

NOTA DI LAVORO

53.2014

**Rugby League in Australia
between 2001 and 2012: an
Analysis of Home Advantage
and Salary Cap Violations**

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Economy and Society Series

Editor: Giuseppe Sammarco

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Keywords: Salary Cap, Home Advantage, Rugby League

JEL Classification: J31, D39, C23

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April 2014

Abstract

Within this paper, we review whether incidences of salary cap circumvention within the Australian professional rugby league competition led to improved home team wins during the period between 2001 and 2012. In doing so, we show that while the salary cap breach amounts can be attributed to an improved home team win record in the case of the Melbourne Storm, success during the period can also be attributed with other factors such as the management of the club, talent identification and the quality of the coach and/or captain. This raises an important issue surrounding the effectiveness of a salary cap to create a level playing field when uncertainty over the quality and performance of players exists. A notable role of the salary cap violations was the retention of a core group of players that were instrumental in the success that occurred in the 2007 season. As part of the analysis we also review home team advantage. A focus on the NRL is justified due to the peculiar nature of having multiple stadium types within the same city and team. For the year 2012 we find that a match at a traditional Sydney stadium against a non-Sydney team had the highest probability of a home team win when the two teams have had a similar level of success during the season.

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Section 1 – Introduction

Between 2001 and 2010 three rugby league teams were found to have significantly and intentionally violated the salary cap in one of Australia's most popular professional sports. Each case of salary cap violation occurred during a mutually exclusive time period and the extent of the violations ranged from \$300,000 to just over 1 million Australian Dollars (AUD). As a percent of the salary cap, the violations ranged from 8% to 26% of the salary cap in the period the violation occurred. The most recent case of salary cap violation by the Melbourne Storm culminated in penalties that included the stripping of two premierships (competition wins), having to pay back \$1.1 million AUD prize money and being fined \$500,000 AUD.

Since 1990 professional rugby league has had multiple ownership structures but some form of salary cap restriction in place. The period between 2001 and 2012 was under the administration of the National Rugby League (NRL) with Ian Schubert acting as Salary Cap Auditor. The NRL website states that there are two functions of a salary cap; these being: - the spread of playing talent, and - to ensure that teams are not forced to spend more than they can afford. Upon the announcement of Ian Schubert's retirement in December 2013, the NRL released a news article that noted many of the goals that the NRL has stated the salary cap achieves. The era of the salary cap and the NRL organisation was noted to be associated with "unprecedented excitement in terms of the closeness of the competition and the genuine hope fans had that their team could win on any weekend." (NRL, 2013) Having noted improved within season competitive balance, the NRL also commented on between season competitive balance with the statement that "over the past 15 years the NRL has seen nine different Premiers, while 12 teams have reached the top-four in just the last five years as a result of the Salary Cap." NRL (2013)

Within this report, we review the extent to which these incidences of salary cap circumvention led to improved home team wins during the regular (non-playoff) season. This measure of within-season competitive balance has been selected based on the suitability of applying this indicator to probit regressions that allows for an analysis of the probability of a home team win that depends upon a range of factors, such as the type of home ground, the quality of the team, and salary cap violations. This analysis is built upon the calculation of an econometrically derived probability of a home team win, subject to key factors included within the regression analysis. Note that this is similar to the approach undertaken in Leard and Doyle (2011) upon reviewing game-level data for the National Hockey League. With the utilisation of this approach, we show that while the salary cap breach amounts can be attributed to an improved home team win record in the case of the Melbourne Storm, success during the period can also be attributed with other factors such as the management of the club, talent identification and the quality of the coach and/or captain. This raises an important issue surrounding the effectiveness of a salary cap to create a level playing field when uncertainty over the quality and performance of players exists. Indeed, a fruitless salary cap violation by the New Zealand Warriors in comparison to the fruitful salary cap violation of the Melbourne Storm shows that the role of the coach, captain, wider organisation and talent identification notably contribute to a team's success, irrespective of salary cap breaches.

Our results show that the probability of a home team win has changed during the period between 2001 and 2012; the changes tend to be related to the type of home ground, the size of the crowd and changes in the level of the salary cap. Changes in the salary cap have a negative impact on the probability of a home team win, even though the level has tended to follow changes in inflation. A 10% increase in the salary cap level in comparison to the 2001 level is attributed to a 2.5% decrease in the probability of a home team win; however the effect is statistically insignificant. The inflation adjusted salary cap level oscillates and the impact of player transfers due to forthcoming changes in the cap may explain the decrease in the probability of a home team win. Nevertheless, more analysis is needed with respect to the impact of the salary cap over the period reviewed and whether this has

improved the competitive balance within the competition. The negative impact of the indicator used to capture changes in the salary cap implies that some effect may be present, but for conclusive results further research is needed. Breaches of the salary cap are found to have led to a statistically significant positive impact on the probability of a home team win for both the Melbourne Storm and the Canterbury Bulldogs. In the period between 2006 and 2010 the probability of a home team win for the Melbourne Storm has been estimated to increase by between 16.8% and 27% for an additional \$1 million AUD of salary cap violations, when the level of salary cap violations have been accounted for and teams are almost evenly matched in terms of quality.

