8. The goals and impacts of age restrictions in sports

Ryan M. Rodenberg

8.1 INTRODUCTION

They shouldn't make those kinds of rules. I've been practicing my whole life to play. And I'm . . . just waiting right now. For what, I don't know.

Anna Kournikova (Roberts, 1997)

Chronological age is frequently used as a proxy of convenience for maturity and competency (Sowell and Mounts, 2005; McCann and Rosen, 2006). Non-sport examples include laws mandating a minimum age for alcohol consumption, automobile driving, military service, and voting rights (Miron and Tetelbaum, 2009). Similarly, in the sports industry, eligibility is often determined according to one's age. Sports provide a near-ideal laboratory to study the interaction between precocity and minimum age rules, as Bernhardt and Heston (2010) generally found that 'sports settings provide abundant clean data' (p. 14). Kahn (2000) posited that there 'is no research setting other than sports where we know the name, face, and life history of every production worker and supervisor in the industry' (p. 75). Kahn also observed that 'professional sports leagues have experienced major changes in labor market rules and structure – such as the advent of new leagues or rules about free agency – creating interesting natural experiments that offer opportunities for analysis' (p. 75). The imposition of minimum age rules in sport creates a quasi-natural experiment.

Precocity has long been an issue in sports, especially in women's sports, as young women typically mature physically earlier than young men do. Professional tennis provides several examples. Steffi Graf earned a world ranking at age 13 and won 22 Grand Slam titles during her long career. In addition to Graf, a veritable 'who's who' of top female players emerged on the elite-level professional tennis scene during their mid-teens and went on to win multiple Grand Slam singles titles, including Tracy Austin, Monica Seles, Jennifer Capriati, Venus Williams, and Martina Hingis. Each player started her professional career before the Women's Tennis Association (WTA), the leading governing body of professional tennis worldwide, adopted its more restrictive minimum age rule in 1995. Outside of tennis, young women also compete in golf, gymnastics, figure skating, and other

women's sports. In September 2011, 16-year-old Alexis (Lexi) Thompson became the youngest golfer ever to win an LPGA (Ladies' Professional Golf Association) event when she finished first in the Navistar LPGA Classic. Ironically, Thompson was not a member of the LPGA at the time because she was too young. The exploits of such precocious athletes have been a fixture in several popular press books about tennis (Stabiner, 1986; Mewshaw, 1993; Wertheim, 2001), golf (Cook, 2008), and gymnastics and figure skating (Ryan, 2000).

Age restrictions have become particularly relevant in women's sports. They have been imposed in response to the growing domination of many women's sports by adolescent and preadolescent girls who trained at levels that one would associate with professional athletes (see, for example, Grenfell and Rinehart, 2003). Moreover, David (2005) claims that because young athletes are often removed from normal childhood surroundings and become dependent on their coaches, they are particularly vulnerable to overwork, physical abuse, and sexual abuse.

While numerous mainstream anecdotes have appeared in the popular press about the effect of age restrictions in sport, academic research has only recently begun to emerge, primarily from legal and economic standpoints. This chapter provides an overview of current age-based restrictions in sport (Section 8.2) and summarizes the legal status of age rules (Section 8.3). It also discusses the economic impact of age restrictions on both individual athletes and the labor markets in which they operate (Section 8.4), a particularly important point given the description of the relationship between age and ability as 'one of the most basic in all of economics' (Sowell and Mounts, 2005: 79). Section 8.5 concludes.

8.2 AN OVERVIEW OF AGE-BASED RESTRICTIONS

Table 8A.1 in Appendix 8A provides a summary of age eligibility rules in a number of women's sports. The underlying rationale for age-based eligibility rules is complex, combining ethical issues and health concerns pertaining to participation in professional sports by teenagers and pre-teens (Doherty, 1999; Rowland, 2000; Warren and Perloth, 2001; Merten, 2004).

In this section, I discuss the minimum age rules in four prominent women's professional sports, as they show how their governing bodies manage and administer age limits. The four governing bodies are: the Women's Tennis Association (WTA), the Women's National Basketball Association (WNBA), the Ladies Professional Golf Association (LPGA), and the Fédération Internationale de Gymnastique (FIG).

8.2.1 Tennis

Modified at least twice since its adoption, the current incarnation of the WTA Tour's age rule was promulgated in 1995 (Rodenberg, 2000). McGuire (2007: 248–9) states:

Before the age eligibility program was put into effect, young stars in women's tennis burned out or suffered career-ending injuries with troubling frequency; by the time they were twenty-one, Tracy Austin, Andrea Jaeger, Jennifer Capriati, and Martina Hingis had all been forced out of the game for these reasons.

