

[For *The Edward Elgar Companion to the Economics of Sports*, edited by Wladimir Andreff and Stefan Szymanski, to appear, 2005]

## **Rugby: Strategy and Structure**

**John McMillan\***

Graduate School of Business  
Stanford University  
Stanford, CA 94305-5015, USA  
mcmillan\_john@gsb.stanford.edu

Rugby union is a grassroots sport. Two and a half million players in ninety-four countries, from Andorra to Zimbabwe, take part in all manner of organized competitions. They are assorted in ability and background, and always have been. Richard Burton, the actor, played club rugby in Wales as a flanker (he described it as “ballet, opera, and bloody murder”). Tony O’Reilly, the businessman who headed the multinational food company H. J. Heinz, was a star winger for Ireland. Ernest Rutherford, the Nobel physicist from New Zealand who split the atom, played lock at club and university level, as did French president Jacques Chirac. In his youth in Argentina, Che Guevara, the revolutionary, played as a scrum-half and even launched a rugby magazine, “Tackle.”

Rugby union is also a professional sport. Jonah Lomu, the New Zealand wing three-quarter, is one of world sport’s recognizable faces. The Rugby World Cup is, by number of participating countries or television viewers, one of the world’s biggest sporting events. The final game of the 2003 tournament, between Australia and England, was watched by a worldwide television audience of 300 million.

### **Strategy**

Rugby and soccer both derive from the game of folk football played in England since medieval times. Folk football had few rules of play: what rules there were rested on custom and varied from village to village. Any number could play, and spectators

---

\* I thank Dorian Owen, Clayton Weatherston, and Justin Wolfers for useful discussions.

sometimes joined the fray. There was no referee, just a kind of social control by the players themselves. For hundreds of years the rules remained unwritten, until the 1860s, when national governing bodies were formed to codify them. Rugby opted to allow the ball to be carried by hand and physical tackles to be made, soccer not.<sup>1</sup> Later, rugby transmuted into rugby league, a simplified version of the game that arose out of a dispute over playing for pay, and American football, founded on the belief that making forward passes legal would improve the game. Today, rugby is played and watched by fewer people worldwide than its sibling, soccer, but by more than its descendants, rugby league and American football.

Rugby demands both speed and strength. In a top-level game, a player runs four to six kilometres, much of that distance at or close to sprinting speed, as well as making an average of ten tackles and, if a forward, pushing in thirty or so scrums and innumerable rucks and mauls.

Rugby also demands, arguably more than most sports, innovative tactical thought. Among other sports, American football is perhaps most like rugby union in the breadth of its tactical options. By contrast, rugby league, for example, has less variety in types of play and therefore less scope for tactical variation. In rugby union, strategies change from season to season. Attack dominates one year and a lot of points are scored. The defensive systems have caught up by the next year and scores are lower. Then still further offensive schemes are hatched. One team dominates its opponents for a while, having devised superior tactics. Then the others work out how to counter them. "The game evolves," remarked John Mitchell, coach of the All Blacks (the New Zealand national team). "You can't live in the past with this game because if you do it bites you in the backside."<sup>2</sup>

Rugby players and coaches are, in effect, game theorists. The essence of game theory is strategic thinking: anticipating your opponents' reactions when you decide your own actions. The gist of the concept of Nash equilibrium is taking the other's strategy into account. This mindset pervades the 1906 book *The Complete Rugby Footballer* by Dave Gallaher and Billy Stead, captain and vice captain of the wildly successful 1905

---

<sup>1</sup> On the origins and early history of rugby, see Macrory (1991) and Richardson (1995).

<sup>2</sup> Quoted from *New Zealand Herald*, May 27, 2003

New Zealand team that toured the United Kingdom and France. “It almost goes without saying,” they said, “that tactics are as the soul of Rugby football.”