The impact of these violations remain statistically significant even when additional factors are accounted for, such as variables to capture the impact of Craig Bellamy becoming Head Coach of the team, the emergence of Cameron Smith as the Captain of the Melbourne Storm and a variable which captures the impact of the number of matches played by the nine Australian Representative players who have been identified by the Authors as being instrumental in achieving an unbeaten home record, the Minor Premiership and the Premiership in the 2007 season. The impact of salary cap violations on the probability of a home team win for the Melbourne Storm reduces to be between 6.4% and 10.6% for an additional \$1 million AUD of salary cap violations, when the team specific variables have been accounted for and teams are almost evenly matched in terms of quality. This implies that a notable role of the salary cap violations was the retention of a core group of players who were instrumental in the success that occurred in the 2007 season. Success in 2006 and 2007, despite smaller salary cap breaches, implies that either the salary cap violations found by the Salary Cap Auditor were insufficient or that successful talent identification meant that a range of young players played above the potential that their contract amounts implied. The three phases of the 'salary cap rorting' identified by the Salary Cap Auditor implies that the latter is true and that a mix of undiscovered potential in salary negotiations before 2007 and player retention after a premiership win are an underlying story of the Melbourne Storm salary cap violations.

Having introduced the analysis, section 2 will provide some background on the rugby league competition within Australia with a specific focus on: - home team advantage across teams and stadia type, - the changes in the salary cap level, and - the extent of the salary cap violations that occurred between 2001 and 2010. Section 3 will then introduce the multivariate analysis that allows for the calculation of an econometrically derived probability of a home team win, subject to key factors included within the regressions, which include team quality (as reflected in competition points and the point difference accumulated during the matches), home team advantage (section 3.1) and the salary cap breach amount (section 3.2). Section 4 will conclude the report.

Section 2 – Background

Having introduced the report and the motivation for the analysis, this section discusses the relevance of reviewing home team advantage and salary cap violations using a database sourced from the Rugby League Project website, <http://www.rugbyleagueproject.org/>. The aim of the Rugby League Project is the collection and presentation of the full details of all notable rugby league matches. Rugby league is a contact sport that became professional in the north of England in 1895 and appeared in Australia in 1907 with a range of ‘foundation clubs’ being established within the cities of Sydney and Newcastle in the State of New South Wales in 1908. In Australia the sport originally broke away from rugby union due to a lack of compensation for time spent away from work and has developed distinct rules. Most notable of these are the reduction of the number of players from 15 to 13, a change in the number of points accrued for a try and a field goal or penalty goal, as well as the abolition of mauls and lineouts. The major professional competitions are still located primarily in Australia and England, with the addition of New Zealand making up the three strongest international representative teams.

In July 2008, NRL Chief Executive David Gallop claimed that the salary cap was fundamental to the sport. In his own words, he stated that “it’s a foundation stone of the competition and if we were to have a competition without the salary cap, a competition based on pure purchasing power, then a few of our clubs, a small number, would be in a position to buy the best players.” (Jancetic, 2008) In addition, he noted that “we would have a lopsided competition and ultimately clubs would be under financial pressure to survive.” (Jancetic, 2008) Arguments that the salary cap constitute a restraint of trade have been countered by claims that players sign knowing that a cap is in place, that the cap is set to a level that the individual teams can afford and that higher player payments would not occur without the cap in place (Jancetic, 2008).

In addition to controlling costs and promoting competitive balance across teams, the problem of maintaining financial viability of teams is also another motivation for the salary cap and has been claimed to be “the only (one) of the cross-subsidization schemes currently in use that can be expected to accomplish this while improving competitive balance in a league.” (Fort and Quirk, 1995) It should be noted that an alternative to reviewing competitive balance is a focus on social welfare, such as that conducted by Dietl, Lang and Werner (2009) due to the contention that competitive balance is a poor proxy for social welfare. And while this is an important issue, the focus on competitive balance in this report is driven by the statements of the NRL on the achievements of the cap and our focus on the impact of salary cap violations. The importance of competitive balance is noted in Dietl, Lang and Werner (2009) and is identified as being related to the uncertainty of outcome hypothesis where fans prefer to attend games with an uncertain outcome and that a weak team produces a negative externality on its stronger competitors. This echoes the statement by the NRL that it “believes that if a few clubs were able to spend unlimited funds that it would reduce the attraction of games to fans, sponsors and media partners due to an uneven competition”. (NRL, 2012)

2.1 Home Team Advantage

Ever since the establishment of the ‘foundation clubs’ in 1908, the centre of rugby league in Australia has been in Sydney. While the sport has expanded to include teams from Queensland, Victoria and New Zealand; the majority of teams are still located in the area surrounding Sydney. Of the 16 teams in existent in 2012, 8 of them are located primarily in Sydney, and as a result the competition provides an interesting example for an analysis of home team advantage. Distances of travel between Sydney teams are minor and a range of teams share the same stadiums due to centrality to the city and guaranteed income from holding a match at certain stadiums. Four Sydney teams share stadiums with a different level of regularity. As shown in Table 1, between 2001 and 2012, 114 games were played at a shared Sydney stadium with the co-sharer. In these cases, we hypothesise that the main difference should be whether the team uses the home or away change room with some auxiliary changes to the

control of schedules or use of the field for training purposes, and yet, we find that there is a difference in the probability of a home team win in such cases (as shown in Figure 2).