The International Tennis Federation (ITF), the rule-making body for tennis, created an Age Eligibility Commission in 1994 '[i]n response to concerns about the well-being and career longevity of individuals competing in women's professional tennis' (ibid.: 207). The WTA Tour's age rule appears in the governing body's rulebook and is structured as a sliding scale from the age of 14 to 18. Girls younger than 14 years old cannot compete at all in professional tennis events. Starting at the age of 14, girls are phased in. Fourteen-year-olds may play in up to seven ITF events and may obtain a 'wild card' to participate in one WTA Championship. They are allowed to play in an increasing number of tournaments each succeeding year and have the opportunity to play in tournaments carrying greater prize money, ranking points, and prestige. Women 18 and older can qualify via their ranking to play in an unlimited number of tournaments. Players who fail to comply with the WTA Tour's age rule can be fined, suspended, or have their tournament results (and accompanying ranking points) removed from their records.

After the age rule in tennis was enacted, commentary on the new rule was generally positive. For example, one commission member, Jim Loehr, said that 'all the data shows us that the longer . . . we delay stardom, the better the players' chances are of sustaining a successful career' (Finn, 1999: D1). Years later, Livengood et al. (2008) described the WTA Tour's age rule as a policy that 'aims to guide players to minimize the stressors associated with women's professional tennis and to promote their safety, career longevity, and performance' (p. 10). One person who felt the reform to be inadequate was Larry Scott, the former CEO of the WTA. He was particularly concerned about the ability of players under the age of 18 to circumvent age restrictions at 'grand slam' events, such as the Australian Open, because they are not sanctioned by the WTA. He also worried about the growth of the 'Junior Tour' and its lack of limits on the participation of women younger than 18 (Kaplan, 2004).

8.2.2 Basketball

The eligibility rule for American-born basketball players seeking to compete in the WNBA is unique among the regulations considered in this chapter in that it contains both age restrictions and education requirements. The WNBA has thus followed in the footsteps of the NBA (National Basketball Association), though its restriction goes much farther than the NBA's current restriction that players cannot enter the league until one year after their class has graduated from high school. The WNBA's rule requires players to be at least 22 years old or to have completed four years of college to be eligible for the annual draft (Edelman and Harrison, 2008). In contrast to tennis, golf, and gymnastics, all individual sports in which the athletes compete as independent contractors instead of employees, WNBA basketball is a team sport in which the athletes are members of a government-recognized labor union, the Women's National Basketball Players' Association (WNBPA). The age/education rule was specifically negotiated by the WNBA and the WNBPA, and it is codified in the collective bargaining agreement between the two entities.

Although Edelman and Harrison find the WNBA rule open to legal, cultural, and ethical criticism, they identify three potential social benefits from the WNBA policy. First, positioning its players as both scholars and athletes has helped the WNBA promote them as role models. Second, the policy 'helps to prepare . . . players for non-basketball careers upon personal retirement or league dissolution' (p. 25). Third, the rule is easy to understand and enforce.

Finally, the eligibility rule is far less binding for women than for men. Salaries in the WNBA are a small fraction of those offered in the NBA, so the incentive to challenge the ruling and jump to the professional ranks is much lower for women than for men.¹ As a result, college graduation rates for members of prominent women's basketball teams are typically higher than those of women who are not varsity athletes and much higher than for members of prominent men's basketball teams (see, for example, Lapchick, 2011).

8.2.3 Golf

Unlike the sliding scale adopted by the WTA Tour in women's tennis, the LPGA Tour's 'bright line' age eligibility rule requires full-time tour members to be 18 or older. However, players from the age of 15 through 17 may petition the governing body for early permission by 'demonstrating . . . their capacity to assume the professional and financial responsibilities required' (Rodenberg et al., 2009: 107). The LPGA Tour's rule was

adopted in the 1970s. At least three underage players have been granted early permission to play professional golf full-time – Aree Song in 2003, Morgan Pressel in 2005, and Alexis (Lexi) Thompson in 2011. Moreover, despite needing special permission to join the tour – a decision that might have been made easier by the lack of prominent Americans on the LPGA Tour – Thompson is no stranger to LPGA tournaments. Having received sponsors' exemptions, she played in three US Women's Opens by the time she was 14, when she made the cut for the first time, and she tied for 10th in the US Women's Open as a 15-year-old (Elliott, 2011). The case-by-case determination of an early entry applicant considers a youth's 'playing ability, intelligence, maturity, and financial stability' (Rodenberg et al., 2009: 113). The literature is silent on the rationale for the rule's enactment.

8.2.4 Gymnastics

The FIG's age rules have moved in three phases (Rodenberg and Eagleman, 2011). Prior to 1980, gymnasts were required to be at least 14 years old. In 1980, the minimum age was increased to 15. In 1997, the minimum age was increased to 16, where it remains today. The restrictions came in response to a perceived trend toward 'adolescents who are usually less than 1.5 meters [4'11] tall and weigh less than 40 kilos [88 lbs]' and a fear that '[a]rtistic ability and femininity have given way to extremely difficult jumps and moves that can only be performed by girls whose bodies are kept artificially small' (David, 2005: 65). The current age rule has several justifications: the facilitation of healthy muscular and skeletal development, which is particularly likely for adolescents (Daly et al., 2001), the prevention of burnout, and the promotion of a better public image (Paul, 2010).