Gallaher and Stead appreciated the interactive decision-making that game theorists were later to model: “One kind of game will be played when a very powerful enemy is feared, and another one when it is realized that the opposition is strong only in a certain department.” They understood the value of the mixed strategy: “the greater variety that a side possesses in its recognized movements, the greater are its chances of springing surprises on its opponents. It may play one set of tactics on one day and another on the next, and it may reserve a few peculiar movements for use only very occasionally.” They stressed strategic innovation: “One must always be searching for some new construction, some new movement, the very ingenuity of which will flabbergast the enemy; and the side which has most of these will be the strongest.”<sup>3</sup>

Fred Allen, coach of the All Blacks in the 1960s, is renowned for his strategic thinking. “Rugby is a simple game,” he said. “But here’s the rub: while you and your fourteen team-mates are trying the run or kick the ball for profit, the fifteen men of the other team are not only actively opposing your intentions but are cooking up scoring schemes of their own.” Like Gallaher and Stead he worked with mixed strategies. “Each side, and each player on the side, must have their recognized ruses. A ruse can seldom be tried more than once in a game, but every ruse has, as it were, a double edge. When you have cut with it one way, you can turn round and cut with the other. You gain by the mystery you create.” Like Gallaher and Stead, also, he thought in terms of anticipating the opponents’ reactions. Praising the great fullback Bob Scott, he said Scott had “developed such confidence that he turned his rugby into the sort of chess of a master-player—he thought at least two moves ahead.”<sup>4</sup>

Wayne Smith, the All Black coach in 2000-01, does what he calls “reverse analysis” of each opposition team, by which he means thinking, like a game theorist, in terms of best responses. “We look at how we think they’ll be looking at us, how they

---

<sup>3</sup> The quotes are from Gallaher and Stead (1906), pp. 135-38.

<sup>4</sup> The quotes are from Allen and McLean (1970), pp. 1, 9.

think we'll play, where they think our strengths and weaknesses are, and we'll try to adapt accordingly."<sup>5</sup>

Tactical innovation accelerated in the mid-1990s. Matches became more open and more appealing to spectators. Speed was emphasized. Attacking ploys multiplied. The typical game plan switched from striving not to lose to striving to win. The new style of play came after the stakes increased as rugby turned professional.

### **Professionalization**

Before 1995, rugby was officially amateur. The game was big business, and it was common for players to receive under-the-table payments, but the rugby authorities refused to acknowledge this. In 1995, the pretence ended abruptly. Driven by the threat of a rival league starting up and bidding the top players away, the rugby authorities bowed to the inevitable and made the game openly professional.<sup>6</sup>

Television was behind the shift to professional play. The explosive growth in broadcasting revenues through the 1990s transformed many sports, and especially rugby. One Australian television network (run by Kerry Packer) funded the threatened break-away league, and another (run by Rupert Murdoch) provided the broadcasting-rights contract that preempted the break-away and bankrolled the nascent professional game.

Change, once it finally came, was sweeping. "We had to acknowledge the changes which had taken place," said Vernon Pugh, the chairman of the International Rugby Board (IRB). "The southern hemisphere had put building blocks in place for professionalism. There was no point in fiddling about. It was too late for evolution."<sup>7</sup>

The switch to professionalism called for changes not only on the field of play but also in organizational structures. The sport's administration had been amateur in the negative sense of the word. Quality management suddenly became needed, but it was not always forthcoming. Will Carling, the captain of the England national team, in a 1995 television interview called the committee running English rugby "fifty-seven old farts."

---

<sup>5</sup> Quoted from *New Zealand Herald*, July 28, 2001.

<sup>6</sup> This episode is described in the best book on the organizational side of the sport, FitzSimons (1996). For more on the process of professionalization, see Owen and Weatherston (2002a).

<sup>7</sup> Quoted by Tim Glover, "Pugh: Rugby's Navigator on a Rocky Road," *Independent*, April 27, 2003.

England's administrators, the Rugby Football Union (RFU), picked a fight over television revenues with France, Scotland, Wales, and Ireland. The resulting impasse almost destroyed their historic tournament. Another bitter dispute erupted between the RFU and the clubs over the terms for the clubs' releasing of players to play for the England team and over the division of television revenues. The upshot was that a separate new body, an association of the leading clubs, was set up to run England's domestic competitions. In 2000, the top English clubs threatened to break away from the RFU. The tensions continued through 2003.<sup>8</sup> The clubs were complaining about the amount of time their stars were away playing for the national team. There was a dispute over clubs' rights to membership of the Premier Division: the RFU argued for end-of-season relegation of the bottom-placed club and promotion of the first-placed lower-division team, while the Premier clubs argued for a closed shop. Most of the clubs were reportedly not covering their operating costs, because, they claimed, of the high salaries they were paying their players—which would seem to be an admission of business ineptitude.