Within this analysis there are four notable home ground categories, these being: Unshared Stadium (*Unsh.*), Traditional Sydney Ground (*TrSyd.*) against a team from Sydney, Marquee Stadium (*Marquee*), and a Shared Sydney Stadium (*Shared Syd.*) against a team who does not share the stadium. In addition we review scenarios where a Sydney-based team plays a home game at a Traditional Sydney Ground against a team from outside Sydney (*TrSyd. NonSyd.*) and the case where a Sydney-based team plays a home game at the site of a Shared Sydney Stadium against another Sydney team which also uses this home ground (*Shared Syd. Sh.*).

Table 1 reviews the home team win percentage for each team during the regular season between 2001 and 2012. Note that the percentage of wins has been used as a measure of competitive balance since Scully (1989). Annual win-loss ratios have also been used widely in the literature and we rephrase this indicator as the win percentage; however the reader should refer to Humphreys (2002) for an interesting discussion of competitive balance and the development of a competitive balance ratio. A commentary by Fort & Maxcy (2003) should also be referred to as a useful summary of the literature on competitive balance up until that point in time and also presents an interesting discussion on whether one indicator should be preferred to another.

With Table 1 broken down across teams, the rank of each team based on the home team win percentage is compared to: - the average home team point difference for all the matches played (where a positive implies a win and a negative a loss), - the number of times the team has won the competition, and - the number of finals wins between 2001 and 2012. In terms of the ranking of teams

by home team win percentage, number of competition wins and the number of finals wins, the Melbourne Storm emerge as the most successful team in the 2001 to 2012 period.

Of interest to the discussion concerning home grounds, the home team win percentage is broken down into the six home ground categories with the Stadia rank provided at the bottom of the table. In terms of rank, an unshared stadium has the highest home team win percentage (60.87%), followed by a shared Sydney stadium against a team which also shares the stadium (57.02%), a traditional Sydney ground against a team not from Sydney (56.76%), a traditional Sydney ground against a team from Sydney (56.59%), a shared Sydney stadium against a team who doesn't share the stadium (52.04%) and then a marquee stadium (45.12%). These percentages can be compared to the overall home team win percentage of 57.49%. Note that these win percentages are the raw figures from the data and no allowance for team quality has been made at this point of the analysis. What we can gather from these numbers is that an unshared stadium has the highest win percentage and this may be related to these teams being far from others as these stadiums tend to be the home grounds of single city teams. Single city teams such as Melbourne, Brisbane and New Zealand all have win percentages higher than the overall rate of home team wins (57.49%). The Canterbury Bankstown team is located in Sydney, but used an unshared stadium called Sydney Showground during 2001 to 2005. During this period, a notable success rate of home team wins accrued and equate to a win percentage of 66.67%. Counter to intuition, the second highest win percentage is attributed to a shared Sydney stadium against a team who also shares the stadium. This may be due to crowd support in a 'local derby' style match whereas the home side gains more supporters due to promotion of the game and the location of member seating allocations. Alternatively, it could be due to scheduling of these matches and whether they are against superior teams. Note that the analysis in section 3 will make adjustments for the opponents' quality with indicators of how well they have been progressing during the season.

Note that matches at a traditional Sydney home ground have been associated with improved success due to beneficial crowd support. In March 2014 a Sydney newspaper reported that once you exclude the Melbourne Storm in the period between 2007 and 2014, “the top three most successful home ground advantages all belong to suburban grounds - Manly at Brookvale (73%), Wests Tigers at Leichhardt (64%) and St George Illawarra at Jubilee (63%).” (Walshaw, 2014) On the matter of home ground advantage at Brookvale Oval the same report quotes a Manly player who states that “the crowd, the atmosphere, the way we lift because of all the history here . . . I can understand why rival players don’t find any of that ideal.” (Walshaw, 2014) For these same teams, in the period between 2001 and 2012, our results show that Manly has a 66.67% win percentage at a traditional Sydney stadium against a team from Sydney, the West Tigers have a 62% win percentage at a traditional Sydney stadium when playing a team from outside Sydney, and St George Illawarra have a 72.13% win percentage at a traditional Sydney stadium against a team from Sydney. Note that the strength of the impact seems strongest for the West Tigers who have an home win percentage across all stadium types of 53.10% and are rated as the 11th most successful team, in comparison to Manly with 65.28% and listed as the 2nd most successful team or St George Illawarra with 64.29% and listed as the 3rd most successful team at home between 2001 and 2012.

In this section, we have defined some of the background on home team advantage in the NRL related to stadium type, however we also refer the reader to section 3.1 as it will review the types of stadium that give a statistically significant advantage after key factors, such as team quality, are allowed for.

Table 1. Home Team Win Percentage and No. of Regular Season Home Matches – 2001 to 2012

