maximization, we must go beyond the traditional theory of selecting the optimal bundle; that is, a college does not simply choose how much to spend on athletics versus academics subject to a budget. Rather, athletic investment mirrors the process of household production by developing inputs, investing the inputs into commodities, and hoping in effect to attain both monetary and nonmonetary outputs.

Labor, land, and human capital all manifest in the college's commodities and inputs. To begin with, the university hires coaches to manage and direct each sport. The coaching staff has its own division of labor, consisting of assistant coaches and specialists that hone in on specific positions. From the coaches comes the most important commodity for the team's success: its athletes. Athletes serve under the staff, carrying out orders both on and off the field. Each player contributes to the team on the field by attending practices, competing in games, and training on personal time. Off the field, the athlete secures the team's footing by maintaining solid academic standing, passing drug tests, and attending events that represent the school.

However, when viewed under the division of labor, a player takes on the character of a menial worker fulfilling the tasks of the coaches who are perceived as the true executors of the team's potential. Athletes are directly responsible for victories and thus the most time and money should in theory be devoted to players. Looking at a player's contributions to the team and the university, athletes also take on the role of human capital. Universities demonstrate consideration for both sides of the argument, funneling millions of dollars into both coaching staff and athletic

scholarships. Regardless of classification, colleges strengthen athletes as a commodity with both time and money through recruitment, scholarships, and training. Strong recruits are assets not just as players that bring a title but also as marketing for the institution. Splashing the rankings and the news, hot topic players raise their target school's athletic prowess and reputation. The prospective student-athlete's already established fans jump the bandwagon for the school, and the press follows. In addition, the athlete's move from a high school or from a community college means that the university has access to more prospective students striving for similar successes. The school that the athlete leaves is further receptive to the firm's brand, especially if it is one that is higher in the rankings, because they seek to identify and lay claim to the departing student's prosperity, consequently putting their stake in the university's victory. Thus a good recruit invites three new income prospects for the school: the marginal income from the fans that he brings, who spend money on university memorabilia, game tickets, and donations; the potential profit from winning a bowl game or tournament with better athletes; and extended reach to additional prospective students.

In exchange for the student-athlete's skill set, the college supports players through scholarships. Financial aid incentivizes prospects to attend the school and, especially with more generous offers, represent the institution with greater motivation to perform well. If the prospective student originates from a lower socio-economic background, the player better appreciates the school's contribution and creates a stronger connection with the university (Denhart et al., 2009). The closer the student's ties with the college, the more likely he is to remain at the campus and perform well. Additionally, scholarships enable poorer athletes to receive the national attention necessary for post-graduate prospects. Able to afford only humbly ranked junior colleges, the student relies on financial assistance to attend a recognized university

whose athletic program sparks the interest of professional recruits. The athlete demonstrates his ability on a more competitive level and reaps the benefits of media broadcasting. Thus the institutions' monetary input illustrates not only the benefits of incentivizing student-athletes but also gains from trade in that the athlete and administration develop a symbiotic relationship securing both parties' outputs of success, pride, and money.

Land poses as a vessel for money and time, giving athletes a space to play as well as offering fans a location to congregate. Colleges construct various facilities relating to athletics. Stadiums host games and tournaments, while gyms and training rooms further prepare the athletes for contest. Larger establishments create gyms and locker rooms separate from non-athletes, often with better grade equipment and better upkeep. In example, the University of Southern California recently began construction on the McKay Center, a $70 million facility that offers a turf field in the basement, iPads in each football locker for reviewing workouts, video games, and a study lounge (*ESPN*). Practice fields and courts outside of the grand stadiums and gymnasiums further sprawl the campus. Housing coaching staff also requires a central building for the athletic department, be it a division three or top-tier institution. Off site from the university, sports bars tailored to specific schools are another use of the university's land. Encouraging a community of non-athletes, colleges draft more fans and inspire more motivation for the team to succeed. Fans can either join together at the stadium to offer a physical presence of money and support, or fans can rally off campus and spread the institution's reach. The sports bars promote the athletic environment by inviting non-athletes and even non-students to engage in the experience, stand in solidarity with the school, and extend the game outside of university grounds.

