

DEPARTMENT OF ECONOMICS

ISSN 1441-5429

DISCUSSION PAPER 02/05

**COMPARING COMPETITIVE BALANCE IN AUSTRALIAN SPORTS LEAGUES, THE AFL, NBL
AND NRL: DOES THE AFL'S TEAM SALARY CAP AND PLAYER DRAFT MEASURE UP?**

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ABSTRACT

In the period following the introduction by the Australian Football League (AFL) of the team salary cap in 1985 and the player draft at the end of 1986, within-season competitive balance (measured by the seasonal distribution of team win percents) has increased. This paper continues the investigation into whether the improvement in competitive balance in the AFL can be attributed to these labour market changes by examining competitive balance outcomes and labour market changes in two other Australian sports leagues, the National Basketball League (NBL) and the National Rugby League (NRL).

The measurement of competitive balance in this paper is extended to include a simple measure of between-season competitive balance, namely the distribution of championships/premierships amongst teams/clubs. The evidence suggests that since 1985 within-season competitive balance (measured by ASD/ISD ratios) has increased slightly in all three leagues, and both pre- and post-1985 the NRL has been the most balanced and the NBL the least balanced. The distribution of championships/premierships is, in general, also more even in the period post-1985 period in all three leagues.

The most significant labour market change in both the NBL and the NRL post-1985 is their adoption of a team salary cap. Thus, the evidence on competitive balance is not inconsistent with

the view that the introduction of a team salary cap (at least) in all three leagues has improved competitive balance since 1985.

However, since 1985 there has also been net expansion in the number of clubs/teams in all three leagues, and a considerable turnover in both the NBL and the NRL, but not the AFL. The expansion and contraction of the leagues is compared with changes in their competitive balance, leading to the conclusion that the number and, in particular, the location of teams/clubs is also likely to have been another major influence on competitive balance.

Keywords: Australian sports leagues; Australian Football League (AFL); National Basketball League (NBL); National Rugby League (NRL); competitive balance; player draft; salary cap.

JEL Classification: L83

COMPARING COMPETITIVE BALANCE IN AUSTRALIAN SPORTS LEAGUES, THE AFL, NBL AND NRL: DOES THE AFL'S TEAM SALARY CAP AND PLAYER DRAFT MEASURE UP?

The aim of this article is to examine further the argument that the AFL's (Australian Football League) introduction of a team salary cap in 1985 and the player draft after the 1986 season has helped to increase competitive balance. Booth (2000, 2003, 2004a, 2004b, 2004c & 2005 forthcoming) argues the theoretical case that a player draft and team salary cap (combined with revenue sharing) in a league comprised of win-maximising clubs (such as the AFL) can increase competitive balance.

In earlier work, Booth (2000, 2004a & 2004c) traced the history of labour market devices (and revenue sharing arrangements) in the AFL and found using some simple measures of competitive balance that the competition was more even in the post-1985 team salary cap/player draft cap period than in earlier periods with different labour market devices in use. Thus, this evidence of competitive balance in the AFL is not inconsistent with Booth's theoretical argument that the introduction of the team salary cap and player draft has improved competitive balance in the AFL. Booth (2000 & 2004a) also made comparisons of the AFL with major professional sports leagues in the US, the American League (AL) and the National League (NL) in Major League Baseball (MLB), the National Basketball Association (NBA) and the National Football League (NFL). Between 1970 and 2000, MLB had a similar level of competitive balance to the AFL, the NFL had the highest level of competitive balance and the most uneven competition was the NBA. During this period, all three US leagues had player drafts (with varying degrees of free agency), but only the NFL (since 1993) and the NBA (since the early 1980s) had team salary caps, though the NBA's was a so-called 'soft' cap. In the absence of local TV revenue and the sharing of most revenues including national TV revenue, the NFL had the least revenue variation amongst teams. The largest variation in team revenues occurred in MLB where local TV revenues dominated, but were not shared.

To try to determine whether the AFL's team salary cap/player draft system has been a contributing factor to increased competitive balance, this article extends the earlier comparison with US leagues to levels of competitive balance in, and features of, the AFL and two other Australian leagues, the National Basketball League (NBL) and the National Rugby League (NRL) over the twenty-five year period 1970-2004, or from 1979 in the case of the NBL, the year of its formation. The AFL grew out of the former Victorian Football League (VFL) formed in 1897, adopting the AFL name from 1990. Similarly, the NRL grew out of the former New South Wales Rugby League (NSWRL) formed in 1908, which was renamed the Australian Rugby League (ARL) between 1995

and 1997 (and which faced a rival league, Super League, in 1997), before the two leagues merged as the NRL from 1998.

We begin by summarising the key features of the AFL which are thought to be relevant for competitive balance outcomes, including the history of club composition of the league, the member-ownership and the win-maximising objectives (subject to a budget constraint) of clubs, the goals of the league and the background to the introduction of the team salary cap and player draft. To bring the discussion up to date since Booth (2004a), we first outline the major changes to the labour market devices (and revenue sharing arrangements) used to even up the distribution of player talent since 2001.

The debate over how best to measure competitive balance is discussed. Measurement typically involves two aspects: within-season competitive balance (which focuses on the relative quality of teams in a season), and between-season competitive balance (which focuses on the relative quality of teams over a number of seasons). The merits of various measures are canvassed before settling on two relatively simple measures, the distribution of season win percents as our measure of within-season competitive balance and the distribution of premierships/championships as our measure of between-season competitive balance.

Using these two measures, competitive balance in the AFL is measured and compared between two different periods, the 15-year period 1970-1984 and the 20-year period 1985-2004, the latter period coinciding with the introduction of the team salary cap (followed by the national player draft at the end of 1986) in the AFL. A discussion of possible explanations of competitive balance outcomes in the two different periods in the AFL then follows, including the introduction of the team salary cap and player draft, and also the number and location of clubs which authors such as (Fort, 2003) and Sanderson and Siegfried (2003) have argued are likely to have had an important influence on competitive balance outcomes in US sports leagues.

Competitive balance outcomes in each of the two periods in the NBL are then examined and an attempt made to explain these outcomes in terms of both changes in the players' labour market and in the number and location of teams. The exercise is replicated for the NRL, which then allows us to make some comparisons between outcomes in the AFL, the NBL and the NRL and draw some conclusions about the relative importance of the players' labour market and the number and location of teams in influencing competitive balance outcomes. The article concludes by making some suggestions for future research into competitive balance in Australian sports leagues.

HISTORY OF AFL CLUBS

The Victorian Football League (VFL), known as the Australian Football League (AFL) since 1990, began in 1897 with eight former Victorian Football Association (VFA) clubs: Carlton; Collingwood; Essendon; Fitzroy; Geelong; Melbourne; St. Kilda and South Melbourne. Seven of these clubs were based in the Melbourne metropolitan area with Geelong located about 75 kilometres south west of Melbourne. Richmond and (Melbourne) University were admitted in 1908, but University disbanded before the start of the 1915 season. During World War One the number of clubs fell to four in 1916, increased to six in 1917, eight in 1918 and nine in 1919. In 1925, Footscray, Hawthorn and North Melbourne joined to make a twelve-team competition that continued until 1987 (except for Geelong's withdrawal during World War Two in 1942 and 1943), though South Melbourne moved to Sydney for the 1982 season and became Sydney (Swans) in 1983. Though strong state-based football competitions had long existed in Adelaide (the South Australian National Football League; SANFL) and Perth, (the West Australian Football League; WAFL), it was the VFL which expanded nationally with the inclusion of the Brisbane Bears and the Perth-based West Coast (Eagles) in 1987, Adelaide in 1991 and Fremantle in 1995 making a league of 16 teams. In 1997 Port Adelaide joined the AFL, and the formation of the Brisbane Lions as a merger of the Brisbane Bears and Fitzroy kept the number of clubs at sixteen. In addition, two Victorian clubs have changed trading names in an attempt to become more attractive to (national) fans and corporate sponsors. Footscray began trading as the Western Bulldogs in 1997 and North Melbourne as the Kangaroos in 1999.

OWNERSHIP OF AFL CLUBS

The nature of club ownership in the AFL varies, and in general is vastly different from the privately owned franchises/teams typical of the US and Europe or the publicly (shareholder)-owned clubs often found in Europe. Most clubs in the history of the AFL have been and are member-owned (now typically companies 'limited by guarantee') with club members typically electing the Board of Directors, who appoint professional managers to run the club. Until 1987, all Victorian-based clubs were member-owned. North Melbourne (the Kangaroos) became shareholder-owned in 1987. From the mid 1980s to the early 1990s, both Sydney and Brisbane each went through a short period of private ownership. Brisbane has now reverted to a traditional member-owned club, whilst the Sydney licence is AFL-owned with its Board approved by the AFL. The two clubs in Adelaide, South Australia (Adelaide and Port Adelaide) and the two clubs in Perth, Western Australia (West Coast and Fremantle) are owned by their respective state football Commissions that also manage football in those two states, including the SANFL and WAFL competitions (Booth, 2000, 2004a & 2005 forthcoming).