English rugby, “resembles nothing so much as post-Soviet Union Russia,” Huw Richards wrote in the *Financial Times* just after the advent of professionalism, “having shifted almost overnight from the constrictions of a wholly regulated system to having few rules, galloping inflation and a desperately uncertain future.” The organizational shortcomings gave rise to a “shambles” in Europe's first season of professional rugby, Richards continued, “a consequence of the nobody's-in-charge anarchy, with clubs and unions apparently bent on mutually assured destruction.”<sup>9</sup>

The “shambles” was, however, specific to the UK. Elsewhere, rugby's administration adapted more effectively. To extend the post-communist analogy, in New Zealand (and Australia, France, and elsewhere) the transition to the new order more resembled China's successful reform path than Russia's disappointing one. By contrast with Russia, where the reformers destroyed the mechanisms of the old regime and started with a clean slate—and the economy went into a tailspin—in China the reformers left the old mechanisms in place and built the new system around the old—and the economy

---

<sup>8</sup> See Malin (1997), Thomas (1997), Paul Rees, “Premiership Goes Cap in Hand,” *The Guardian*, March 25, 2003.

<sup>9</sup> Huw Richards, “A Primitive Form of Warfare,” *Financial Times* May 4, 1996, p. I; Huw Richards, “Euroseptic Fans Are Conquered,” *Financial Times* November 16, 1996, p. XI.

boomed.<sup>10</sup> Whereas in England change was radical, in New Zealand professional rugby was grafted on the existing hierarchy of club, provincial and national levels, and the transition to professional play went relatively smoothly. The New Zealand Rugby Union (NZRU), whose members are elected by the provincial unions, continues to organize both the national team and the domestic competitions. Retaining some degree of central control, the NZRU is able to balance the demands of the national team with those of provincial and club teams; the national team gets precedence.<sup>11</sup>

Rugby's governing bodies saw a rapid increase in their revenues following professionalization. Between 1995 and 2000, the NZRU's annual income rose more than five-fold.<sup>12</sup> This windfall came from television fees and sponsorships, which in 1995 were small and by 2000 were ninety percent of total income.

### **Tournaments**

The ordinary recreational player is rugby's bedrock, professionalization notwithstanding. Among the 94 countries that belong to the IRB as of 2003 (see the appendix), England has the most registered players, with 640,000; then South Africa with 430,000, France with 250,000, and Australia, Japan, and New Zealand with 130,000.

Countless local club tournaments are held, from the serious to the pleurably casual. "My playing career was spectacularly undistinguished. However, I enjoyed barging about and using my considerable weight, in a lumpen sort of way, at loose-head," says British writer Mike Seabrook, speaking for thousands just like himself. "And later on I found that even if I did play the game like an ox on an ice-rink, there was still room for a substantial contribution for a drinker of my abilities in the clubhouse afterwards."<sup>13</sup>

A nationwide professional or semi-professional tournament is held in most of the major rugby nations, involving either elite clubs or regional teams: the Currie Cup in South Africa, the French Championnat, the English Premiership, the Welsh Premiership,

---

<sup>10</sup> See McMillan (2002), Ch. 15.

<sup>11</sup> New Zealand's administrators have committed bumbles of their own, notably the loss of the status of sub-host for the 2003 World Cup through a combination of misunderstandings and over-aggressive negotiating.

<sup>12</sup> See Owen and Weatherston (2002a), Figure 1.

<sup>13</sup> Quoted from Barnes and Seabrook (1995), p. 72.

the Super League in the United States, New Zealand's National Provincial Championship, and so on.

International tournaments for club or regional teams are a relatively new feature of the sport. The European Cup involves the top clubs from France, Ireland, and the UK. The Super 12 pits regional teams from Australia, New Zealand, and South Africa.