An unintended consequence of the FIG's move to increase its minimum age policy has been the increase in documented cases of age fraud among individual gymnasts and national-level federations, with China and North Korea having the most egregious cases (Rodenberg and Eagleman, 2011). The FIG-led investigation uncovered long-term systematic corruption among national governing bodies in both countries. FIG found that they had actively facilitated the fabrication of athlete ages to gain a competitive advantage.

8.3 THE LEGAL STATUS OF AGE RESTRICTIONS

The extensive literature on the legality of minimum-age rules in the sports industry spans many sports. In addition to the age policies in the women's

sports detailed above, minimum-age rules exist in high-profile men's sports, including the National Football League (NFL), the NBA, Major League Baseball (MLB), the National Hockey League (NHL), men's professional golf on the PGA TOUR, and men's professional tennis on the Association of Tennis Professionals (ATP) World Tour. Like the WNBA, the NFL has an eligibility rule with both an age restriction and an education requirement, as a player may not enter the league until at least three years after he graduated from high school. The NBA's 2005 collectively bargained rule requires American players to be no less than 19 years old and at least one year removed from high school. The education-related portion of the NBA's rule does not apply to non-Americans. Eligibility rules in MLB, the NHL, the PGA TOUR, and the ATP World Tour are related only to age and include no minimum education requirements.

Examples of legal analyses of age restrictions that have focused on the NBA and NFL include Rosner (1998), Jones (2005), Cimino (2006), Pensyl (2006), Pitts (2008), Rodenberg (2008), and Shaffer (2008). Such legal analyses usually turn on whether the age eligibility rule in question violates antitrust and/or labor law, with experts split on the issue of whether such rules violate the law. Those who support the legality of minimum age rules in the sports industry usually point to the collectively bargained nature of the rules and the accompanying non-statutory labor exemption that likely shields the rules from antitrust liability. In contrast, critics of the age policies often point out that, under antitrust law's rule of reason, there is a dearth of evidence supporting any pro-competitive qualities and emerging evidence illustrating the rules' anti-competitive effect.

The Sherman Antitrust Act of 1890 (Sherman Act), the most prominent federal antitrust statute, prohibits '[e]very contract, combination . . . or conspiracy, in restraint of trade or commerce among the several states' (15 U.S.C. § 1, 2010). The Sherman Act was interpreted in *Standard Oil v. United States* (1911) as outlawing contracts, combinations, or conspiracies that 'unreasonably' restrain trade (p. 63). In *Chicago Board of Trade v. United States* (1918: 238), the Court set out the applicable antitrust rules:

The court must ordinarily consider the facts peculiar to the business to which the restraint is applied; its condition before and after the restraint was imposed; the nature of the restraint, and its effect, actual or probable. The history of the restraint, the evil believed to exist, the reason for adopting the particular remedy, the purpose or end sought to be attained, are all relevant facts.

The Sherman Act's intersection with sports started over 90 years ago. In 1922, the Supreme Court decided *Federal Baseball Club of Baltimore v. National League of Professional Baseball Clubs*, a dispute between rival

baseball leagues. It found MLB to be exempt from antitrust scrutiny. The ruling resulted from the Court's finding that professional baseball did not constitute interstate commerce. The Supreme Court revisited the issue in *Flood v. Kuhn* (1972) and alluded to the *Federal Baseball* decision as 'an aberration' and 'an anomaly', but did not explicitly overrule the case even though it found MLB to be 'a business [that] is engaged in interstate commerce' (p. 282). The *Flood* case turned on whether MLB could enforce the then-applicable reserve clause, a long-entrenched rule that mandated, among other things, that players be tied to the team that initially drafted them even after the player's contract expired. *Federal Baseball* notwithstanding, other sports have been deemed generally subject to federal antitrust laws: basketball (*Haywood v. National Basketball Association*, 1971), football (*Radovich v. National Football League*, 1957), hockey (*Philadelphia World Hockey Club, Inc. v. Philadelphia Hockey Club, Inc.*, 1972), boxing (*International Boxing Club v. United States*, 1958), and tennis (*Volvo North American Corp. v. Men's International Professional Tennis Council*, 1988). Although none of the preceding cases pertained to sport industry age rules, their disposition demonstrated that courts are willing to analyze whether the actions of sports leagues, tours, and teams comply with antitrust law.