OBJECTIVES OF AFL CLUBS

The overriding goal of AFL clubs is winning and team success. In analysing the objectives of VFL clubs in the early 1970s, Dabscheck (1975) found that club officials' "... major objective is to see their football team win as many premierships as possible." (p. 178). In the mid 1980s Stewart (1984) concurs, arguing that "profits are seen as a secondary goal: a premiership is ranked more highly than an operating surplus." (p. 7). The authors also found that clubs were prepared to go into debt to achieve playing success.

More recently, Shilbury (1994) in a study of the strategic planning practices of AFL clubs finds that financial trading performance and on-field performance are the two most important aspects of football club management. Shilbury (1994) describes this as "the utility maximising effect of voluntary administration by the president and board of directors" (p. 257).

OBJECTIVES AND GOVERNANCE OF THE AFL

In its role as "manager of the national competition and keeper of the code" (Australian Football League, 2002, p. 4), the AFL has four objectives which it sees as fundamental to the game's long-term future so as to ensure the AFL retains its position as a leader in Australian sport.

The AFL's four objectives are: "to effectively manage the national competition to ensure it is the most successful national elite sports competition for the benefit of our stakeholders – our AFL clubs, the players and the public; to promote public interest in the game by building the strongest consumer brand in Australian sport; to promote high levels of player participation in well-managed programs at all levels of community football to ensure Australian Football is the pre-eminent national football code; and to maximise the economic benefits of Australian Football to our member clubs, our players, the supporters, the football fraternity and the community at large" (Australian Football League, 2002, pp. 6-13).

The development of the national league was made easier by significant changes to the governance of the league. Both Dabscheck (1973) and Stewart (1984) discuss the organisational structure of the VFL during the 1970s and early 1980s. At this time, the League was run by a Board of Directors, comprised of one Director from each of the 12 clubs. However, with clubs intent on pursuing policies in their own self-interest, the so-called 'delegate' system seemed incapable of making decisions to solve both the competitive and financial difficulties of the 1980s.

In 1983, the VFL's player rules were declared void as a common law restraint of trade (Dabscheck, 1984). In addition, in the eighteen years of football between 1967 and 1984, the premiership was shared between only five of the twelve VFL clubs. Fifteen of these eighteen premierships were

shared between just three clubs; Carlton won six premierships in this period, Richmond five and Hawthorn 4, with North Melbourne winning two and Essendon one. By this simple measure alone, it was evident that the VFL competition over this period was decidedly uneven. Moreover, by the middle of the 1980s the VFL was in serious financial trouble. The competition was incurring heavy losses, and a group of the stronger VFL clubs were planning a breakaway to form a national competition (Australian Football League, 1994, p. 1; Linnell 1995, Ch.2).

In December 1985, the VFL Board of Directors resolved to appoint a Commission with specific powers to administer the competition, but with the Board (and therefore the clubs) still exercising ultimate control. In July 1993, the transformation of the AFL's corporate governance structure was completed with the Board of Directors' approval of the recommendations of the *Crawford Report*. The *Crawford Report* recommended that all powers to run the AFL competition be transferred to the AFL Commission comprised of up to eight commissioners, a Chairman and a Chief Executive Officer (but with limited powers with respect to the admission, re-location and merger of clubs and also limited powers with respect to the expulsion of a club) and the AFL Board of Directors be abolished (Australian Football League, 2003a, p. 780).

FINANCIAL AND PLAYING EQUALISATION (POST 2001) IN THE AFL

From the formation of the VFL in 1897, Booth (1997, 2000 & 2004a) identifies six different periods (seen in Figure 1 and Table 3) comprising various combinations of different labour market devices and revenue sharing rules used by the league to try to improve competitive balance. Booth (1997) discusses the devices and rules used until the end of 1996. Booth (2000) contains a more detailed discussion than Booth (1997) and includes changes made between 1997 and 2000. Booth (2004a) provides a brief overview of the history of devices and rules identified in Booth (2000). In this section, the discussion of the most recent period Booth identifies (period 6, beginning in 1985) is expanded to include significant changes made between 2001 and 2004, thereby bringing up-to-date the discussion of the period 1985-2004.

To support the 16-team competition, a Special Assistance Fund (subject to various terms and conditions) to assist clubs in difficulty was announced in November 2001. The Western Bulldogs received \$1m in both 2002 and 2003 and the Kangaroos received \$1m in 2003.

After broadcasting football for 45 years since 1957 (except for ABC TV in 1987), a new consortium of the Nine (free-to-air), Ten (free-to-air) and Foxtel (pay) networks secured the national TV rights ahead of the Seven network for 2002-2006 for an estimated \$500m (Macdonald & Borland, 2004, pp. 310-311). The major change in the players' labour market for 2002 was the reduction of the minimum team salary to 92.5% of the total player payments cap (TPPC).

A Competitive Balance Fund (CBF) providing up to \$5m per club over a three-year period 2004-2006 (to coincide with the end of the current national TV broadcast agreement) was agreed to in 2003. The Western Bulldogs received \$1.5m and the Kangaroos \$1m in 2004 from the CBF (Stevens, 2003, p. 126). The eligibility requirement for listing a player under the father-son rule was increased in 2003 to 100 VFL/AFL games (with interstate equivalents) after being 50 for around a decade, and 20 even earlier (Australian Football League, 2003b). A new CBA was agreed to for the period 2004-2008 which features a moderate 3% growth in the TPPC in both 2004 and 2005, no growth in 2006 and to be negotiated for 2007 and 2008. Minimum senior list sizes come into effect from 2004, 37 in 2004 and 38 in 2005 and 2006 while the maximum senior list (which can now include any number of veterans, rather than the previous two) remains at 40. The total player list including (up to 6) rookies cannot exceed 44 (Australian Football League, 2003b). During 2003, the AFL announced the future phasing out of the 15% cap loading (for higher cost of living) to Sydney and the 10% loading (to help retain players in the non-traditional Australian football state) to Brisbane (Australian Associated Press, 2003b, p. 45) and their replacement with more general allowances depending on a club's number of interstate players (Australian Associated Press, 2003a, p. 36). In 2004, Melbourne applied for \$1.5m in 2004 and \$5m over four years from the CBF (Sheahan, 2004, p. 43).

In summary, the most recent period 1985-2004 roughly coincides with the term of the Commission, during which the AFL has pursued a policy of 'financial and playing equalisation' to improve competitive balance. A team salary cap and national player draft have been the major devices used to influence the distribution of player talent, complemented by the continued use of various revenue sharing rules designed to make clubs' revenues more equal.

COMPETITIVE BALANCE AND ITS MEASUREMENT

Before measuring competitive balance in the AFL, the NBL and the NRL, the concept of competitive balance and the issues involved in its measurement need to be discussed. Fort & Maxcy (2003) identify two distinct lines in the empirical literature on competitive balance. The first is the analysis of competitive balance (ACB) literature which "is interested in measuring the behaviour of competitive balance over time especially relative to changes in business approaches of pro sports leagues" (p. 159), and the other is the uncertainty of outcome hypothesis (UOH) literature which "is interested in the effect of competitive balance on fan welfare" (p. 159). The discussion in this article falls into the first category, the measurement of competitive balance in different leagues and an attempt to understand why there are differences in competitive balance between leagues.

As guest editor on a symposium in the *Journal of Sports Economics* on competitive balance in sports leagues, Zimbalist (2002) suggests, “there are almost as many ways to measure competitive balance as there are to quantify the money supply” (p. 112). Some of the more commonly used measures are listed in Table 1 and discussed in this section. These measures of competitive balance have various strengths and weaknesses which are discussed in detail by authors such as Eckard (1998, 2001a, 2001b & 2003), Humphreys (2002, 2003a & 2003b), Utt and Fort (2002), Fort and Maxcy (2003), Zimbalist (2003), Kahane (2003) and Leeds and von Allmen (2005).

The debate over how best to measure competitive balance involves two aspects. One aspect sports economists have tried to measure is so-called within-season competitive balance (which focuses on the relative quality of teams in a season). The other aspect is between-season competitive balance (which focuses on the relative quality of teams over a number of seasons).

Most measures of within-season competitive balance focus on the distribution of team’s season winning percentages, usually the (actual) standard deviation (ASD) of the distribution of win percents, and sometimes their range. In this article we follow the recommendation of Utt and Fort (2002) to continue to use “the tried and true standard deviation of winning percentages (and their idealized values) for within-season competitive balance of winning percentages” (p. 373). Following the approach suggested by Noll (1998) and first applied by Scully (1989), this measure has been used in the US by Quirk and Fort (1992), Vrooman (1995), Berri (2001) and others to compare the closeness of competition within seasons. A ratio is calculated which compares the actual performance of the league, with the performance the league would have achieved if all teams were of equal playing strength by measuring the dispersion of teams’ win percents over a season relative to the idealised dispersion when all teams are assumed to have equal playing strengths. The less is the deviation of the actual league performance from the ideal league, the greater is the degree of competitive balance.