	Unsh.	TrSyd. ¹	TrSyd. NonSyd.	Marquee	Shared Syd.	Shared Syd. Sh.	All Stadia Home	Home Team Rank	Average Home Team Pts Difference	No. Comp. Wins	Finals Wins
Brisbane Broncos	62.50%						62.50%	4	6.667	1	11
	<i>144</i>						<i>144</i>				
Canberra Raiders	57.04%						56.94%	8	3.104	0	3
	<i>142</i>						<i>144</i>				
Canterbury Bulldogs	66.67%			77.78%	52.86%	75.00%	61.97%	5	4.113	1	15
	<i>39</i>			<i>9</i>	<i>70</i>	<i>24</i>	<i>142</i>				
Cronulla Sharks		44.30%	58.33%	25.00%			49.65%	13	-0.077	0	4
		<i>79</i>	<i>60</i>	<i>4</i>			<i>143</i>				
Gold Coast Titans	56.94%						56.94%	8	0.681	0	4
	<i>72</i>						<i>72</i>				
Manly Sea Eagles	100.00%	66.67%	62.50%	65.00%			65.28%	2	5.125	2	6
	<i>1</i>	<i>75</i>	<i>48</i>	<i>20</i>			<i>144</i>				
Melbourne Storm	77.62%						77.62%	1	13.259	3 ²	15
	<i>143</i>						<i>143</i>				
NZ Warriors	59.44%			0.00%			58.62%	6	4.11	0	5
	<i>143</i>			<i>2</i>			<i>145</i>				
Newcastle Knights	56.55%						56.55%	9	4.869	1	5
	<i>145</i>						<i>145</i>				
Nth. Qld. Cowboys	52.11%			0.00%			51.39%	12	1.826	0	4
	<i>142</i>			<i>2</i>			<i>144</i>				
Parramatta Eels		58.57%	59.02%	100.00%	0.00%	37.50%	57.75%	7	5.725	0	6
		<i>70</i>	<i>61</i>	<i>2</i>	<i>1</i>	<i>8</i>	<i>142</i>				
Penrith Panthers		51.81%	42.11%	0.00%	0.00%	100.00%	47.55%	14	1.021	1	5
		<i>83</i>	<i>57</i>	<i>1</i>	<i>1</i>	<i>1</i>	<i>143</i>				
St. George Ill. Dragons		72.13%	56.90%	100.00%	63.64%	55.56%	64.29%	3	8.371	1	7
		<i>61</i>	<i>58</i>	<i>1</i>	<i>11</i>	<i>9</i>	<i>140</i>				
Sth. Sydney Rabbitohs				31.58%	51.25%	35.48%	44.62%	15	-2.862	0	1
				<i>19</i>	<i>80</i>	<i>31</i>	<i>130</i>				
Sydney Roosters				15.38%	53.92%	71.43%	53.85%	10	3.098	1	10
				<i>13</i>	<i>102</i>	<i>28</i>	<i>143</i>				
Wests Tigers		47.83%	62.00%	57.14%	44.83%	53.85%	53.10%	11	1.11	1	7
		<i>46</i>	<i>50</i>	<i>7</i>	<i>29</i>	<i>13</i>	<i>145</i>				
All Teams	60.87%	56.76%	56.59%	45.12%	52.04%	57.02%	57.49%		3.889	12	6.966
	<i>971</i>	<i>414</i>	<i>334</i>	<i>82</i>	<i>294</i>	<i>114</i>	<i>2209</i>				
Stadia Rank	1	3	4	6	5	2					

Note: colouring from green to red reflects the relative difference between the highest and lowest observations. This colour scheme is used in three cases as highlighted with the grey, blue and purple backgrounds. Number of games is shown in italics.

¹ Note that TrSyd. denotes a match played in a traditional Sydney stadium against a team from Sydney.

² Refer to section concerning Salary Cap Violations for a description of the penalty which led to two of these Premierships being stripped.

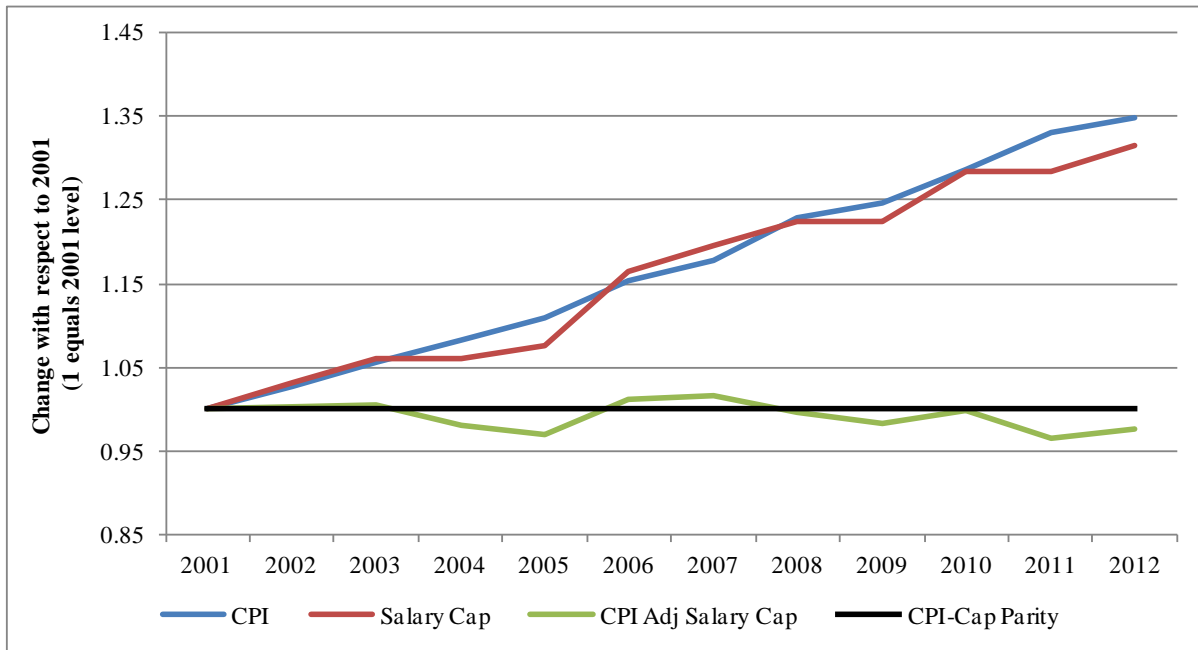
2.2 Salary Cap Level and Salary Cap Violations

Having discussed home ground advantage across a range of stadium types, the analysis now turns to a review of the salary cap levels and the salary cap violations that were found to have occurred during the period reviewed.