From another perspective, the fans of the team compose human capital. Building support for players strengthens the team's mentality and brings more attention to the college. Additionally, fans contribute a direct line of revenue by accumulating team gear, purchasing game tickets, and donating to programs. Given a team cannot control its winning record, colleges maintain a consistent base through marketing memorabilia and community events. The combination of the college and the fans' efforts creates experience effects wherein the pride and spirit in being a part of the enthusiasm is as much of an output as is the monetary gain from winning.

Lastly, a college devotes time to ensuring the success of each commodity. As mentioned above, prospective athletes offer multiple revenue opportunities, rendering the recruitment process a vital exercise of care and caution. Coaches expend time and effort scoping out students across the country, gathering statistics on other schools' recruits, and marketing the university to potential athletes. Moreover, universities must expend time fundraising to acquire donations and sponsorships. Phone calls, tailgating events, and special mailings to alumnae and patrons are catered specifically towards the athletic department.

Pooling together resources of time, capital, and skill, universities hope to yield outputs of pride, revenue, and community. Each agent, both within and outside of the athletic program, develops from the inputs of time and money under the expectation of guaranteed success. Victory poses a different appeal for each agent, but ultimately the players, the promoters, and the fans come together and drive the university's success and hopefully financial gain.

Modeling the Investment

A university represents a profit-maximizing corporation with multiple franchises, athletics *A* being just one of many others such as research, academics, and the performing arts. Each franchise is a commodity by generating financial output, and thus *A* takes the form *A(X, T, S*) with inputs of money, time, and skills. For the purposes of simplicity, we will only look at the athletics function and ignore the effects of the other franchises. In addition to the direct contribution of each franchise, the indirect effects of the other commodities or agents as distinct functions of *A* contribute to the utility equation. Once again, for simplicity, categories of agents are narrowed to athletes *H* (which will include coaches), community agents *G* (fans, students, and alumni), and university administrators *V*. Doing so gives the indirect factors *H(A)*, *G(A)*, and *V(A)*. However, given the intense competition between schools, each firm's expected utility depends on that of the other schools' *A'*. So, the indirect functions become *H(A, A'), G(A, A')*, and *V(A, A')*. Thus, we must maximize the simplified utility function $U(A(X_A, T_A, S_A), H(A, A'), G(A, A'), V(A, A'))$ subject to $z_i = F(X_i, T_i S_i)$ —that is, the commodities with inputs of time, money, and skill—and subject to the budget constraint, $\sum P_i X_i + WT_i \leq 24W + N$.

With multiple firms and multiple agents within each firm—athletes, fans, administrators, students, alumni, coaches—the maximization becomes an interlocking process of commodity efforts relative to other universities and the individual firm's success. Athletics is its own commodity for the firm, but also contains its own set of commodities driven by separate agents. Maximizing utility and optimizing $z_i *, X_i *$ and $T_i *$ from athletic investments therefore requires skill and knowledge from all agents involved.

Best understood within a dynamic framework, variations of each commodity cause shifts in the utility function. Looking at changes over time indicates that technology holds a poignant impact on the athletic investment model. For example, safer equipment leads athletes to take more risks on the field. The risk could either result in injury or in success for the team. Injury increases the shadow price of the commodity z_H because coaches must spend more time recruiting a replacement or training an athlete off of the bench. The raised cost lowers *H(A,A')* and in effect the overall utility derived. Furthermore, over time athletic conditioning and training has advanced. Improved competency on the field raises S_H, meaning that better conditioning means a better skill set for athletes. As athletes are better trained and the value of the commodity increases, the chances of success are greater and *A, H(A,A')*, and *U* increase.

In addition to advancements directly for the athletes, the proliferation of broadcasted college sports has led to an outward shift of utility function. The Big Ten Conference established a cable network in 2009, which, in addition to the recruiting advantage of enticing students with fame, "provides a revenue stream of $9 million per year to each member" of the network and ultimately a total yield of $2.8 billion (Weaver, 2011). National exposure at a given school entices prospective athletes to attend, therefore increasing the value of *H(A, A')*. Seen in another way, the administrators who communicate with the NCAA and networks to bring exposure boost their worth *V(A,A')* by inputting time negotiating contracts and outputting money and publicity. In addition, broadcasted sports generate more fans for schools by reaching people outside of the university. The reach includes alumni who make donations and enthusiasts who buy tickets to games. With greater financial and communal support, contribution of commodity z_G expands and hence *G(A, A')* and *U* as a whole.