In a league of teams with equal playing strength, the probability of winning any game is .5. The value of the idealised standard deviation (ISD) depends on the number of games (rounds) in a league season. Quirk and Fort (1992) point out that it follows from the properties of a binomial distribution that the value of the ISD for the season-long win percent is equal to $(.5)/\sqrt{N}$, where N is the number of league games (rounds) in a season. For example, the ISD for the 22-game AFL season is $(.5)/\sqrt{22}$ which equals 0.1066. The ratio for each year can be calculated by dividing the actual standard deviation (ASD) by the idealised standard deviation (ISD). The lower is the ASD/ISD ratio the more within-season competitive balance there is in the league.

The problem with relying solely on the ASD/ISD ratio is that this measure of (within-season) competitive balance is unable to capture changes in league standings (or win percents) of teams over time, that is, between-season competitive balance. For example, a league could have the same ASD/ISD ratio in two different years either with or without changes in individual team win percents (and ladder positions). In such cases, the constant ASD/ISD ratio would not capture the change in relative win percents (and ladder positions) from season to season, so-called between-season competitive balance.

Sports economists such as Eckard (1998, 2001a, 2001b & 2003) and Humphreys (2002, 2003a & 2003b) discuss the merits of various measures designed to capture changes in relative standings of teams over time. These include the analysis of variance (ANOVA) of all annual team win percents over time. However, according to Eckard (2001a), these measures have more stringent data requirements, in particular, "that the league should consist of the same teams throughout the period and each team should play an equal number of games against each other team" (p. 215) which, as we shall see has not been the case in the AFL, NBL and NRL in the period under examination. Herfindahl-Hirschman Indexes can be used to measure concentrations of teams in certain positions, such as the top and bottom four, but as Eckard (2001a) notes these indexes need to exclude new (expansion) teams.

The complexity involved in measuring competitive balance is perhaps best summed up by Zimbalist (2003) who suggests that "in the end, it may be that the best measure of competitive balance is a multi-variate index, that is nonlinear or constrained, and/or that it differs league by league. In the meantime, in order to make some simple comparisons between the leagues, we will use the ASD/ISD ratio as our measure of within-season competitive balance, and the distribution of premierships/championships as our measure of between-season competitive balance.

MEASURING COMPETITIVE BALANCE IN THE AFL

Looking first at within-season competitive balance, Table 2 and Figure 1 show the ASD/ISD ratios for the AFL based on the teams' win percent data for the home and away seasons between 1897 and 2004. For example, the ASD/ISD ratio for the AFL in 2004 is equal to the ASD (0.1881)/ISD (0.1066), that is, 1.7645. Unevenness of competition peaked in the early 1980s with 1981 and 1982 having the highest ASD/ISD ratios ever in the AFL. Given the prevalence of the payment of transfer fees and interstate recruiting at this time, the AFL was concerned not only about an uneven competition but also the financial health of some of the clubs. This led the Commission to re-emphasize 'financial and playing equalisation' between the clubs and to introduce the team salary cap and then the national player draft (Booth, 2000, 2004a & 2004c).

Table 3 shows the average ASD/ISD ratios for the six different periods identified. The average ASD/ISD ratio over the whole history of the VFL/AFL (1897-2004) is 1.8282. Of the six periods, the most uneven period of competition on this measure is free agency in period 1 (1897-1914), which has the highest average ratio of 1.9520, whereas period 6 (1985-2004) with the team salary cap and player draft is the most even period of competition, recording the lowest average ratio (1.7106) of any period. For purposes of later comparison with the NBL and the NRL, the average ASD/ISD ratio in the AFL for the period 1970-1984 is 1.886, slightly higher than for the period 1985-2004 (1.711). Moreover, in only seven of the 35 seasons between 1970 and 2004 was the ASD/ISD ratio above 2.0 in the AFL, and all but one of these (1985) was in the period 1970-1984. Four of these observations above 2.0 were in succession (1979-1982) and two other observations were also in succession (1979 and 1980). Thus, the evidence on average ASD/ISD ratios and the levels in individual seasons suggests that there was more within-season competitive balance in the AFL in the period 1985-2004 than in the period 1970-1984. For purposes of comparison later with competitive balance in the NBL and NRL, the average ASD/ISD ratios (and other competitive balance information) for all three leagues is summarised in Table 8 for the period 1970-1984 (1979-1984 for the NBL) and for the period (1985-2004) in Table 9.

Our simple measure of between-season variation is the distribution of league premierships between teams over time. Table 5 shows the premiers and number of teams in the AFL from 1970-2004, and a summary of the distribution of premierships/championships for all three leagues for the two periods being is also shown in Table 8 and Table 9. During the period 1970-1984, the 15 premierships were shared between only 5 of the twelve clubs: Carlton won the flag five times (1970, 1972, 1979, 1981 and 1982), Hawthorn won 4 times (1971, 1976, 1978 and 1983), Richmond (1973, 1974 and 1980) three times, and North Melbourne (1975, 1977) twice with Essendon winning the last in premiership in 1984. Both Carlton and Richmond won two premierships in succession, and the distribution of premierships among 5 of the twelve clubs over the 15-year period 1970-1984 was 5-4-3-2-1.

In period 6 (1985-2004) the 20 premierships were shared between 9 of the clubs, which as discussed earlier, increased from 12 to 14 in 1987, to 15 in 1991 and to 16 between 1995 and 2004 (for an average of 15 clubs over this period). Hawthorn won 4 flags (1986, 1988, 1989 and 1991), the Brisbane Lions (2001, 2002 and 2003) and Essendon (1984, 1993 and 2000) three, Carlton (1987, 1995), West Coast (1992, 1994), North Melbourne/Kangaroos (1996 as North Melbourne, 1999 as Kangaroos) and Adelaide (1997, 1998) each won 2 flags and Collingwood (1990) and Port Adelaide (2004) won one premiership each, for a distribution of 4-3-3-2-2-2-1-1. As in the earlier period, two clubs (Hawthorn and Adelaide) each won two premierships in succession whilst Brisbane's three premierships were in successive years. It is worth noting that in

none of its premierships years was Brisbane 'minor premiers' (most wins at the end of the home and away season). Moreover, Port Adelaide was 'minor premiers' three years in succession, 2002 to 2004, before winning its inaugural flag in 2004. With more than half (9 clubs from an average of fifteen) of AFL clubs winning premierships between 1985 and 2004 compared with less than half (5 different clubs from an average of twelve) between 1970 and 1984, and a more even spread of premierships amongst the clubs between 1985-2004, we conclude that, on this measure, between-season competitive has been higher in the later period.

To summarise, on the basis of our two measures of competitive balance, the ASD/ISD ratio and the distribution of premierships, the AFL has had higher levels of competitive balance since 1985.

EXPLAINING COMPETITIVE BALANCE IN THE AFL

There is a body of literature which suggests that, *ceteris paribus*, under free agency, a league comprised of win-maximising clubs is likely to have less competitive balance than a league comprised of profit maximising teams because of different incentives to acquire player talent (Booth, 2000, 2003, 2004a, 2004b, 2004c & 2005, Késenne 1996, 2000 & 2001 and Fort, 2004). More particularly, Booth (2000, 2004c) argues that in the AFL, a league comprised of member-owned win-maximising clubs, the team salary cap and player draft tend to reinforce one another, since a player cannot be drafted unless it can be demonstrated to the AFL that his anticipated salary can be fitted under the team salary cap. Whilst cash sales of player contracts are not permitted in the AFL, the trade of players/draft selections can partially undo the effects of the player draft. However, if the player draft is combined with a 'hard' and enforceable team salary cap and teams have the revenue to actually pay the team salary cap, there appears little incentive for a win-maximising club to trade away (net) player talent. Nor are there any financial incentives for (net) player talent to change clubs (Booth, 2000 & 2004b).

Club revenues have typically been large enough to allow even those with the lowest revenues to pay the team salary cap. If not for 50-50 gate revenue sharing over the years and league-revenue sharing of key income streams from national broadcast rights, corporate sponsorship and finals, the revenues of the smaller clubs might not have been sufficient to pay the team salary cap. Financially-embattled Fitzroy was an exception and was merged with Brisbane at the end of 1996. Whilst there is agreement that revenue sharing arrangements in general have no impact on competitive balance in a league of profit-maximising clubs, revenue sharing can improve competitive balance in a league of win-maximising clubs (Booth 2000, 2003 & 2004c; Késenne 1996, 2000 & 2001). In any case, 50-50 gate sharing was abandoned from 2000 in favour of the home team keeping the net gate receipts (after deduction of match expenses).

The team salary cap has been strongly enforced in recent years with Essendon and Melbourne in 1999, Fremantle in 2001 and Carlton in 2002 having all incurred large fines and national draft selection losses following team salary cap breaches.

In conclusion, the evidence is not inconsistent with the view that in the AFL, a league comprised of win-maximising clubs, the player draft, team salary cap and revenue sharing have all played their part in helping to achieve higher levels of competitive balance (Booth, 2000 & 2004c).