2.1 Salary Cap Level

Within Table 2 and Figure 1 there are comparisons of the salary cap level in terms of: - the raw figure, and - the Consumer Price Index (CPI) adjusted level with respect to 2001 (the starting point of our empirical analysis). As reflected in a comparison of the CPI Adjusted Salary Cap and CPI-Cap Parity indicator, the level of the salary cap since 2001 has generally followed inflation, as reflected in the CPI. The impacts of changes in the salary cap are important as while the level of the cap has increased with inflation there are notable periods where the salary cap is revised for two seasons at a time. Indeed, player movements are likely to be partially driven by the oscillations of contract revisions, successful seasons and salary cap revisions. The 2012-2013 contracting period resulted in players and player managers insisting on clauses which allowed for contract renewal or increases in salary based on the subsequent level of the salary cap set for the 2013 to 2014 period. In 2012 it was reported that the Penrith Panthers asked players to remove a clause in their contracts related to receiving a percentage of any increase in the salary cap (Riccio, 2012). In addition, the West Tigers were reported to have opened discussions on re-negotiating a player's contract as it contained a clause allowing for a renegotiation following any increase in the salary cap (Jackson, 2013).

Figure 1. Evolution of the Consumer Price Index and the Salary Cap – 2001 to 2012



2.2 Salary Cap Violations

Table 2 reviews the level of the salary cap and the timing of major incidences/violations between 1990 and 2012. Notable events included within Table 2 include the introduction of the salary cap in 1990, the Super League war in 1997, the formation of the NRL in 1998 and then three periods where teams were found to have violated the salary cap to a notable extent for a sustained period. Also included in Table 2 are the amounts with which each team was found to have breached the salary cap. Between 2001 and 2003 the Canterbury Bulldogs were found to have circumvented the salary cap by at least \$2 million AUD. More moderately, the New Zealand Warriors were found to have circumvented the salary cap by approximately \$1.1 million AUD during 2004 and 2005. In contrast, the Melbourne Storm circumvention of the salary cap between 2006 and 2010 has been described as a period in which “the Storm developed a toxic culture of deceit that led to the Club making secret payments that exceeded the Salary Cap by an amount that totalled approximately \$3.8 million” AUD. (NRL, 2011; 2) The Salary Cap Auditor’s Report notes that: “the Storm obtained a benefit to which the Club would otherwise not have been entitled, namely, a markedly strengthened playing roster.

That in turn led during the period in question to the Storm appearing in four successive Grand Finals (2006 to 2009), winning the 2007 and 2009 Telstra Premierships and the Minor Premiership for the 2006, 2007 and 2008 Seasons.” (NRL, 2011: 3) It should be noted that the Salary Cap Auditor specifically notes that no evidence was found to establish that the players involved and the coach Craig Bellamy were aware of the breaches. (NRL, 2011: 5 and 68)

Having briefly noted the history of major salary cap violations in the NRL, section 3.2 will investigate whether the teams identified in Table 2 had a notable and statistically significant advantage in the years that they were found to have notably circumvented the salary cap. In the case of the Melbourne Storm the investigation will review whether the breaches in the salary cap fully explain the success of the team in that period. A notable result that is established is that the breach amounts reported by the Salary Cap Auditor are insufficient in tracking the success which occurred within 2006 and 2007. Indeed the Salary Cap Auditor has stated that: “it is important in considering the conclusions that I have reached in this report to recognise that this may not disclose the full extent of the breaches of the Salary Cap Rules by the Storm during the relevant years. The information obtained in the investigations is necessarily not a complete record of what occurred as I have not had full access to all potentially relevant documents and communications.” (NRL, 2011: 15) However, this also leads to the question of whether the player contracts in this period adequately reflected the talent within the team. With 2007 being the most successful season, the breach amount of \$459,206 is not fully compatible with the level of success the Storm enjoyed and an indicator of player talent for the period between 2005 and 2009 is statistically significant irrespective of an allowance made for the breach amount. Nevertheless, in the post-2007 period, keeping the successful combination of players together would have been a challenge as their true value was revealed and Premiership winning players are usually associated with a premium. Indeed, it is of interest that the Salary Cap Auditor identifies three phases of the ‘salary cap rorting’, these being between 2005 and 2007, 2008 and then a final phase which commenced in 2008. These phases are consistent with the success of 2007, large breach amounts after 2007 and the challenge of keeping Premiership winning players together.