For national teams, two major competitions are held annually. In the northern hemisphere, the Six Nations tournament pits the national teams of England, France, Ireland, Italy, Scotland, and Wales. In the southern hemisphere, the Tri-Nations tournament involves Australia, New Zealand, and South Africa. An itinerant world sevens tournament—an abbreviated version of the game, with seven players per team instead of the usual fifteen—runs each year.

The World Cup, held every four years, is rugby's showcase (see Table 1). The winners have been New Zealand (1987), Australia (1991), South Africa (1995), Australia (1999), and England (2003). The Women's World Cup, held in 1998 and 2002, was won by New Zealand both times.

**Table 1: Rugby World Cup<sup>14</sup>**

	<u>Teams</u>	<u>TV broadcasts</u>	<u>Live viewers</u>
1987 in New Zealand & Australia	16	17 countries	600,000
1991 in England & surrounds	16	103 countries	1,000,000
1995 in South Africa	16	124 countries	1,000,000
1999 in Wales & surrounds	20	140 countries	1,750,000
2003 in Australia	20	200 countries	1,870,000

The reigning Olympic rugby champion, by the way, is the United States, which won with a team from Stanford University in Paris in 1924. Rugby has not been at the Olympics since then, although there have been periodic moves to reinstate it.

<sup>14</sup> Sources: <http://www.worldcupweb.com/WCrugby/records.asp>,  
<http://www.worldcupweb.com/WCrugby/donews.asp?ID=1746>,  
[http://www.news24.com/News24/RWC\\_2003/Features/0,,2-1529-1532\\_1421857,00.html](http://www.news24.com/News24/RWC_2003/Features/0,,2-1529-1532_1421857,00.html).

## Organization

Competitive balance is an issue for any sports league. If the competition were to become unbalanced, so the outcome of the games was easily predictable, then any tournament would risk becoming boring, to the cost of live and television viewership.<sup>15</sup> Competitive balance is an issue in some of rugby's competitions.

In national-team tournaments, like the World Cup, the Six Nations, and the Tri-Nations, not much can be done to foster competitive balance, a player's nationality and therefore the team he plays for being more or less fixed. However, the IRB might improve the worldwide competitive balance if it were to change its eligibility rules, applying them differentially. It could loosen the rules defining the players' nationality for lower-ranked teams like Samoa and the United States, while retaining the existing strict nationality rules for higher-ranked teams like Australia and France. The IRB's current rules allow a player to be qualified for a country via his own or his parents' or his grandparents' nationality, so a player may be eligible to play for more than one country. Once he has represented one country, however, he may not then play for another. The IRB could perhaps relax this rule, so as to favour the lower-tier countries, by permitting former major-country players who satisfy the other nationality criteria to switch to playing for lower-tier countries. An ex-All Black of Samoan extraction, for example, would be allowed to play for Samoa. By strengthening the lower-ranked teams, such a rule change could bring better contested and more exciting international matches. (In 2004, such a proposal was put before the IRB board but the IRB, with its penchant for dim-witted decisions, rejected it.)

In domestic professional tournaments, various competitive-balance mechanisms are in use. In New Zealand's provincial competition, there is regulation of player movement between teams, revenue sharing (of the gate from international games and of television and sponsorship earnings), and promotion and relegation (with three divisions, the best and worst teams at the end of each season going up and down). Competitive balance does not seem to have been achieved, however, as two teams, Auckland and Canterbury, disproportionately win the title. In England's club competition, there is a

---

<sup>15</sup> See McMillan (2002), Ch. 10.

salary cap (which is, however, reported to be routinely abused), the sharing of television revenues, and promotion and relegation.

The competition-policy authorities have on occasion probed rugby's organizational rules, questioning the constraints that the rugby unions have placed on the teams' off-the-field competition. In 1996, the New Zealand Commerce Commission examined the NZRU regulations on player transfers among provincial teams. Its preliminary judgment was that the transfer rules amounted to price-fixing in the players' labour market. It later reversed itself, however, finding that, although the rules breached certain sections of the Commerce Act, any detriments from the lessening of competition were outweighed by their public benefits. The commission's chairman Allan Bollard concluded, "the benefits to the public flowing from a more even National Provincial Championship are likely to be of a reasonably significant size, even when calculated conservatively." In 2003, the UK Office of Fair Trading investigated whether the twelve English Premiership clubs had been operating as a cartel. It was alleged that the incumbent clubs had blocked access to the top league by preventing promotion and relegation from being implemented.<sup>16</sup>