Perhaps the major problem with concluding that changes in the players' labour market (and in revenue sharing) have improved competitive balance is that over the period in question there have also been changes in the location and number of teams which may have also affected competitive balance. Sanderson and Siegfried (2003) and Fort (2003) discuss this (and other issues) affecting competitive balance. It might be that competitive balance in the AFL since 1985 has also increased as a result of the move of another financially-embattled club, South Melbourne, to the large but non-traditional football market of Sydney in 1982, and the introduction of a new (expansion) team into another large but non-traditional football market of Brisbane in 1987, as well as further expansion later into the smaller but traditionally stronger football markets in Perth and Adelaide.

In the AFL, the member-owned nature of clubs could be a major factor inhibiting a merger and/or relocation to a more viable market and thus a more competitively balanced league. On the other hand, this ownership structure may have some advantages in building 'brand loyalty' and the league might be more willing to give financial support to a member-owned club than a privately-owned team.

Both the Sydney and Brisbane clubs went through short periods of unprofitable private ownership (Booth, 2004a) and neither team had immediate playing success. South Melbourne moved to Sydney in 1982, but it wasn't until 1986, 1987, 1988 and 1989 that the Swans won 50 percent or more than half of their games. This was followed by another lean spell between 1990 and 1995 until procuring a Grand Final spot in 1996 after which the Swans won more than 50 percent of their games every year except in 2000 and 2002. Though it wasn't until 1995 that Brisbane first won more than half of its games, the subsequent merger with Fitzroy in 1997 both removed a relatively-uncompetitive team (Fitzroy won more than half its games only once in the 7 seasons between 1990 and 1996, in 1993), and provided the impetus for the Brisbane Lions to achieve win percents above .50 consistently from 1999 to 2004, culminating in three premierships in a row from 2001-2003 and a Grand Final spot in 2004. The introduction of two new teams in both Perth (West Coast in 1987 and Fremantle in 1995) and Adelaide (Adelaide in 1991 and Port Adelaide in 1997) in cities which were strong supporters of Australian football increased competition for the traditional

Victorian-based clubs. These four clubs have large membership bases and revenue streams and three of the four clubs have achieved playing success relatively quickly; West Coast winning premierships in 1992 and 1994, Adelaide in 1997 and 1998 and Port Adelaide in 2004. Only Fremantle is yet to win a premiership.

When we include Brisbane's three flags (2001, 2002 and 2003), expansion teams have won eight of the 13 premierships between 1992 and 2004. For purposes of comparison with other leagues later, since 1985, excluding the relocation of South Melbourne to Sydney, there have been 5 expansion teams (Brisbane, West Coast, Adelaide, Fremantle and Port Adelaide) in the AFL (one of which, Brisbane, was subsequently made stronger with a merger), and of the 20 premierships contested since 1985, 8 have been won by these expansion teams (Table 9).

MEASURING COMPETITIVE BALANCE IN THE NBL

The NBL is a relatively new competition, having begun in 1979, making us unable to compare the NBL's performance with the AFL and NRL back to 1970. However, Table 4 and Figure 2 reveal that in seven of the nine years between 1982 and 1990 (including four years in succession, 1982-1985), ASD/ISD ratios are above 2.0, and the ratios are higher than in both the AFL and the NRL in every year between 1983 and 1990. From these high ratios in the 1980s, there has been a long downward trend apart from spikes in 1994 (2.137), 2000 (2.424) and 2001 (2.674). As shown in Tables 8 and 9, the average ASD/ISD ratio is lower for the 20-year period 1985-2004 (1.887) than for the earlier 6-year period 1979-1984 (1.981), and in both periods is higher than for the AFL, 1.711 (1985-2004) and 1.886 (1970-1984).

The list of NBL champions and the number of competing teams in the NBL between 1979 and 2004 is shown in Table 6. Four of an average 13.5 teams NBL teams won championships during this six year period (Table 8). The St Kilda Saints (1979, 1980) and the Canberra Cannons (1983, 1984) each won two successive championships with Launceston Casino City (1981) and West Adelaide Bearcats (1982) the other championship winners.

The twenty championships over the period 1985-2004 have been shared between 9 different teams (Table 9), the same number of teams as for the AFL over the same period; though the average number of teams in the NBL (12.7) was lower than in the AFL (15). The Adelaide 36ers (1986, 1998, 1999 and 2002) and the Perth Wildcats each won four times (1990, 1991, 1995 and 2000) and each two years in succession, the Brisbane Bullets (1985, 1987), the North Melbourne Giants (1989, 1994), South East Melbourne Magic (1992, 1996) and the Melbourne Tigers (1993, 1997) twice, and the Sydney Kings (2003, 2004) also twice but in succession, whilst the Canberra Cannons (1988) and the Wollongong Hawks (2001) each have won once.

Table 8 and Table 9 summarise this and other competitive balance measures for the NBL and also the AFL and NRL for the two periods. For the period 1985-2004, the 4-4-2-2-2-2-2-1-1 distribution of NBL championships between 9 of an average of 12.7 teams, compares not unfavourably with the earlier (admittedly short) 6-year period distribution (2-2-1-1) amongst only 4 of the average 13.5 teams in the NBL between 1979 and 1984. The NBL's 1985-2004 distribution is not dissimilar to that in the AFL, where the distribution was 4-3-3-2-2-2-2-1-1 (between 9 of an average of 15 teams). Between 1985 and 2004, three teams won championships in succession in the NBL, similar to the AFL where two teams won premierships in succession and one team, Brisbane, won three in a row.

In summary, looking at the ASD/ISD ratios and the distribution of premierships, competitive balance has improved in the NBL in the latter period, as it did in the AFL and is not too dissimilar from levels of competitive balance in the AFL since 1985.

EXPLAINING COMPETITIVE BALANCE IN THE NBL

For comparative purposes, it is worth noting that in the early years NBL clubs were non-profit organisations whereas now the majority are privately owned. National television broadcasting rights and sponsorship revenue is distributed equally, but gate revenue and local broadcasting revenue is not shared in the NBL.

One possible explanation for an improvement in competitive balance in the NBL is the introduction of a team salary cap and a limit on 'imported' players. According to Macdonald and Borland (2004), a team salary cap was first introduced in the NBL in the 1989 season, though its significance as a device to improve competitive balance is downplayed by the authors who suggest that not only did the NBL not have the resources to effectively police the cap but also that many clubs did not have the financial resources to meet the rising value of the team salary cap. The other feature of the NBL's player labour market which might have had an impact on competitive balance has been the 'two-import rule'. Since 1990, this rule has limited a club to two players who are ineligible to represent the Australian national team.

The problem of determining what might have caused competitive balance to improve in the NBL is also made more difficult by changes in the number and location of teams in the league. Unlike the AFL, the NBL has not only included expansion teams, but has seen many teams excluded. The exclusion of teams in small revenue markets could improve competitive balance, especially if they had problems generating the revenue to pay the team salary cap. Likewise, the inclusion of more teams in large revenue markets could also improve competitive balance, by increasing the number of well-performing teams.

Using data compiled from Macdonald and Borland (2005 forthcoming), we first describe in some detail the changes in the number and location of NBL teams over time in order identify new teams to the league (expansion teams) and teams which have left the league (so-called 'contraction' teams), before discussing some examples of the possible effects of these changes on competitive balance.

The NBL was formed in 1979 with 10 teams, two each in Adelaide (Glenelg Tigers and West Adelaide Bearcats), Melbourne (Nunawading/Eastside Spectres and St Kilda/Westside/Southern Melbourne Saints) and Sydney (Bankstown Bruins/West Sydney Westars and Sydney Astronauts/Supersonics) and one each from Brisbane (Brisbane Bullets), Canberra (Canberra Cannons), Newcastle (Newcastle Falcons) and Wollongong (Illawarra/Wollongong Hawks). In 1980 and 1981, there were 12 teams in the NBL following the addition of Launceston Casino City, Coburg/North Melbourne Giants and West Torrens/Forrestville Eagles and the loss of Glenelg Tigers. The number increased to 14 in 1982 with the addition of Geelong Supercats, Perth Wildcats and Adelaide City Eagles/Adelaide 36ers, and West Torrens/Forrestville Eagles dropping out. In 1983 a two-conference format operated, each of 8 teams. Launceston Casino City left, whilst Devonport Warriors and Frankston Bears entered the East conference and Hobart Tassie Devils joined the West conference. In 1984, the two-conference format continued, Devonport Warriors left the East for the West, Bankstown Bruins/West Sydney Westars moved from West to East, leaving the West unchanged with 8 teams, and Melbourne Tigers entered the East to make a conference of 9 teams. The NBL returned to one division between 1985 and 1987 comprised of 14 teams following the departure of Devonport Warriors, Frankston Bears and West Adelaide Bearcats. In 1988, Bankstown Bruins/West Sydney Westars and Sydney Astronauts/Supersonics left, and Sydney Kings entered for a 13-team competition which was unchanged in 1989. The inclusion of Gold Coast Cougars/Rollers made a 14-team competition in both 1990 and 1991. In 1992, Nunawading/Eastside Spectres and St Kilda/Westside/Southern Melbourne Saints left to be replaced by South East Melbourne Magic for a 13-team competition. The inclusion of Townsville Suns/Crocodiles in 1993 made the NBL a 14-team competition until 1996, but in 1997 Geelong Supercats, Gold Coast Cougars/Rollers and Hobart Tassie Devils dropped out for an 11-team league in both 1997 and 1998. Following the regular winter season in 1998, the NBL switched to a summer season and the 1998-1999 makeup of the 11 teams changed when Coburg/North Melbourne Giants and South East Melbourne Magic departed for Victoria Titans/Giants and West Sydney Razorbacks. In 1999-2000, Cairns Taipans took the place of Newcastle Falcons and this 11-team combination was stable until the end of 2002-2003. In 2003-04, Canberra Cannons left and Hunter Pirates and New Zealand Breakers were included for a 12-team competition.