A recent high-profile lawsuit evidences the contentiousness and practical importance of minimum age rules in sports. In 2003, former Ohio State University running back Maurice Clarett filed an antitrust lawsuit in federal court challenging the NFL's age rule. Following a stellar freshman season, in which he helped the team to a college national championship, Clarett sought to continue his football career in the NFL despite not meeting the league's eligibility rule. Clarett's move was also precipitated by looming sanctions that may have rendered him ineligible to play college football as a member of the Ohio State team. Among other things, Clarett claimed that the NFL's rule denied him the chance to earn a living as a professional football player. The case resulted in two published judicial decisions. Clarett prevailed at the district court level, but the NFL obtained a reversal upholding its eligibility rule on appeal (*Clarett v. National Football League*, 2004). Clarett's subsequent appeal to the United States Supreme Court was denied.

The basis for the Court's decision was the NFL's non-statutory labor exemption. This exemption frequently applies in the presence of a collective bargaining agreement. The exemption was created to protect a union's right to bargain on behalf of its membership, an action that inherently conflicts with the rights of individual workers to contract with the firm. The rationale for the exemption is that individual workers would not be able to bargain effectively with their employers in the absence of a union.

Thus, the right of a union to bargain collectively trumps antitrust considerations. Because the NFL's age restriction is part of a collective bargaining agreement between the NFL and the NFL Players' Association, the Court ruled that antitrust considerations did not apply, and the NFL's eligibility rule thus remains intact.

The status quo also holds in other sports. In 1997, female tennis player Mirjana Lucic unsuccessfully challenged the WTA Tour's age eligibility rule in an Australian court. There have been no legal challenges in American courts to age restrictions in women's professional sports in tennis, basketball, golf, or gymnastics.

8.4 THE ECONOMIC IMPACT OF AGE RESTRICTIONS

Outside of sports, economists have studied child labor for some time. Grootaert and Kanbur (1995) offer an analysis of child labor, discussing topics such as the determinants of child labor and the role of policy interventions. Lleras-Muney (2002) tracks the change in child labor laws from 1915 to 1939 and finds that an increase in the minimum age required to obtain a work permit, coupled with compulsory school attendance policies, resulted in increased educational attainment. Moehling (1999) tests the impact of minimum-age limits in the manufacturing sector from 1880 to 1910 and finds that they contributed little to the precipitous drop in child labor during the time period. Baland and Robinson (2000) provide a formal model of the efficiency of child labor.

In the subfield of sports economics, Sowell and Mounts (2005) use data from the Ironman Triathlon World Championships to analyze the relationship between age and ability. They use stochastic frontier analysis to determine the efficiency of male and female triathletes at transforming underlying talent into performance. They find that, while men reach peak efficiency in their late twenties, women reach peak efficiency in their early thirties but women's performance then declines more quickly than men's. These results, however, are of limited value for the sports considered in this chapter, as the triathlon events (running, swimming, and cycling) use 'slow-twitch' muscles, while the sports considered in this chapter rely much more on 'fast-twitch' muscles, which might age differently.

Rodenberg and Stone's (2011) investigation into the effects of the WTA Tour's age restriction on career success is the most in-depth empirical examination to date. Their data consist of all players who finished in the top 50 of the WTA Tour singles rankings for the first time between 1989 and 2000. Because the age rule was implemented at the mid-point

of the time period (1995), a natural experiment results in which one can test the impact of the rule change. A dummy variable denotes whether a player was subject to the age restriction. In particular, the variable equals 1 when the player was born after December 31, 1977 and first played in a WTA main draw tournament after January 1, 1995.² The authors test the null hypothesis that the age rule has had no effect on the short- and long-run career success of elite female tennis players. With no single metric universally considered as the best measure of tennis success, Rodenberg and Stone use 'a variety of dependent and independent variables, adopt different sample restrictions, and show that the main results are robust to varying model specification' (p. 186).

All their models use a combination of the following six independent variables: age rule status, handedness, height, socioeconomic background, birth month, and career-best year-end ranking (as a proxy for talent and ability). To estimate any short-run effects of the 1995 age rule, they use ordinary least squares (OLS) regression with the dependent variable equal to the player's average WTA Tour singles ranking when 19 and 20 and no longer constrained by the age rule. Regression results do not 'evidence any systematic beneficial short-run effect of a player's [age rule] compliance status on the mean rank when young' (p. 191).

To investigate the long-run impact of tennis' age rule, Rodenberg and Stone select three dependent variables to capture the quantity and quality aspects of the rule's intended effect: the number of years a player is ranked, the number of years a player is ranked in the top 50, and the number of years a player is ranked in the top 10. Using OLS across the different specifications and among the three dependent variables, the authors do not find systematic evidence of the age rule's having any effect on player outcomes.

One reason for the age restriction was a desire to reduce early, career-ending injuries. To capture this, Rodenberg and Stone estimate two probit models with binary dependent variables that denote early career retirements (those occurring before age 26) and serious injuries of six months or more during the first nine years of a player's career after breaking into the rankings top 50. Neither being subject to the age restriction nor any other control variable affected premature retirement. In contrast, players who were affected by the age restriction had a higher rate of serious injury than those who were not. Although this result suggests a negative and unintended outgrowth of the minimum age rule, its importance is mitigated by the lack of any other corroborating evidence and could result from a relatively small sample that did not include the player's age.