The labour market for players and coaches has gone global. Clubs in Japan, Italy, France, and the UK bid for players, both stars and journeymen. Australia, New Zealand, and South Africa have decreed that those who play overseas are ineligible for selection in the national team. This prevents most at the very top of the game from leaving, but others go. In 2002, it was reported that 650 New Zealanders, including some former All Blacks and some who had been close to All Black selection, were playing for pay overseas.<sup>17</sup> This is enough to man about 25 squads. Some players looking overseas could influence wage setting domestically. If their teams attempt to keep them by raising their pay, then pressures to maintain parity will push up the other team members' pay. The global market puts a floor on players' earnings, and perhaps limits the effectiveness of mechanisms like a salary cap. English clubs, under a salary cap, reportedly find it hard to retain their star players in competition with French clubs, with no salary cap.

---

<sup>16</sup> See McMillan (1997); Paul Rees, "OFT Set to End Closed Shop," *The Guardian*, March 19, 2003.

<sup>17</sup> According to Paul Verdon, "Is Our National Game Truly Losing Ground?" *National Business Review* September 20, 2002.

## Questions

Little has been written on the economics of rugby union. There is just a single econometric study—Owen and Weatherston’s (2002b) pioneering inquiry into the determinants of match attendance in the Super 12—and there exist three other articles—McMillan (1997), Owen and Weatherston (2002a) and Thomas (1997), on the organization of the sport in New Zealand and the UK.<sup>18</sup>

Rugby’s mix of international and local tournaments raises some questions. Does the design of the domestic competition affect the national team’s performance? Does the national team perform better when talent is dispersed through the domestic teams, or does it help to have a single domestic team that is dominant? For grooming players for the national team, how does a system of elite clubs, as in England, compare with a hierarchical system of local clubs feeding into selective regional teams, as in New Zealand? What are the consequences of the globalization of the players’ labour market?

Rugby is a promising test case for theories of sports organization. How much does competitive balance matter?<sup>19</sup> How can the clubs and the rugby unions best address the competitive-balance externality (all teams benefit from the competition being balanced but each, individually, has little incentive to foster it)? The range of structures of competition in the various tournaments provide data that could be used to compare the efficacy of alternative competitive-balance policies. For example, alongside the New Zealand domestic competition, with its promotion and relegation incentives, is the Super 12, without promotion and relegation but with considerable central control. What is the optimal design of a tournament? Can rugby put to use the recent thinking on the principles of sporting-contest design?<sup>20</sup>

Rugby’s methods of organizing its tournaments might contain lessons for other sports. Competitive balance is the focus much of the debate about the right way to organize sporting leagues. But creating a balanced competition is not the only way to ensure spectator engagement. As with a handicap in a horse race, the authorities can make an uneven contest exciting for spectators by appropriately designing the rules governing the contest. The Super 12, for example, tallies tournament points in a novel

---

<sup>18</sup> Nothing else shows up in searches in EconLit and discussion-paper archives.

<sup>19</sup> The answer from Owen and Weatherston (2002b) is: In the Super 12, not much.

<sup>20</sup> See Szymanski (2003).

way. In addition to the four points a team gets for a win, bonus points are on offer: one for scoring four or more tries and one to a losing team for getting within seven points of the winner. Whereas a low-scoring game yields four points to the winner and none to the loser, a high-scoring game could yield the winner as many as five points to the winner and two to the loser. The popularity of the Super 12—it is televised worldwide—suggests the bonus points have their intended incentive effect. Rewarding a team scoring by tries rather than by penalty kicks, and rewarding continued efforts to score by both teams even if one is far ahead on the scoreboard, bonus points enhance the spectators' enjoyment. Does a bonus-point system like the Super 12's, creating incentives for attractive play by both teams even if the match-up is one-sided, reduce the need for policies addressed at competitive balance?

With rugby's worldwide scope, it deserves more analysis than it has so far received. Many questions remain to be answered.