To summarise, in the period 1979-1984 there were 10 expansion teams and 6 contraction teams in the NBL (Table 8). The league began with 10 teams in 1979 and started the 1985 season with 14 teams. During the period the 10 expansion teams were: Launceston Casino City, Coburg/North Melbourne Giants and West Torrens/Forrestville Eagles (1980), Geelong Supercats, Perth Wildcats and Adelaide City Eagles/Adelaide 36ers (1982), Devonport Warriors, Frankston Bears and Hobart Tassie Devils (1983), and Melbourne Tigers (1984). The 6 contraction teams were Glenelg Tigers (after 1979), West Torrens/Forrestville Eagles (after 1981), Launceston Casino City (after 1982), and Devonport Warriors, Frankston Bears and West Adelaide Bearcats (after 1984).

In the period 1985-2004, there were 9 expansion teams and 11 contraction teams in the NBL (Table 9). There were 14 teams from 1985, and the league comprised 12 teams in 2004. The 9 expansion teams were Sydney Kings (1988), Gold Coast Cougars/Rollers (1990), South East Melbourne Magic (1992), Townsville Suns/Crocodiles (1993), Victoria Titans/Giants and West Sydney Razorbacks (1999), Cairns Taipans (2000), and Hunter Pirates and New Zealand Breakers (2004). The 11 contraction teams were Bankstown Bruins/West Sydney Westars and Sydney Astronauts/Supersonics (after 1987), Nunawading/Eastside Spectres and St Kilda/Westside/Southern Melbourne Saints (after 1991), Geelong Supercats, Gold Coast Cougars/Rollers and Hobart Tassie Devils (after 1996), Coburg/North Melbourne Giants and South East Melbourne Magic (after 1998), Newcastle Falcons (after 1988-1989), and Canberra Cannons (after 2002-2003).

One possible example of the effect of the number and/or location of teams on competitive balance occurred in 1980 with the inclusion of Launceston Casino City, Coburg/North Melbourne Giants and West Torrens/Forrestville Eagles. This coincided with the ASD/ISD ratio dropping from 1.931 in 1979 to 1.414 by 1981, and Launceston Casino City winning the championship in 1981. A contrary example, however, occurred in 1982 following the inclusion the initially very strong-performing Geelong Supercats, the weak Perth Wildcats and moderately-performed Adelaide City Eagles/Adelaide 36ers, and the exclusion of the poorly-performed West Torrens/Forrestville Eagles: a (net) expansion of two teams which saw the ASD/ISD ratio jump to 2.273. Moreover, further (net) expansion of two more teams in 1983 and another in 1984 did nothing to reduce the ratio below 2.0. Following the relatively stable 13 or 14 one-division competition between 1985 and 1996, another major change occurred in 1997 when three relatively small-revenue market teams in Hobart, Geelong and the Gold Coast were excluded, and the ASD/ISD ratio dropped from 1.815 in 1996 to 1.401 in 1997, 1.670 in 1998 and 1.282 in 1999, though the Adelaide 36ers did win successive championships in 1998 and 1999.

In general, expansion teams have not been as successful in winning championships in the NBL as expansion teams have been in winning premierships in the AFL. Between 1985 and 2004 there were 9 expansion teams included in the NBL. Of the 20 premierships contested over this period, only four were won by these 9 expansion teams, South East Melbourne Magic twice (1992, 1996) and Sydney Kings twice in succession (2002-2003, 2003-2004). This compares with 5 expansion teams winning eight of the 20 premierships in the period 1985-2004 in the AFL.

MEASURING COMPETITIVE BALANCE IN THE NRL

Table 4 and Figure 2 show that between 1970 and 1984, the NRL recorded an ASD/ISD ratio above 2.0 only once in 1977 (2.216), but it was below 1.5 also only once in 1981 (1.340). In the post-1985 period, the NRL recorded a ratio of 2.0 or above only twice, in 1993 (2.000) and 1995 (2.193), and below 1.5 five times, in 1986 (1.225), 1987 (1.421), 1992 (1.286), 2000 (1.240) and 2004 (1.279). But, as shown in Tables 8 and 9, the average ASD/ISD ratio in the NRL was only slightly higher in the pre-1985 period (1.757) than in the post-1985 period (1.668), yet slightly lower than both the corresponding AFL ratios of 1.886 and 1.711 for the pre- and post-1985 periods respectively. On the ASD/ISD ratio evidence, the NRL has become slightly more competitive post-1985 and on average has been slightly more competitive than the AFL in both periods since 1970.

The list of NRL premiers and the number of competing teams in the NRL between 1970 and 2004 is shown in Table 7. It is worth beginning on an historical note of extreme between-season competitive imbalance, that of St George which, between 1956 and 1966, won 11 successive NSWRL premierships in a period when there were ten clubs.

In the 15 years between 1970 and 1984, the NRL was a stable 12-team league until 1981, with 14 teams in 1982 and 1983 and 13 teams in 1984, making the average number of teams over the period 12.3 (Table 8). Between 1970 and 1984 only 6 of the 12.3 teams won a premiership. Manly (-Warringah) won four times (1972, 1973, 1976 and 1978) including two in succession, Parramatta won three in-a-row (1981, 1982 and 1983), South Sydney (1970, 1971), Eastern Suburbs (1974, 1975), each won two premierships in succession whilst St George (1977, 1979) and Canterbury (1980, 1984) also won two premierships each. This distribution of premierships (4-3-2-2-2-2) amongst six of an average of 12.3 teams in the NRL is slightly more even than the distribution of premierships (5-4-3-2-1) to five of the 12 AFL teams over the same 15-year period. However, there were four occasions in the NRL when clubs won premierships in succession, including Parramatta's run of three, as opposed to just two clubs winning successive premierships in the AFL.

In the twenty-year period 1985-2004, the average number of teams in the NRL increased to 15.4 (excluding the 10-team Super League competition in 1997) and 9 of these teams won premierships (Table 9). Having won the last premiership of the 1970-1984 period, Canterbury/Bulldogs (1985, 1988 and 1995 as Canterbury, 2004 as Bulldogs) won four more premierships (and if not for salary cap breaches causing competition points loss after 17 wins in a row, might have won in 2002), as did Brisbane (1992, 1993, 1998 and 2000), the first two in succession. Canberra won three premierships (1989, 1990 and 1994), Manly (-Warringah, 1987, 1996), Penrith (1991, 2003) and Newcastle (1997, 2001) two each and Parramatta (1986), Melbourne (1999) and Sydney Roosters (2002), formerly Eastern Suburbs, one each.

This distribution of premierships between 9 of the average 15.4 teams on a 4-4-3-2-2-2-1-1-1 basis suggests a higher level of between-season competitive balance in the NRL in the post-1985 period. This distribution compares similarly to that in the AFL over the same period, where 9 of an average of 15 teams also shared the premierships, but on a 4-3-3-2-2-2-1-1 basis. In terms of successive premierships, Canberra and Brisbane won two in a row in the NRL, and Hawthorn and Adelaide won two in a row and Brisbane won three in a row in the AFL.

In summary, the ASD/ISD ratios and the distribution of premierships in the NRL suggest that competitive balance has increased slightly in the period since 1985, and is not significantly different from the competitive balance levels experienced in the AFL.

EXPLAINING COMPETITIVE BALANCE IN THE NRL

The ownership structure of NRL clubs has also changed over time, not only are there now the traditional member-owned clubs, but also some privately-owned teams. In the NRL, the corporate governance structure, which impinges on revenue sharing arrangements, is described as complex by Macdonald and Borland (2004). Currently, revenue from media, sponsoring and merchandising contracts is either retained by the NRL owners (a 50-50 partnership between Australian Rugby Football League Ltd (ARFL Ltd.) and News Limited subsidiary National Rugby League Investments Pty. Ltd.) or distributed to National Rugby League Ltd. (NRL Ltd.), which was established to run the NRL competition, and to the NRL clubs. Clubs receive all regular home game and season ticket revenues and NRL Ltd. receives all finals' revenue. During and since the Super League war in 1997 there has also been substantial funding of clubs by media organisations.