Table 2. Salary Cap Level and Salary Cap Violations

Season	Salary Cap Level for Top 25 Players (Million AUD)		Description of Major Incidents/Violations	Breach Size (AUD)	Breach as a % of Cap
	Unadj.	CPI adj. (2001)			
1990	0.80-1.50	-	Salary Cap introduced which differs based on the clubs circumstances.	-	-
1991-1993	1.60	-		-	-
1994-1996	1.80	-		-	-
1997	None	-	Super League war	-	-
1998	3.25	-	NRL Formed	-	-
1999	3.25	-		-	-
2000	3.33	-	Introduction of guidelines for Salary Cap Violations – includes fines and deduction of competition points.	-	-
2001	3.35	3.35	Canterbury Bulldogs – Breach of the Salary Cap of approximately \$2 million over three years, fined \$500,000 and had a removal of competition points in the 2002 season.	750,000	22.4%
2002	3.45	3.36		889,496	25.8%
2003	3.55	3.36		459,500	12.9%
2004	3.55	3.28	New Zealand Warriors – New management discovered breaches relating to seasons 2004 and 2005 – reported to be \$1.1 million over two years. Fined \$430,000 and stripped of 4 competition points in 2006.	550,000	15.5%
2005	3.60	3.25		550,000	15.3%
2006	3.90	3.38	Melbourne Storm – Stripped of 2007 and 2009 Premierships and stripped of 2006-2008 Minor Premierships. Paid back \$1.1 million prize money and fined \$500,000. Unable to accumulate competition points in 2010.	302,891	7.8%
2007	4.00	3.40		459,206	11.5%
2008	4.10	3.33		957,206	23.3%
2009	4.10	3.29		1,020,597	24.9%
2010	4.30	3.34		1,039,696	24.2%
2011	4.30	3.23	No Major Violations Reported	-	-
2012	4.40	3.26		-	-

Section 3 – Multivariate Analysis

Having discussed a preliminary review of the key factors addressed in this report, this section investigates these factors together using Generalized Estimating Equation (GEE) Population-Averaged Probit Regressions. By utilising this regression technique, we are able calculate the probability of a home team win, subject to key factors included within the regressions. This allows for an assessment of whether such factors are statistically significant in determining differences in the probability of a home team win. Variables designed to capture differences in team quality are included in the regressions (refer to Table 3 for a broader description of the variables included in the regressions). Two of the measures of team quality potentially introduce heteroscedasticity into the results; hence robust standard errors are imposed. Heteroscedasticity is likely to occur as the difference in competition points (Diff. Comp. Pts) and difference in points scored (Diff. Pts) are calculated for the beginning of the match with the potential of higher accuracy as the season continues as these indicators depend on the progress of the season so far.

Section 3.1 will focus on the issue of home team advantage with respect to all of the sixteen teams within the competition between 2001 and 2012. Greater detail in the specific stadium types for the nine Sydney based teams is due to the peculiar nature of having multiple stadium types within the same city and team. For example, as calculated using Table 1, seven of the Sydney teams played approximately 41% of their home games at a shared stadium, six Sydney teams played approximately 87% of their home games at a traditional suburban ground, and three Sydney teams played 81% of their home games at a shared stadium.

Table 3 lists the variables used within the regression analysis alongside a description of the variable and the section/table within which the variable will be utilised. The approach to the regression estimation process is to establish a set of variables which adequately capture the impact of home

ground advantage and then utilise this basis for a review of the impact of salary cap breaches upon the performance of a team. Central to the analysis is the use of probit regressions to calculate the probability of a home team win when the home team and the away team are of a similar quality. Similar quality is measured by the teams having had a similar amount of success in that season in terms of competition points and the aggregated point difference from the matches themselves. By imputing elasticities and probabilities with key variables set to certain values, we are able to capture the change in the probability of a home team win when the difference in competition points (Diff. Comp. Pts) and the difference in aggregate points difference (Diff. Pts) is set to one unit. Hence, the probability of a home team win is calculated for the situation where the position on the competition ladder of the away team is only slightly higher than the home team (this equates to a scenario where the difference in success between the teams is a draw for the away team, rather than a loss) and that in all the games during the season up until that point the away team has only scored one more point than the home team (with respect to the aggregate amount that the competitors scored against the team in question).

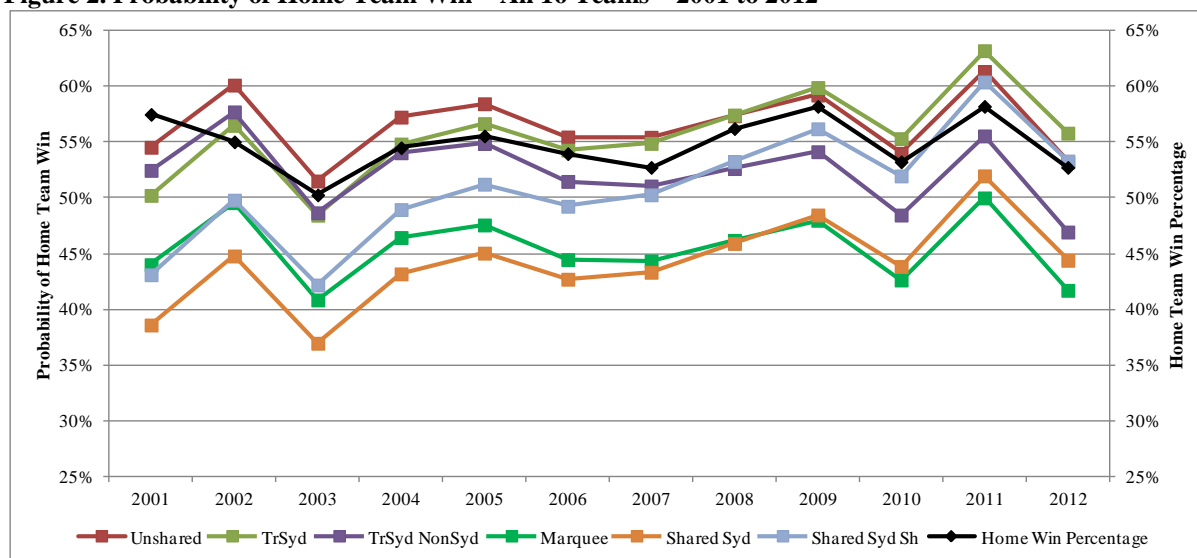
Table 3. Application and Definition of Variables Used in Regressions