## Appendix

### Player Numbers

Andorra	459	Guyana	270	Romania	2,987
Arabian Gulf	2,305	Hong Kong	5342	Russia	8,700
Argentina	50,160	Hungary	1,489	Samoa	14,263
Australia	127,801	India	2,900	Scotland	33,600
Austria	400	Ireland	52,000	Senegal	310
Bahamas	284	Israel	1,100	Serbia	3,450
Barbados	100	Italy	39,856	Singapore	7,200
Belgium	4,121	Jamaica	3,570	Slovenia	820
Bermuda	120	Japan	133,330	Solomon Is.	780
Bosnia	635	Kazakhstan	2,400	South Africa	434,600
Botswana	425	Kenya	6,000	Spain	14,390
Brazil	2,000	Korea	1,604	Sri Lanka	65,850
Bulgaria	1,645	Latvia	520	St Lucia	72
Cameroon	700	Lithuania	1,620	Swaziland	594
Canada	16,500	Luxembourg	605	Sweden	2,840
Cayman	1,247	Madagascar	9126	Switzerland	1,830
Chile	13,710	Malaysia	14,190	Tahiti	1,150
China	3,760	Malta	1,027	Thailand	2,900
Chinese Taipei	1,225	Moldova	1,270	Tonga	7,788
Colombia	460	Monaco	240	Trinidad	1,750
Cook Islands	1,000	Morocco	8,935	Tunisia	3,920
Cote d'Ivoire	5,962	Namibia	13,000	Uganda	4,500
Croatia	1,490	Netherlands	6,560	Ukraine	2,040
Czech Rep.	2,495	New Zealand	133,400	Uruguay	3,750
Denmark	2,722	Nigeria	780	USA	37,430
England	641,260	Niue	440	Vanuatu	1,000
Fiji	60,000	Norway	450	Venezuela	850
Finland	148	PNG	3,100	Wales	59,900
France	252,638	Paraguay	1,740	Zambia	6,000
Georgia	6,492	Peru	550	Zimbabwe	17,625
Germany	4,200	Poland	2,250		
Guam	239	Portugal	3,958		

Source: International Rugby Board, <http://www.irb.com/> (March 31, 2003)

## References

- Allen, Fred, and McLean, Terry, *Fred Allen on Rugby*, Auckland, Cassell, 1970
- Barnes, Stuart, and Seabrook, Mike, editors, *Nice Tries: An Anthology of New Rugby Writing*, London, Gollancz, 1995
- FitzSimons, Peter, *The Rugby War*, Sydney: HarperCollins, 1996
- Gallaher D., and Stead, W. J., *The Complete Rugby Footballer on the New Zealand System*, London, Methuen, 1906
- Macrory, Jennifer, *Running with the Ball: The Birth of Rugby Football*, London: Collins Willow, 1991
- Malin, Ian, *Mud, Blood and Money: The English Rugby Union Goes Professional*, Edinburgh, Mainstream, 1997
- McMillan, John, "Rugby Meets Economics," *New Zealand Economic Papers* 31 (2), June 1997, 93-114; also at <http://faculty-gsb.stanford.edu/mcmillan/personal/homepage.htm>
- McMillan, John, *Reinventing the Bazaar: A Natural History of Markets*, New York, Norton, 2002
- Owen, P. Dorian and Weatherston, Clayton R., "Professionalization and Competitive Balance in New Zealand Rugby Union," in *International Sports Economics Comparisons*, R. Fort and J. Fizek (eds), Praeger, Westport, CT, (forthcoming) 2004
- Owen, P. Dorian, and Weatherston, Clayton R., "Uncertainty of Outcome and Super 12 Rugby Union Attendance," Discussion Paper No. 0211, University of Otago, Dec. 2002b, <http://www.business.otago.ac.nz/econ/research/discussionpapers/DP0211.pdf>, forthcoming in *Journal of Sports Economics*, 2004
- Richardson, Len, "The Invention of a National Game: The Struggle for Control," *History Now* 1, June 1995, 1-8
- Szymanski, Stefan, "The Economic Design of Sporting Contests: A Review," *Journal of Economic Literature* 41, December 2003
- Thomas, Dennis, "The Rugby Revolution: New Horizons or False Dawn?" *Economic Affairs* 17 (3), Sept. 1997, 19-24