Finally, the authors use panel data methods to exploit the dataset's player-level annual ranking time-series and control for time-varying effects. For these models, Rodenberg and Stone use binary dependent

variables analogous to the three left-hand-side variables adopted in the long-run analysis described above. With the player-specific age rule dummy variable constant from year to year, they use a random-effects estimator instead of a fixed-effects estimator. The authors also assume that none of the explanatory variables is correlated with other time-invariant, unobservable characteristics, particularly the player's ability. Linear probability regression results from the panel data analysis, particularly the impact of the age restriction, were largely insignificant, like those of the long-run OLS regressions summarized above. In sum, using a variety of methods, Rodenberg and Stone find 'very limited evidence that the [WTA Tour age rule] has had any systematic beneficial effect on players' career longevity or success' (p. 181).

These findings suggest that the rule changes have failed to protect younger players and to promote longer, more successful careers. Further analysis, however, is required before drawing a firm conclusion. For example, the findings might reflect self-selection among tennis players. By looking at highly ranked players, Rodenberg and Stone are actually testing the impact of the rule change on the very best players. It is possible that these players have the physical and emotional tools needed to succeed even at a young age. It is possible that the age restriction extends and improves the careers of lower-ranked players. Such a result cannot be captured by this dataset.

Basketball is one of the few sports that have been the focus of economic analyses of age limits. The NBA's recently enacted minimum age rule, a policy similar in content and form to the numerous eligibility rules in women's sports, has been put under the economic microscope in a number of ways. Rosenbaum (2003) explains how collective bargaining agreements in the 1990s increased the opportunity costs of attending college for elite basketball players and, in turn, precipitated the 'flood' of high-school students who have been declaring themselves eligible for the NBA. McCann (2004) claims that 'high school players who have declared [for the draft] have encountered more success than has any other age cohort' (p. 197). Rodenberg and Kim's (2011) NBA-specific findings support McCann. They 'analyze the role of precocity on labor market outcomes of elite-level NBA players and, indirectly, test the on-court efficacy of the NBA's age rule' (p. 2186). Using a data set of all first-round draft picks from 1989 to 2000 and including a host of player-specific control variables, Rodenberg and Kim find evidence that 'players who enter the NBA at a relatively younger age have more successful on-court careers' (p. 2188).

As was the case for the study of tennis, the data underlying the findings for basketball might generate biased estimates due to self-selection. By considering only high draft choices, the studies leave out players who

declare for the NBA but who are selected in the second round or are not selected at all. Not being a first-round draft pick has serious implications for a potential player, as only first-round picks receive guaranteed contracts. There is, moreover, some evidence that first-round picks are treated differently by their teams long after the draft even when one controls for the player's performance (see Staw and Hoang, 1995, and Camerer and Weber, 1999). The economic implications of age limits thus remain uncertain as they await correction for self-selection.

8.5 CONCLUSION

Table 8A.1 in Appendix 8A shows that age eligibility rules are common in a variety of women's sports. However, the formulation, enactment, and management of such rules is challenging from both a legal and economic perspective. The difficulties in administering age eligibility rules and the potential for inconsistency and unfairness are articulated by Weiss (2005):

Chronological age is not equivalent to social, emotional, cognitive, and anatomical age. We need age eligibility rules, but we also know that chronological age, while we use it as a main index for classifying athletes, is not reliably associated with these other age or maturity levels. Two adolescents of the same age can be widely different in terms of social and emotional types of maturity. (p.2)

Weiss also speculates that rules based solely on chronological age could be improved:

The implication of this idea is that age eligibility rules and policies need to consider the wide variety of individual differences in these various age indices and strategize ways of ensuring that the adolescent phenom is ready for the transition to professional. This might be done through other kinds of interviews and other kinds of standards than just age. (p.2)

Asking whether age rules can be improved begs the question of whether the rules are effective – or even desirable. Fortunately, as noted in the introduction to this chapter, the plethora of performance and reward data in sports combined with the presence of exogenous changes in structure and rules mean that sports readily generate natural experiments (see Kahn, 2000). As aptly observed by Sowell and Mounts (2005: 92), such a 'controlled experiment [is] something rare' in academic research. One example, the WTA Tour minimum age rule promulgated in 1995, lends itself well to the 'before and after' analysis of the type found in Rodenberg and Stone (2011).

In an ideal experiment, the WTA Tour would have prospectively tested the age rule's efficacy for a number of years prior to mandating its compliance for all new players. The WTA Tour could have done this through randomization, like the clinical trials of pharmaceutical companies, given that '[t]he most credible and influential research designs use random assignment' (Angrist and Pischke, 2009: 11) in the process of making an informed decision. For a number of legal, ethical, and pragmatic reasons, sport governing bodies do not pursue randomization, a fact contributing to the sometimes contentious and controversial nature of minimum age rules in various sports. While there is a dearth of *ex ante* analysis, there are still opportunities for research *ex post*, after the age-based policies have been in effect for several years.