Innovations in architecture further impact the utility function. The amalgamation of national exposure and its growing importance to marketing universities pushes schools to construct stadiums and facilities. In 2009, the University of Minnesota opened a $289 million facility and Oklahoma State University *remodeled* their facility for $288 million following a $165 million donation from graduate T. Boone Pickens. With Oklahoma State's renovation came a new end zone facility, which included "a 20,000-square-foot-gym, and a palatial locker room with flat-screen televisions" (Sander and Wolverton, 2009). A modern, expansive project signals to other firm's the school's potential and demonstrates the power of its commodities. However, the push towards the biggest and the best establishment pushes several competitive firms into an arms race. In relation, as the commodities factor in their positions relative to other firms, engaging in the competition is very costly. Both time and money must be put forth to promote the signal and erect the buildings, raising the shadow price and shifting the budget constraint inward. Administrators who market the construction also invest inputs of time and money which in turn raises T_v and lowers U.

Better technology has also led to an increase in mobility for prospective students. Over time, improvements have led to more methods of cheaper transportation and more methods of communication to stay in touch with the family. Instead of "staying local", adolescents are more inclined to pursue better schools farther away because the cost of studying out-of-state decreased. Universities recognize the opportunity to acquire a diverse student body and in consequence rely on athletics as a source of marketing to those they cannot immediately reach. The increase in prospective, and hopefully future, students leads to an increase in support. Going back to *G(A,A')*, the commodity has more value and triggers an outward shift.

To maximize utility from the simplified model, commodities must demonstrate a promising value that can be augmented by numerous factors, including technology. Technological shifts reach different parts of the university and of the sport, indicating the importance of improvements to investing. Even with a positive shift, ideally a college will act as a rational corporation and factor in all costs of the investment, including the shadow price, to maximize production without faltering on other franchises.

Costs and Benefits

Maintaining commodities causes the majority of the university's costs in athletic investment. In 2010 alone, university subsidies and student fees allocated to athletics totals more than $800 million (Siegfried and Getz, 2010). Colleges finance coaching salaries, athletic scholarships, and facility maintenance. These all depreciate in value over time, leading to replacing staff and athletes as well as refurbishing stadiums to appeal to the public. Less apparent, however, are the monetary costs associated with signaling: advertising, recruitment, and fundraising. In a competitive market, the profit-maximizing institution signals its strength to other schools and prospective applicants. Generating interest from both groups indicates dominance, so long as the athletic program follows through with a win.

Given an athlete's direct impact on the outcome of a game, financing specific players comes with several costs. To begin with, the most skilled competitors have the highest turnover. Professional programs target student-athletes as they enter freshman year, enticing prospects with promises of fame and salaries that make a full-ride scholarship look like pocket change. If the player performs well enough at the school, they could very well participate a single season and then leave for the draft. The college's heavy investment is therefore subject to other forces in

the market, in this case the demand for athletes. When the student leaves the program, the college loses its investment and exerts more effort and money recruiting a new player as a replacement. Likewise, the potential for injury among athletes is a constant threat to the team's success. The university must consequently invest in superior athletic training and in enough strong recruits to create a deep bench. Already accounting for graduating seniors each year, the college therefore incurs additional promotional costs in dealing with the short-term presence of strong athletes.

Furthermore, capable players that sparked interest for the school depreciate in value as their careers progress. New athletes that enter the market at other schools detract attention from the signals that colleges were once successful in sending out. As programs overshadow one another, an arms race to acquire the best recruits—all the while accommodating for the risk of losing out to professional teams and physical harm—emerges and spikes the cost of recruitment. Experience effects arise in the competition as well, but unlike the case of fan development, the arms race hinders the college's efforts. Colleges grow consumed in the battle for athletic success through recruiting which diverts their focus from more cost-effective solutions. The institution could reinforce another commodity such as training facilities or coaching, but instead engages in the enrapturing competition.

In regards to opportunity cost, colleges sacrifice an emphasis on academia for athletics. Diverting funding and time away from scholastics provokes criticism from students and researchers at the university for inhibiting the main purpose of the institution. The money invested in sports could be invested in research and a different kind of attention from the university, and the land used for athletic facilities could house more classrooms or laboratories and improve current students' academic experiences. Yet, the disparity in support eliminates a

middle ground between the two realms. If tension between athletics and academics persists within the university, the campus splits athletes and students and creates a disjointed population. Athletes, limited from full academic engagement, free-ride off of their physical ability by "slacking off" at a prestigious school—where, on academic standing alone, they otherwise would have been denied admission—while enjoying the benefits of media exposure and scholarship funds. If the school embraces the push towards athletics, the student body takes on the reputation of a "party school". Both responses damage the university's footing within the market for academic institutions and signal either a change in branding to an athletic powerhouse or simply weakness in scholastic competence. Hence investing in athletics over academics imposes a weighted nonmonetary cost by bringing division into the school.