In seeking to understand the influences on competitive balance in the NRL, we should first consider any changes in labour market devices used in the NRL. Macdonald and Borland (2004) describe the labour market in the decade before 1971 as essentially the 'retain and transfer' system, similar to that formerly employed in the AFL and English soccer. Following the 1971

Buckley v. Tutty decision in the High Court, out-of-contract players became free agents. This was accompanied in the 1970s first by a series of wage maxima (most of which were thought to have been disregarded), then by limits on the number of 'imports' of players from outside clubs' residential zones. The team salary cap was introduced in 1990 along with an internal draft, modelled on the AFL pre-season draft that was designed to allocate out-of-contract players to clubs. The internal draft was ruled an unreasonable restraint of trade in September 1991 and since then the labour market is characterised as one of free agency supplemented by a team salary cap.

The potential also exists for competitive balance in the NRL to have changed as a result of significant changes in the number and location of teams since 1982. The number of teams is shown in Table 7, and changes in the location of teams discussed below. Macdonald and Borland (2004) and Macdonald and Borland (2005 forthcoming) outline the major changes to the makeup of the NRL competition, which we expand upon below. The NSWRL comprised 12 Sydney-based clubs at the beginning of our study in 1970 through until 1981: Balmain, Canterbury, Cronulla, Eastern Suburbs, Manly (-Warringah), Newtown, North Sydney, Parramatta, Penrith, St George, South Sydney and Western Suburbs. The addition of Canberra Raiders and Illawarra Steelers increased the number of teams to 14 in 1982 and 1983, and with the removal of Newtown to 13 from 1984 to 1987. The addition of Brisbane Broncos, Gold Coast Seagulls/Chargers and Newcastle Knights took the league to 16 teams from 1988 to 1994 after which another four teams were included: Auckland/New Zealand Warriors, North Queensland Cowboys (based in Townsville), South Queensland Crushers (based in Brisbane) and Western/Perth Reds) to bring the total to 20 in 1995 and 1996 (and a change of name in 1995 from the NSWRL to the ARL). In 1997, two separate rugby leagues existed: the ARL comprised 12 teams and Super League comprised 10 teams which included 8 former ARL teams and new teams Adelaide Rams and Hunter Mariners. The two leagues combined into the newly-named NRL in 1998 comprising 20 teams including new team Melbourne Storm but not Super League teams Hunter Mariners and Western/Perth Reds, and ARL team South Queensland Crushers. The loss of Adelaide Rams, Gold Coast Seagulls/Chargers and the St. George-Illawarra merger (St George and Illawarra Steelers) reduced the number of teams to 17 in 1999. The NRL dropped to just 14 teams in 2000 and 2001 with the mergers of Balmain and Western Suburbs (Wests Tigers), and Manly (-Warringah) and North Sydney (Northern Eagles), and the expulsion of South Sydney. From 2002 until 2004 there have been 15 teams in the NRL following the readmission of South Sydney. The Northern Eagles merger ceased from 2003 with the former Manly (-Warringah) club competing as the Manly Sea Eagles.

To summarise, in the period 1970-1984, there were 2 expansion teams and 1 contraction team in the NRL (Table 8). The league had 12 teams for the 1970 season and finished with 13 teams for

the 1984 season. The 2 expansion teams were Canberra Raiders and Illawarra Steelers (1982) and the contraction team was Newtown (after 1982).

In the period 1985-2004, not including the expulsion (after 1999) and readmission of South Sydney (2002), there were 10 expansion teams and 5 contraction teams (and 3 mergers) in the NRL (Table 9). The league began with 13 teams in 1985 and finished with 15 teams in 2004. The expansion teams were Brisbane Broncos, Gold Coast Seagulls/Chargers and Newcastle Knights (1988), Auckland/New Zealand Warriors, North Queensland Cowboys, South Queensland Crushers and Western/Perth Reds (1995), Adelaide Rams and Hunter Mariners (in Super League, 1997), and Melbourne Storm (1998). The 5 contraction teams were Hunter Mariners (Super League), Western/Perth Reds and South Queensland Crushers (after 1997), and Adelaide Rams and Gold Coast Seagulls/Chargers (after 1998). The 3 mergers were between St George and Illawarra Steelers (St. George-Illawarra, after 1998), and after 1999 Balmain and Western Suburbs (Wests Tigers) and Manly (-Warringah) and North Sydney (Northern Eagles) However, the Northern Eagles merger failed leaving the Manly Sea Eagles to stand alone from 2003.

Unlike the NBL, there does not appear to be any systematic changes in the ISD/ASD ratios associated with the expansion/contraction of the NRL. For example, during the period of team stability between 1970 and 1981, the ratio ranged from a high of 2.216 in 1977 to a low of 1.340 in 1981. However, between 1982 and 2004 when the NRL varied in size from as many as 20 teams in 1995, 1996 and 1998 to as low as 12 in 1997 (excluding the 10-team Super League in 1997), the ratio ranged from a high of 2.193 in 1995 with 20 teams to a low of 1.225 in 1986 with 13 teams (Table 4). Unlike the AFL or the NBL, there appear to be no obvious examples of the expansion/contraction of the league having any identifiable impact on the ASD/ISD ratio of competitive balance in the NRL.

However, what is perhaps more important is not the number of teams in the league, but the revenue-size distribution NRL markets, which can change as a result of the league's expansion and/or contraction. For example, the South Sydney expulsion/readmission episode in the NRL suggests that the political backlash from members could make it more difficult to expel a member-owned club from a league than a privately-owned team. Ceteris paribus, the retention of a poorly-performed team would lower competitive balance.

Expansion in the NRL in the period 1970-2004 began in 1982 with the inclusion of Canberra Raiders and Illawarra Steelers, but since 1985 ten expansion teams have been admitted. Table 9 shows that ten of the 20 premierships contested since 1985 have been won by these expansion teams since 1985: Brisbane has won four (1992, 1993, 1998 and 2000), Canberra three (1989,

1990 and 1994), Newcastle two (1997, 2001) and Melbourne (1999) one. This proportion (50%) is higher than in the AFL where expansion teams have won 8 of 20 premierships since 1985 (40%), though fewer expansion teams (5) have been introduced in the AFL since 1985. Note that Brisbane won Super League in 1997, but since expansion team Newcastle won the ARL premiership in 1997, to include Brisbane's 1997 Super League premiership would amount to double counting.

SUMMARY AND CONCLUSION

Two simple measures of competitive balance, the ASD/ISD ratio (to measure within-season competitive balance) and the distribution of premierships/championships (to measure between-season competitive balance), have been used to assess recent levels of competitive balance in the AFL, NBL and NRL.

Over the period 1970-2004 (1979-2004 in the NBL), average ASD/ISD ratios were lowest in the NRL (1.706) followed by the AFL (1.786) and highest in the NBL (1.917). This is also true for both sub-periods, firstly 1970-1984 with the NRL (1.757), the AFL (1.886) and (for 1979-1984) the NBL (1.981), and secondly 1985-2004 with the NRL (1.668), the AFL (1.711) and the NBL (1.887). Using ASD/ISD ratios as our measure, we conclude that within-season competitive balance has increased in all three leagues in the period 1985-2004 compared with the pre-1985 period, and has been consistently highest (but only slightly) in both periods in the NRL, followed by the AFL, and lowest of all (but only slightly) in the NBL.

In the period 1970-1984, the distribution of premierships (4-3-2-2-2) in the NRL between six of an average of 12.3 teams is perhaps slightly more even than the distribution of premierships (5-4-3-2-1) between five of the 12 AFL teams. In the period 1985-2004, the NRL distribution of premierships (4-4-3-2-2-2-1-1-1) between 9 of the average 15.4 teams is not dissimilar to that in the AFL (4-3-3-2-2-2-2-1-1) between 9 of an average of 15 teams. This distribution of premierships suggests between-season competitive balance has been similar in the NRL and the AFL and has increased in both leagues. The distribution of NBL championships in the period 1985-2004 (4-4-2-2-2-2-2-1-1) between 9 of an average of 12.7 teams is also not dissimilar to both the NRL and the AFL, and possibly an improvement over the (admittedly short) 6-year period distribution (2-2-1-1) amongst only 4 of the average 13.5 teams in the NBL between 1979 and 1984. Using the distribution of premierships/championships as our measure, in general, we conclude that there is very little difference in between-season competitive balance between the three leagues, and that it too has increased in all leagues since 1985.

In the 15-year period 1970-1984, three NRL clubs won premierships in succession, and one club won three in a row, as opposed to just two clubs winning successive premierships in the AFL. In

the period 20-year 1985-2004, two clubs won successive premierships in the NRL and in the AFL two clubs won premierships in succession and one club won three in a row. In the NBL, two teams won championships in succession between 1979 and 1984, compared with three teams between 1985 and 2004. In summary, the number of times a club/team wins successive premierships/championships, another aspect of between-season competitive balance, in general shows little difference between the three leagues.

Thus, the evidence indicated by ASD/ISD ratios, and the distribution and number of successive premierships/championships leads to the general conclusion that both within-season and between-season competitive balance has increased in all three leagues in the period 1985-2004. However, whilst within-season competitive balance has been consistently higher (but only slightly) in the NRL followed by the AFL and then the NBL, there is very little (if any) difference in between-season competitive balance between the three leagues.