NOTES

1. Berri and Krautmann provide a detailed comparison of salaries in the NBA and the WNBA in Chapter 7 in this volume.
2. Thus Venus Williams, who was born in 1980 and did not enter the WTA Tour top 50 until 1997, was not subject to the age restriction because she had competed in the main draw of a WTA Tour tournament in 1994 as a 14-year-old. As a result, she was coded as a 0. Note that the dummy variable identifies players who were *potentially* restricted. Some players might have qualified at exactly 18 years of age in the absence of a restriction.

REFERENCES

- Angrist, Joshua D. and Jörn-Steffen Pischke (2009), *Mostly Harmless Econometrics: An Empiricist's Guide*, Princeton, NJ: Princeton University Press.
- Baland, Jean-Marie and James A. Robinson (2000), 'Is Child Labor Inefficient?', *Journal of Political Economy*, **108**(4), November: 663–79.
- Bernhardt, Dan and Steven L. Heston (2010), 'Point Shaving in College Basketball: A Cautionary Tale for Forensic Economics', *Economic Inquiry*, **48**(1), January: 14–25.
- Camerer, Colin F. and Roberto A. Weber (1999), 'The Econometrics and Behavioral Economics of Escalation: A Re-examination of Staw and Hoang's NBA Data', *Journal of Economic Behavior and Organization*, **39**(1), May: 59–82.
- Chicago Board of Trade v. United States*, 246 U.S. 231 (1918).
- Cimino, Kevin J. (2006), 'The Rebirth of the NBA – Well, Almost: An Analysis of the Maurice Clarett Decision and its Impact on the National Basketball Association', *West Virginia Law Review*, **108**(3), Spring: 831–71.
- Clarett v. National Football League*, 306 F. Supp.2d 379 (S.D.N.Y. 2004), reversed in part, vacated in part, remanded by, 369 F.3d 124 (2nd Cir. 2004).
- Cook, Kevin (2008), *Driven: Teen Phenoms, Mad Parents, Swing Science and the Future of Golf*, New York: Gotham Books.
- Daly, Robin M., Shona L. Bass and Caroline F. Finch (2001), 'Balancing the Risk of Injury to Gymnasts: How Effective are the Counter-measures?', *British Journal of Sports Medicine*, **35**(1), February: 8–20.
- David, Paulo (2005), *Human Rights in Youth Sport*, New York: Routledge.

- Doherty, Eryn M. (1999), 'Winning Isn't Everything . . . It's the Only Thing: A Critique of Teenaged Girls' Participation in Sports', *Marquette Sports Law Review*, **10**(1), Fall: 127–60.
- Edelman, Marc and C. Keith Harrison (2008), 'Analyzing the WNBA's Mandatory Age/Education Policy from a Legal, Cultural, and Ethical Perspective: Women, Men, and the Professional Sports Landscape', *Northwestern Journal of Law and Policy*, **3**(1), Winter: 1–28.
- Elliott, Mick (2011), 'Calm Down, Lexi Thompson Will Get Her Wish', *ESPNW*, September 21, online at: <http://espn.go.com/espnw/news-opinion/7001638/calm-lexi-thompson-get-wish> (accessed December 27, 2011).
- Federal Baseball Club of Baltimore v. National League of Professional Baseball Clubs*, 259 U.S. 200 (1922).
- Finn, Robin (1999), 'Fourteen Year-old May Sue Over Locked Pro Courts', *New York Times*, D1.
- Flood v. Kuhn*, 407 U.S. 258 (1972).
- Grenfell, Christopher C. and Robert E. Rinehart (2003), 'Skating on Thin Ice: Human Rights in Youth Figure Skating', *International Review for the Sociology of Sport*, **38**(1), March: 79–97.
- Grootaert, Christiaan and Ravi Kanbur (1995), 'Child Labour: An Economic Perspective', *International Labour Review*, **134**(2), January: 187–203.
- Haywood v. National Basketball Association*, 401 U.S. 1204 (1971).
- International Boxing Club v. United States*, 358 U.S. 242 (1958).
- Jones, Andrew M. (2005), 'Hold the Mayo: An Analysis of the Validity of the NBA's Stern no Preps to Pros Rule and Application of the Nonstatutory Exemption', *Loyola of Los Angeles Entertainment Law Review*, **26**(3), March: 475–522.
- Kahn, Lawrence M. (2000), 'The Sports Business as a Labor Market Laboratory', *Journal of Economic Perspectives*, **14**(3), Summer: 75–94.
- Kaplan, Daniel (2004), 'I.D. Please: WTA Tour CEO Pushing Grand Slams to Raise Age Limits', *Street and Smith's Sports Business Journal Daily*, April 19–25, online at: <http://www.sportsbusinessdaily.com/Journal/Issues/2004/04/20040419/This-Weeks-Issue/ID-Please-WTA-Tour-CEO-Pushing-Grand-Slams-To-Raise-Age-Limits.aspx> (accessed December 27, 2011).
- Lapchick, Richard (2011), 'Keeping Score When It Counts: Sweet 16 Men's and Women's Teams. A Look at Their Academic Success', The Institute for Diversity and Ethics in Sport, March 23, online at: http://tidesport.org/Grad%20Rates/2011_Sweet_16_FINAL.pdf (accessed December 28, 2011).
- Livengood, Thomas, Ashley Keber and Kathy Martin (2008), 'Introduction to PRO U Player Orientation', *Science and Medicine in Tennis*, **13**(2): 10–12.
- Lleras-Muney, Adriana (2002), 'Were Compulsory Attendance and Child Labor Laws Effective? An Analysis from 1915 to 1939', *Journal of Law and Economics*, **45**(2), October: 401–35.
- McCann, Michael A. (2004), 'Illegal Defense: The Irrational Economics of Banning High School Players from the NBA Draft', *Virginia Sports and Entertainment Law Journal*, **3**(2), Spring: 113–98.
- McCann, Michael A. and Joseph S. Rosen (2006), 'Legality of Age Restrictions in the NBA and the NFL', *Case Western Reserve Law Review*, **56**(3), Spring: 731–68.
- McGuire, Bartlett H. (2007), 'Age Restrictions in Women's Professional Tennis: A Case Study of Pro-competitive Restraints of Trade', *Journal of International Media & Entertainment Law*, **1**(2), Winter/Spring: 199–251.
- Merten, Jenna (2004), 'Raising a Red Card: Why Freddy Adu Should not be Allowed to Play Professional Soccer', *Marquette Sports Law Review*, **15**(1), Fall: 205–25.
- Mewshaw, Michael (1993), *Ladies of the Court: Grace and Disgrace on the Women's Tennis Tour*, New York: Crown Publishers.
- Miron, Jeffrey A. and Elina Tetelbaum (2009), 'Does the Minimum Legal Drinking Age Save Lives?', *Economic Inquiry*, **47**(2), April: 317–36.