Section	Variable	Definition	
Section 3.1 - Home Team Advantage - Table 1A	Unshared	Unshared home ground	
	TrSyd	Traditional Sydney suburban ground against a Sydney based team	
	TrSyd NonSyd	Traditional Sydney suburban ground against a non-Sydney based team	
	Marquee	Game played at a marquee ground in a neutral city	
	Shared Syd	Shared Sydney stadium	
	Shared Syd Sh	Shared Sydney stadium against a team that shares it with the home team	
	Unshared TT	Interaction variable - Unshared multiplied by time trend	
	TrSyd TT	Interaction variable - TrSyd multiplied by time trend	
	TrSyd NonSyd TT	Interaction variable - TrSyd NonSyd multiplied by time trend	
	Marquee TT	Interaction variable - Marquee multiplied by time trend	
	Shared Syd TT	Interaction variable - Shared Syd multiplied by time trend	
	Shared Syd Sh TT	Interaction variable - Shared Syd Sh multiplied by time trend	
	Section 3.2 - Salary Cap Breaches - Tables 2A to 5A	No. Referee	Number of referees - one between 2001 and 2008 - two from 2009 onwards
		CPI adj Salary Cap	CPI adjusted Salary Cap level (with respect to the 2001 level)
TT		Time trend	
2002 Dum. Var.		Variable which captures the year as an outlier	
2003 Dum. Var.		Variable which captures the year as an outlier	
2010 Dum. Var.		Variable which captures the year as an outlier	
2012 Dum. Var.		Variable which captures the year as an outlier	
Perc. Highest Cwd		Attendance as a percentage of highest crowd recorded at that field	
Diff. Comp. Pts		Difference in the competition points - as held at the start of the match	
Diff. Pts		Difference in the aggregate points difference - as held at the start of the match	
No. Finals Wins		Number of Finals wins during the 2001 to 2012 period	
Section 3.2 - Salary Cap Breaches - with additional information on Melbourne Storm team profile - Table 6A		Mjr Scap Breach - MS - Home	Dummy variable or level of breach (in Million AUD) for Melbourne Storm - applied for a home game
		Mjr Scap Breach - CB - Home	Dummy variable or level of breach (in Million AUD) for Canterbury Bulldogs - applied for a home game
		Mjr Scap Breach - NZ - Home	Dummy variable or level of breach (in Million AUD) for New Zealand Warriors - applied for a home game
	Mjr Scap Breach - MS - Away	Dummy variable or level of breach (in Million AUD) for Melbourne Storm - applied for a away game	
	Mjr Scap Breach - CB - Away	Dummy variable or level of breach (in Million AUD) for Canterbury Bulldogs - applied for a away game	
	Mjr Scap Breach - NZ - Away	Dummy variable or level of breach (in Million AUD) for New Zealand Warriors - applied for a away game	
	Coach Bellamy	Dummy variable for home games where Craig Bellamy was the coach of the Melbourne Storm	
	Captain C Smith	Dummy variable for home games where Cameron Smith was the captain of the Melbourne Storm	
	Rep. Player Index	Representative Player Index for the Melbourne Storm based on 2007 - applied to Melbourne Storm home games between 2005 to 2009	

3.1 Home Team Advantage

Figure 2 reviews the results of the multivariate regressions in terms of the estimate probability of a home team win across the population reviewed. As previously noted, these estimates reflect the probability of a home team win when the home team and the away team are of a similar quality. Before discussing the results of Figure 2, it should be noted that the regression results are shown in the appendix of the report. Table 1A shows both the regression estimates and the marginal effect for 2012. Figure 2 reviews the econometrically derived probability of a home team win with respect to home team advantage. Overall, marquee and shared Sydney stadiums against a non-sharer have fared the worst with predicted probabilities below 50% in all but one year. The average probabilities estimated across the period were: 56.50% for unshared stadiums, 55.63% for traditional Sydney stadiums against Sydney based rivals, 52.34% for traditional Sydney stadiums against non-Sydney teams, 50.83% for the shared Sydney stadium against a sharer, 45.48% for marquee stadiums and 44.10% for shared Sydney stadiums against non-sharers.

Figure 2. Probability of Home Team Win – All 16 Teams – 2001 to 2012



The order of the probabilities has changed in comparison to the percentage of home team wins in section 2.1 where the shared Sydney stadium against a sharer was the second most favourable stadium and this stadia type is now the fourth most favourable once certain factors have been accounted for. However, it should be noted that the most dramatic change over time is that the probability of a home team win has substantially increased between 2001 and 2012 for the shared Sydney stadiums against a sharer. With the number of games classified as a shared Sydney stadium against a sharer changing over time, the pattern implies that teams have become more comfortable playing in such situations with a greater regularity of games, rather than notable increases in the occurrence of large crowds (with average crowds at such games spiking in 2007 at almost 26 thousand per match). Focusing on the most recent year, 2012, figure 2 and table 1A show that with a 55.81% predicted probability that a traditional Sydney stadium against a non-Sydney team has the highest probability of a home team win when the two teams have had a similar level of success during the season. This is then followed by a shared Sydney stadium against the sharer (53.31%) and an unshared stadium (53.24%). All other stadiums have a predicted probability of less than 50% and hence are relatively unfavourable.