It has been argued elsewhere (Booth, 2000 & 2004c) that the introduction of a team salary cap and national player draft is one possible reason for the increase in competitive balance in the AFL in the period 1985-2004. The introduction of a team salary cap in the NRL, and the introduction of both a team salary cap and the 'two import rule' in the NBL are possible explanations of the increase in competitive balance in these two leagues.

However, increases in competitive balance have also been affected simultaneously in all three leagues by changes in the number and location of teams, in particular the introduction of expansion teams into large-revenue markets (and the removal of relatively uncompetitive teams from small-revenue markets). Indeed, the number and location of clubs/teams might help to explain the (slight) relative differences in levels of (within-season) competitive balance between the leagues. In both the AFL and the NBL, there are examples of correlation between changes in ASD/ISD ratios and expansion (and also contraction in the case of the NBL) of the leagues, but there does not appear to be any systematic or identifiable change in the ISD/ASD ratio associated with the expansion/contraction of the NRL. Moreover, expansion teams have been quite successful in winning premierships in all leagues. In the NRL, ten expansion teams have been admitted since 1985, with 10 of the twenty premierships contested since then won by expansion teams. Since 1985, five expansion teams have been included in the AFL, with 8 of the 20 flags won by expansion teams, all since 1992. In the NBL, 9 expansion teams have been included, with 4 of the twenty premierships won by expansion teams.

In conclusion, the purpose of this article was to investigate further the argument that the team salary cap and national player draft had been effective in increasing competitive balance in the

AFL since 1985. Similar increases in competitive balance have also been achieved in the NRL and the NBL with the introduction of team salary caps. But competitive balance in all leagues is also likely to have been affected by changes in the number and, in particular, the location of teams in the respective leagues. A number of other potential influences, beyond the scope of this article, are worthy of further attention. For example, an examination of competitive balance and the labour market devices and revenues sharing rules used in the NRL since its formation in 1908 might provide more insights. For all leagues, more detailed analysis of teams' revenues, including the influence of revenue-sharing arrangements in addressing revenue imbalances between teams, could help to identify whether revenue market size determines on-field success. Finally, whether differences in and/or changes in ownership of clubs/teams affects levels of player talent and hence competitive balance is another area worthy of pursuit.

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Tables and Figures

Table 1: Concepts and Measures of Competitive Balance

Concepts of Competitive Balance	Common Measures of Competitive Balance
Within-Season Competitive Balance	Actual SD of Season Win Percents Range of Season Win Percents Actual SD/Idealised SD (ASD/ISD) Ratio
Between-Season Competitive Balance	Distribution of Premierships/Championships Hirschman-Herfindahl Indexes Analysis of Variance (ANOVA) in Team Win Percents

Table 2: Rounds per Season, ASD/ISD Ratios, AFL

Year	Rds	ASD/ISD	Year	Rds	ASD/ISD	Year	Rds	ASD/ISD
1897	14	2.1339	1933	18	2.0344	1969	20	1.6758
1898	17	2.2262	1934	18	2.2215	1970	22	1.7321
1899	17	2.1004	1935	18	2.1731	1971	22	2.1638
1900	17	1.6977	1936	18	2.0000	1972	22	2.2747
1901	17	2.1386	1937	18	1.8782	1973	22	1.8566
1902	17	2.0580	1938	18	1.7743	1974	22	1.8464
1903	17	2.1454	1939	18	1.9555	1975	22	1.6697
1904	17	1.4297	1940	18	1.3472	1976	22	1.3844
1905	17	1.8981	1941	18	2.0184	1977	22	1.9656
1906	17	1.9852	1942	15	1.9343	1978	22	1.5101
1907	17	1.1632	1943	15	1.2411	1979	22	2.0094
1908	18	1.8738	1944	18	1.9100	1980	22	2.0707
1909	18	1.9293	1945	20	1.9770	1981	22	2.3549
1910	18	2.0028	1946	19	1.7622	1982	22	2.2680
1911	18	2.1499	1947	19	1.8918	1983	22	1.5570
1912	18	1.9322	1948	19	1.7547	1984	22	1.6237
1913	18	2.2336	1949	19	1.6490	1985	22	2.0132
1914	18	2.0385	1950	18	1.9508	1986	22	1.8505
1915	16	2.0242	1951	18	1.8733	1987	22	1.6157
1916	12	1.5679	1952	19	1.8353	1988	22	1.6652
1917	15	1.2383	1953	18	1.9603	1989	22	1.7746
1918	14	1.7321	1954	18	1.2693	1990	22	1.8091
1919	16	1.9543	1955	18	2.0638	1991	22	1.8781
1920	16	2.0000	1956	18	1.7533	1992	22	1.8749
1921	16	1.5855	1957	18	0.9813	1993	20	1.6713
1922	16	1.3123	1958	18	1.4011	1994	22	1.4078
1923	16	1.3070	1959	18	1.5546	1995	22	1.8387
1924	16	1.3693	1960	18	1.6415	1996	22	1.8540
1925	17	1.9225	1961	18	1.4561	1997	22	1.1555
1926	18	2.2132	1962	18	2.0548	1998	22	1.3121
1927	18	2.0794	1963	18	1.9413	1999	22	1.7139
1928	18	2.0367	1964	18	2.1731	2000	22	1.7678
1929	18	2.2812	1965	18	1.7213	2001	22	1.8586
1930	18	1.8659	1966	18	2.2751	2002	22	1.6096
1931	18	2.1257	1967	18	1.8810	2003	22	1.7774
1932	18	2.1452	1968	20	2.0656	2004	22	1.7645

Table 3: Average ASD/ISD Ratios, AFL

Periods of Labour Market Intervention and Revenue Sharing	ASD/ISD ratio
1. (1897-1914) Free Agency	1.9520
2. (1915-1929) Free Agency and Metropolitan Zoning	1.7749
3. (1930-1944) Free Agency, Metropolitan Zoning & the Coulter Law	1.9083
4. (1945-1967) Free Agency, Metropolitan Zoning, The Coulter Law, 'Modified Form' of Gate-Revenue Sharing and League-Revenue Sharing	1.7749
5. (1968-1984) Free Agency, Metropolitan Zoning, Country Zoning, 50-50 Gate-Revenue Sharing and League-Revenue Sharing	1.8840
6. (1985-2004) Team Salary Cap, National Player Draft (from 1987), 50-50 Gate-Revenue Sharing and League-Revenue Sharing. (TPP Cap and Minimum Team Salary from 1999, 50-50 Gate-Revenue Sharing abolished in 2000)	1.7106
(1897-2004) Average	1.8282

Table 4 ASD/ISD Ratios: AFL, NBL & NRL

Year	AFL	NBL	NRL
1970	1.732		1.765
1971	2.164		1.813
1972	2.275		1.983
1973	1.857		1.792
1974	1.846		1.612
1975	1.670		1.532
1976	1.384		1.593
1977	1.966		2.216
1978	1.510		1.905
1979	2.009	1.931	1.813
1980	2.071	1.868	1.576
1981	2.355	1.414	1.340
1982	2.268	2.273	1.759
1983	1.557	2.285*	1.767
1984	1.624	2.329*	1.884
1985	2.013	2.287	1.826
1986	1.850	1.956	1.225
1987	1.616	2.321	1.421
1988	1.665	2.020	1.825
1989	1.775	1.819	1.696
1990	1.809	2.040	1.846
1991	1.878	1.851	1.627
1992	1.875	1.695	1.286
1993	1.671	1.851	2.000
1994	1.408	2.137	1.862
1995	1.839	1.864	2.193
1996	1.854	1.815	1.752
1997	1.156	1.401	1.547**
1998	1.312	1.670	1.904
1999	1.714	1.282	1.745
2000	1.768	2.424	1.240
2001	1.859	2.674	1.551
2002	1.610	1.090	1.809
2003	1.777	1.781	1.726
2004	1.765	1.760	1.279
Ave	1.786	1.917	1.706

ASD/ISD Ratios: AFL (Booth, 2004c), NBL & NRL (Macdonald & Borland, 2005 forthcoming). * The ASD/ISD ratios for the NBL are the mean ratios of the two conferences which operated in 1983 and 1984. ** The ASD/ISD ratio is for the ARL. The ASD/ISD ratio for Super League was 1.261.