- Moehling, Carolyn M. (1999), 'State Child Labor Laws and the Decline of Child Labor', *Explorations in Economic History*, **36**(1), January: 72–106.
- Paul, Jennifer (2010), 'Age Minimums in the Sport of Women's Artistic Gymnastics', *Willamette Sports Law Journal*, **7**(2), Spring: 73–90.
- Pensyl, Tyler (2006), 'Let Claret Play: Why the Nonstatutory Labor Exemption Should Not Exempt the NFL's Draft Eligibility Rule from the Antitrust Laws', *University of Toledo Law Review*, **37**, Winter: 523–50.
- Philadelphia World Hockey Club, Inc. v. Philadelphia Hockey Club, Inc.*, 351 F.Supp. 462 (E.D. Pa. 1972).
- Pitts, Jack N.E. (2008), 'Why Wait? An Antitrust Analysis of the National Football League and National Basketball Association's Draft Eligibility Rules', *Howard Law Journal*, **51**(2), Winter: 433–78.
- Radovich v. National Football League*, 352 U.S. 445 (1957).
- Roberts, Selenia (1997), 'Kournikova: Part Phenom, Part Press Agent's Dream', *New York Times*, 26 August.
- Rodenberg, Ryan M. (2000), 'Age Eligibility Rules in Women's Professional Tennis: Necessary for the Integrity, Viability, and Administration of the Game or an Unreasonable Restraint of Trade in Violation of Antitrust Law?', *Sports Lawyers Journal*, **7**, Spring: 183–212.
- Rodenberg, Ryan M. (2008), 'The NBA's Latest Three Point Play: Age Eligibility Rules, Antitrust, and Labor Law', *Entertainment and Sports Lawyer*, **25**(4), February: 14–17.
- Rodenberg, Ryan M. and Andrea N. Eagleman (2011), 'Uneven Bars: Age Rules, Antitrust, and Amateurism in Women's Gymnastics', *University of Baltimore Law Review*, **40**(4), July: 585–605.
- Rodenberg, Ryan M., Elizabeth A. Gregg and Lawrence W. Fielding (2009), 'Age Eligibility Rules in Women's Professional Golf: A Legal Eagle or an Antitrust Bogey?', *Journal of Legal Aspects of Sport*, **19**(2), Summer: 103–20.
- Rodenberg, Ryan M. and Jun Woo Kim (2011), 'Precocity and Labor Market Outcomes: Evidence from Professional Basketball', *Economics Bulletin*, **31**(3), July: 2185–90.
- Rodenberg, Ryan M. and Daniel F. Stone (2011), 'Short and Long Run Labor Market Effects of Age Eligibility Rules: Evidence from Women's Professional Tennis', *Journal of Labor Research*, **32**(2), April: 181–98.
- Rosenbaum, Dan T. (2003), 'How the NBA Turned a Trickle of Underclassmen Leaving School Early into a Flood', unpublished working paper, Department of Economics, University of North Carolina, Greensboro, NC.
- Rosner, Scott R. (1998), 'Must Kobe Come Out and Play? An Analysis of the Legality of Preventing High School Athletes and College Underclassmen from Entering Professional Sports Drafts', *Seton Hall Journal of Sport Law*, **8**(2): 539–74.
- Rowland, Thomas W. (2000), 'On the Ethics of Elite-level Sports Participation by Children', *Pediatric Exercise Science*, **12**(1), February: 1–5.
- Ryan, Joan (2000), *Little Girls in Pretty Boxes: The Making and Breaking of Elite Gymnasts and Figure Skaters*, New York: Warner Books.
- Shaffer, Brian (2008), 'The NBA's Age Requirement Shoots and Misses: How the Nonstatutory Exemption Produces Inequitable Results for High School Basketball Stars', *Santa Clara Law Review*, **48**(3), January: 681–707.
- Sherman Antitrust Act, 15 U.S.C. § 1 (2010).
- Sowell, Clifford B. and Wm Stewart Mounts Jr. (2005), 'Ability, Age, and Performance: Conclusions from the Ironman Triathlon World Championships', *Journal of Sports Economics*, **6**(1), February: 78–97.
- Stabiner, Karen (1986), *Courting Fame: The Perilous Road to Women's Tennis Stardom*, New York: Harper & Row.
- Standard Oil Co. v. United States*, 221 U.S. 1 (1911).
- Staw, Barry M. and Ha Hoang (1995), 'Sunk Costs in the NBA: Why Draft Order Affects Playing Time in Professional Basketball', *Administrative Science Quarterly*, **40**(3), September: 474–94.