Although the costs of high investment endanger a university's footing amongst other institutions, the benefits associated with victory strengthen more than just the athletic program. Monetary gains alone from winning bowl games and tournaments generate revenue used for the entire university. Alabama's 2012 BCS championship earned the school $23.6 million, and the second place received Notre Dame $6.2 million for participation (*Forbes*). After season ends, corporate sponsorships promote lower cost intercollegiate games for fans. The most successful teams during official play earn the most revenue—up to six figure sums—during corporate sponsored competition, and the money earned funds university scholarships and facility maintenance (*USA Today*).

In addition, the increase in attention from winning games connects alumnae back to their alma mater. The renewed sense of pride leads to more donations, and thus more funding for the college. For private universities, postseason football bowl appearances boost alumni donations by as much as 50 percent; public universities have seen an increase of 40 percent from football

and basketball championship play (Baade and Sundberg, 1996) Organized sports engage the student body outside of the classroom, rounding out an academic experience and unifying the campus. Looking back on college memories, an alumnus may not remember every paper or midterm, but sitting in the crowded stands with classmates at the championship game may be that memory a school needs to create in order to acquire an extra donation.

For public universities, another source of income arises from the government. As state legislature is more inclined to award money to schools of high perception, colleges with athletic programs reap the benefits. Schools with Division 1 football teams alone “receive about eight percent more from their state legislature than otherwise comparable universities that do not participate in Division 1 football” (Siegfried and Getz, 2010). Given that tax revenues actually fall on game days versus non-game days, the government’s investment is made off of perception rather than financial logic. The government does not receive direct benefits from the subsidy, thereby indicating that legislature invests out of enthusiasm much more than monetary gain.

Money aside, victory invigorates the experience effects of engaging in the college sport craze. Each win comes with its own set of pride and bragging rights for the university and the community alike. Ritualizing sports through pep rallies, tailgating, and bracket-building, universities establish a network that includes students, alumni, and people who just love the sport. Fans want to see their favorite team win, and will thus support the program psychologically—through cheers and solidarity—and financially—through purchasing events and memorabilia. Large fan bases also give universities a bigger sense of pride knowing that more people are committed to their school’s success. However, Frank (2004) suggests that holding the team too highly amongst the competition could lead to irrational investment

decisions, giving the school an inflated sense of pride that blinds them from the actual chances of winning.

Once again, the bigger the support network, the farther the university's brand reaches. Prospective students leaving their homes and embarking on the journey towards independence are looking for a new community to be a part of. Seeing the engagement and thrill of an athletic powerhouse encourages adolescents to identify with the school and pursue similar success at the institution. Data from Daren and Jared Pope (2009) indicate "being one of the 64 teams in the NCCA tournament yields approximately a 1% increase in applications the following year, making it to the "Sweet 16" yields a 3% increase, the 'Final Four' a 4-5% increase, and winning the tournament a 7-8% increase…ending the season ranked in the top 20 in football yields approximately a 2.5% increase in applications the following year, ending in the top 10 yields a 3% increase, and winning the football championship a 7-8% increase". In conjunction, Mixon et al. (2004) establish a positive and significant correlation between higher SAT scores and college football success. The increased attention from prospective students leads to an increase in applications to the university. With more—quantitatively and qualitatively—options to select from, the administration can be more selective in creating a better student body.

From the plethora of costly commodities, college sports impose significant charges to the university that more often than not lead the school into financial strain. In the 2007-08 season, "only 25 of the 119 Football Bowl Subdivision universities in the NCAA ran an athletic department surplus" (Siegfried and Getz, 2010). Investment benefits, albeit more social than monetary, indicate universities give more weight to the social appeal and experience effects of intercollegiate athletics. Supremacy over other institutions is an intimidating yet enticing prospect for colleges, as is the madness that comes along with it.