Table 5 **AFL: Number of Teams and Premiers**

Year	Teams	Premiers
1970	12	Carlton
1971	12	Hawthorn
1972	12	Carlton
1973	12	Richmond
1974	12	Richmond
1975	12	North Melbourne
1976	12	Hawthorn
1977	12	North Melbourne
1978	12	Hawthorn
1979	12	Carlton
1980	12	Richmond
1981	12	Carlton
1982	12	Carlton
1983	12	Hawthorn
1984	12	Essendon
1985	12	Essendon
1986	12	Hawthorn
1987	14	Carlton
1988	14	Hawthorn
1989	14	Hawthorn
1990	14	Collingwood
1991	15	Hawthorn
1992	15	West Coast Eagles
1993	15	Essendon
1994	15	West Coast Eagles
1995	16	Carlton
1996	16	North Melbourne
1997	16	Adelaide
1998	16	Adelaide
1999	16	Kangaroos
2000	16	Essendon
2001	16	Brisbane Lions
2002	16	Brisbane Lions
2003	16	Brisbane Lions
2004	16	Port Adelaide

Table 6: NBL: Number of Teams and Champions

Year	Teams	Champions
1979	10	St Kilda Saints
1980	12	St Kilda Saints
1981	12	Launceston Casino City
1982	14	West Adelaide Bearcats
1983*	16	Canberra Cannons
1984**	17	Canberra Cannons
1985	14	Brisbane Bullets
1986	14	Adelaide 36ers
1987	14	Brisbane Bullets
1988	13	Canberra Cannons
1989	13	North Melbourne Giants
1990	14	Perth Wildcats
1991	14	Perth Wildcats
1992	13	South East Melbourne Magic
1993	14	Melbourne Tigers
1994	14	North Melbourne Giants
1995	14	Perth Wildcats
1996	14	South East Melbourne Magic
1997	11	Melbourne Tigers
1998	11	Adelaide 36ers
1998-99	11	Adelaide 36ers
1999-00	11	Perth Wildcats
2000-01	11	Wollongong Hawks
2001-02	11	Adelaide 36ers
2002-03	11	Sydney Kings
2003-04	12	Sydney Kings

* 1983 comprised an East conference and a West conference each of 8 teams. ** 1984 comprised an East conference of 9 teams and a West conference of 8 teams (Macdonald and Borland, 2005 forthcoming).

Table 7 **NRL: Number of Teams and Premiers**

Year	Teams	Premiers
1970	12	South Sydney
1971	12	South Sydney
1972	12	Manly (-Warringah)
1973	12	Manly (-Warringah)
1974	12	Eastern Suburbs
1975	12	Eastern Suburbs
1976	12	Manly
1977	12	St George
1978	12	Manly
1979	12	St George
1980	12	Canterbury
1981	12	Parramatta
1982	14	Parramatta
1983	14	Parramatta
1984	13	Canterbury
1985	13	Canterbury
1986	13	Parramatta
1987	13	Manly (-Warringah)
1988	16	Canterbury
1989	16	Canberra
1990	16	Canberra
1991	16	Penrith
1992	16	Brisbane
1993	16	Brisbane
1994	16	Canberra
1995	20	Canterbury
1996	20	Manly
1997*	12	Newcastle
1998	20	Brisbane
1999	17	Melbourne
2000	14	Brisbane
2001	14	Newcastle
2002	15	Sydney Roosters
2003	15	Penrith
2004	15	(Canterbury) Bulldogs

* The 1997 figure is for the ARL. Brisbane was the premier team in Super League in 1997 which comprised 10 teams (Macdonald and Borland, 2005 forthcoming).

Table 8 Competitive Balance Comparisons: 1970-1984, (1979-1984, NBL)

	AFL (1970-1984)	NBL (1979-1984)	NRL (1970-1984)
Average ASD/ISD Ratio	1.886	1.981	1.757
# Premier/Champion Teams	5	4	6
Premierships Distribution	5-4-3-2-1	2-2-1-1	4-3-2-2-2-2
Average # of Teams	12	13.5	12.3
# Expansion Teams	0*	10	2
# Expansion Team Flags	0	1	0
# Contraction Teams	0*	6	1

* Not including South Melbourne's move to Sydney in 1982.

Table 9: Competitive Balance Comparisons: 1985-2004

	AFL	NBL	NRL
Average ASD/ISD Ratio	1.711	1.887	1.668
# Premiers/Champions	9	9	9
Premierships Distribution	4-3-3-2-2-2-2-1-1	4-4-2-2-2-2-2-1-1	4-4-3-2-2-2-1-1-1
Average # of Teams	15	12.7	15.4*
# Expansion Teams	5	9	10**
# Expansion Team Flags	8	4	10
# Contractions/Mergers	0/1***	11	5**/3

* Excluding teams in Super League in 1997. ** Not including South Sydney's expulsion in 2000 and readmission in 2002. *** Fitzroy's merger with Brisbane Bears to form the Brisbane Lions in 1997.

Figure 1 ASD/ISD Ratios: AFL

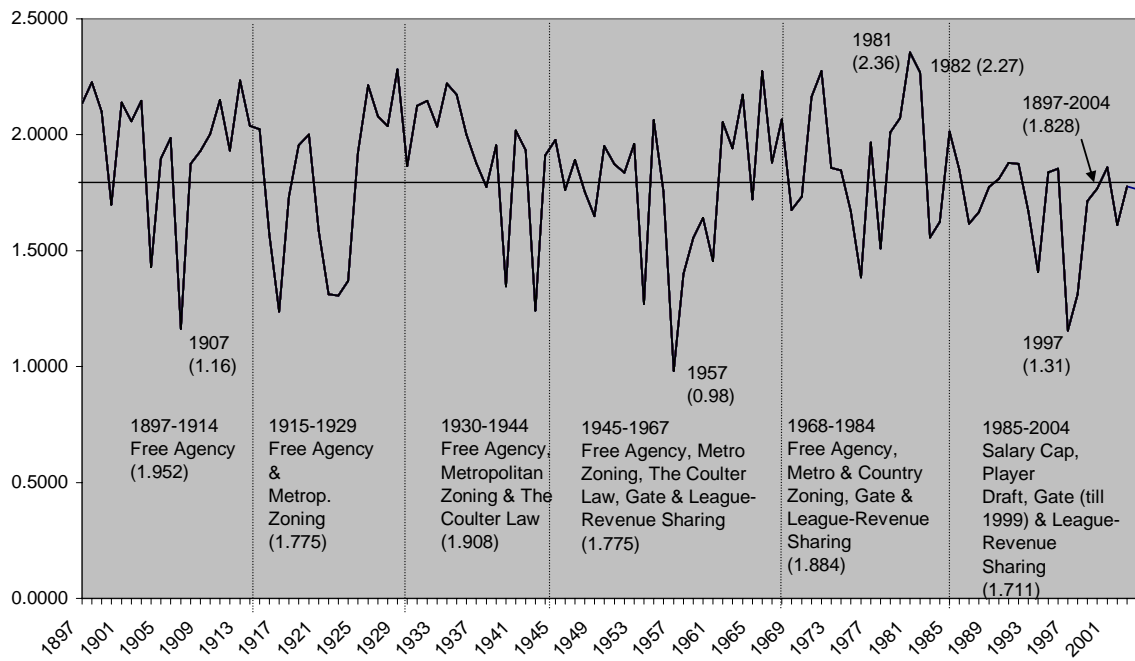
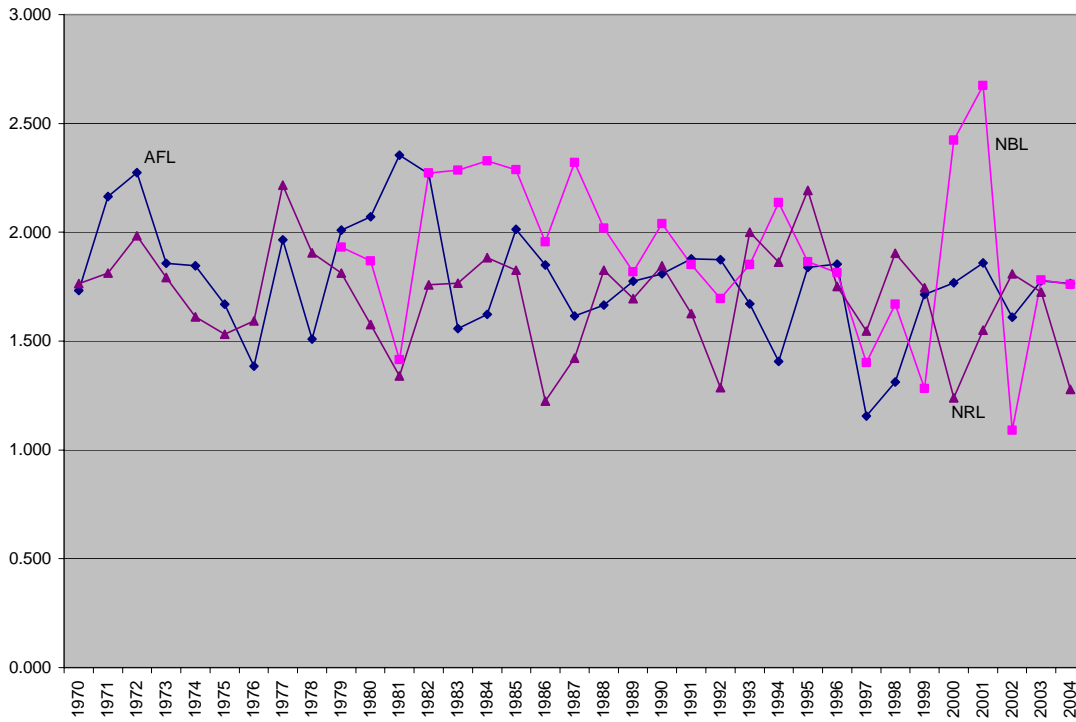


Figure 2 ASD/ISD Ratios: AFL, NBL & NRL



ASD/ISD Ratios: AFL (Booth, 2004c), NB