- Volvo North American Corp. v. Men's International Professional Tennis Council*, 857 F.2d 55 (2d Cir. 1988).
- Warren, Michelle P. and N.E. Perloth (2001), 'The Effects of Intense Exercise on the Female Reproductive System', *Journal of Endocrinology*, **170**(1), July: 3–11.
- Weiss, Maureen (2005), 'Successful Transitions: Strategies and Programs', oral presentation at the 'Phenoms to Professionals: Successful Transitions' forum hosted by the Ladies Professional Golf Association, Daytona Beach, FL, December.
- Wertheim, L. Jon (2001), *Venus Envy: A Sensational Season Inside the Women's Tennis Tour*, New York: Harper Collins.

APPENDIX 8A

Table 8A.1 Age restrictions and governing bodies for selected sports

Women's sport	Minimum age*	Governing bodies
Archery	None	International Archery Federation
Badminton	19 'recommended'	Badminton World Federation
Biathlon	21	International Biathlon Union
Bobsled	18	Fédération Internationale de Bobsleigh et de Tobogganing
Body Building	21	International Federation of Bodybuilding & Fitness
Bowling	16	Fédération Internationale des Quilleurs
Boxing	17	International Boxing Association
Canoeing/ Kayaking	None	International Canoe Federation
Cricket	19	International Cricket Council
Cycling	Road = 19; BMX = 16	Union Cycliste Internationale
Diving	14	Fédération Internationale de Natation
Football	18	Independent Women's Football League
Fencing	13	Fédération Internationale d'Escrime
Field Hockey	None	International Hockey Federation
Ice Hockey	18	International Ice Hockey Federation
Ice Skating/ Ice Dancing	15	International Skating Union
Judo	15	International Judo Federation
Karate	None	World Karate Federation
Luge	15	Fédération Internationale de Luge de Course
Mixed Martial Arts	18	International Sport Combat Federation
Pentathlon	17	Union Internationale de Pentathlon Moderne
Polo	None	Federation of International Polo
Powerlifting	14	International Powerlifting Federation
Racketlon	None	International Racketlon Federation
Rowing	18	Fédération Internationale des Sociétés d'Avion
Rugby	18	International Rugby Board
Sailing	None	International Sailing Federation
Shooting	16	International Shooting Sport Federation

Table 8A.1 (continued)

Women's sport	Minimum age*	Governing bodies
Skeleton	16	Fédération Internationale de Bobsleigh et de Tobogganing
Skiing	Snowboard/ Alpine/Freestyle: 15 Nordic/Cross-Country/Jumping: None	Fédération Internationale de Ski
Softball	None	International Softball Federation
Speed Skating	15	International Skating Union
Squash	None	World Squash Federation
Swimming	None	Fédération Internationale de Natation
Synchronized Swimming	15	Fédération Internationale de Natation
Table Tennis	15	International Table Tennis Federation
Taekwondo	18	World Taekwondo Federation
Track and Field	14	International Association of Athletics Federations
Volleyball	None	Fédération Internationale de Volleyball
Water Polo	None	Fédération Internationale de Natation