Game Theory and Risk

Considering the high and far-reaching costs of athletic funding, colleges needs even greater benefits to justify spending. However, competition jeopardizes potential gains from being realized, making input strength all the more important. A team's success fortifies the commodities and maximizes the outputs of the university's investment. Failure, on the other hand, endangers the university's goals and emits a negative signal to both athletic and academic markets.

Acquiring success as a prize, colleges mirror rent-seeking behavior in contests by investing money in sports. Money increases the likelihood of winning the prize, but also adds to the cost. When the value of the prize increases—that is, when the stakes of competition are higher such as in the Final Four or the BCS championship—colleges put more money into strengthening their resources. In larger games such as these, the victorious opponent's total profit factors in how much was spent to win, while the other team ends up worse off.

The black-white nature of college sports draws a parallel to a zero-sum game. One college must win, and another will lose. From this logic, universities consistently risk draining hard-earned inputs for each victory—and, at the more competitive level, the odds of winning the zero-sum game dissolve even further. Likewise, as Siegfried and Getz (2010) suggest, "If the teams that do not achieve potential success fail to garner anticipated revenues, they may be tempted to invest in improving their circumstances so that they can be more successful in the future…Such efforts cost money, which could and would generate success except that rival institutions are doing the same thing, and in the end, there can be only one winner of each game, only one league champion, and only one national champion". The zero-sum game is thus repeated after season, and the cycle of whopping costs and feeble returns continues. The initial

logic behind investing more to perform better makes sense, especially within the framework of a contest. However, in a zero-sum game the high chance of loss disproves the college's reasoning and highlights the hopelessness in putting more money into a shaky future.

Winning a matchup brings the school pride and capital, but losing imposes far greater burdens. By post-season play, rivaled teams have developed a monstrous fan base, trained determined athletes, and hired expert coaches. The victorious team's assets will flourish and grow from victory. The defeated team, however, faces disappointed, disengaged supporters that may flock to another school. Likewise, prospective students inquiring about the school lose interest knowing a more superior team is at another institution. Seeking to maximize individual utility, scholars who could have raised the school's academic standing now illustrate the folly in athletic investment. The accumulated pride and spirit so forceful in the progression of the season dwindles, giving the school and the team less incentive to persevere for another chance at the title, or, as mentioned above, more incentive to increase the cost of inputs.

Defeated athletes devoted hours of intense work for the school's success, only to have it ripped away in a few hours. These disheartened students have the opportunity to transfer to a more promising institution, or remain at the current university to endure the bleak aftermath for another year. If the program is not as successful as it was the next season, the athlete's professional prospects are limited because the victorious school attracted more interest from scouts. Losing decreases players' incentive to perform well and therefore endangers the university's investment from the defeat onward.

As coaching salaries comprise a substantial portion of the athletic budget, universities often point a team's failure on the staff. Despite strategy and dedication, the coach is at the mercy of the other team's ability, yet is still responsible for a victory. Losses disrupt the

relationship between the coach and the college, either resulting in termination or more pressure to do better next year. Just as the fans supported the school, the school needs to support the coach but must now divert more time and energy ensuring the team's success.

Otherwise put, when the team fails, the investment fails. After a loss, colleges must rebuild the program that they so painstakingly established, raising the cost of inputs for a bleak chance of obtaining desired outputs. The shame associated with losing as well as the university's decreased appeal to prospective students and donor force the college to increase efforts to regain a high ranking, only to enter the same of risk the next season. Hence, game theory concepts of rent-seeking contests, zero-sum game and risk explain the dangers behind making high investments in intercollegiate athletics.

Conclusion

As shown in the simplified utility maximization model, the university consists of multiple franchises, which are composed of their own commodities or agents, which are in turn supplemented by their own inputs. The complex weaving of these factors is relative to that of other universities because of the intense competition between colleges. Technological change over time is just one of many shifts that alter commodities within the utility function, and indicates the significance of lowered costs and the consequent chance of success in incentivizing more investment from the university.

Successful teams are a point of pride and a source of community for universities. Despite the inevitability of an imperfect record and the low chances of reaching the championships, colleges still invest in college athletics to perpetuate the satisfaction and sense of belonging that comes with being part of a team. The social appeal of investing in sports reflects the importance

of experience effects to economic behavior. For a university to divert so much attention, time, and money into a non-profitable sector therefore indicates the emphasis we place on intangible gains.

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