Table 1A also presents the regression results for all teams in the NRL competition with the difference in points scored during the season and the number of finals wins being statistically significant with a 1% confidence interval. The difference in competition points and the relative size of the crowd in comparison to the largest crowd to have appeared at the stadium to that date (Perc. Highest Cwd) are significant with a 5% confidence interval. When marginal effects are calculated for 2012, most stadium types are statistically significant indicators for the probability of a home team win. None of the time trend variables and only one of the outlier variables are significant, but as the overall fit is statistically significant and the trends tend to fit the home win percentage shown in Figure 2, we have kept these variables within the analysis.

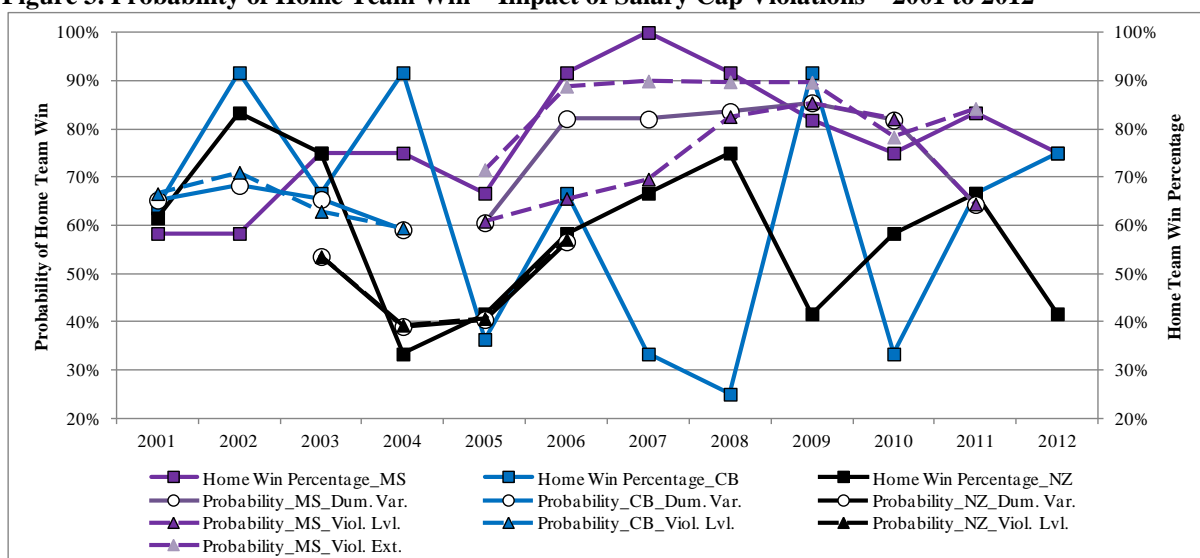
3.2 Salary Cap Breaches

Having reviewed the impact of different home grounds on the probability of a home team win, the analysis now turns to a review of the impact of salary cap violations. As noted in section 2.2 there were three notable cases of salary cap violations across three different teams and three distinct periods of time. Within this analysis a range of factors are reviewed, including the salary cap violation being defined as either a dummy variable for the period concerned or as the level of the salary cap violation (with the incorporation of the monetary breach amounts into the regressions, as listed in Table 2). Before focusing on the summary of the results shown in Figure 3, it should be noted that the regression results are shown in the appendix of this report. Figure 3 provides an overview of the results with a comparison between the probability of a home team win in the periods within which the team was identified as having circumvented the salary cap and the actual home team win percentage for the team across all of the years reviewed. At least three lines are plotted for each team so as to compare the raw home team win percentage from the data with the probability of a home team win when teams have had a similar level of success using either a dummy variable or the monetary level to represent salary cap violations within the analysis.

Table 2A and 3A review the regressions conducted using a dummy variable for the period within which the Canterbury Bulldogs, the New Zealand Warriors and the Melbourne Storm breached the salary cap. The first column of the tables show the regression estimates and then produces the estimates in terms of the marginal effect for 2012 so that the results are more easily reviewed. Refer to the observations labelled with ‘_Dum. Var.’ in Figure 3 for the estimated probability of home team wins with a dummy variable to capture the salary cap violations. Table 5A and 6A review the regressions conducted using the amounts by which the Canterbury Bulldogs, the New Zealand Warriors and the Melbourne Storm breached the salary cap. Refer to the observations labelled with ‘_Viol. Lvl.’ in Figure 3 for the estimated probability of home team wins with the level of salary cap violation incorporated into the analysis. Table 6A then completes the analysis by focusing on the

Melbourne Storm and incorporates team specific variables to capture the impact of Craig Bellamy becoming Head Coach of the team, the emergence of Cameron Smith as the Captain of the Melbourne Storm and a variable which captures the impact of the number of matches played by the nine Australian Representative players who have been identified by the Authors as being instrumental in achieving an unbeaten home record, the Minor Premiership and the Premiership all within the 2007 season. Refer to the observations labelled with ‘_Viol. Ext.’ in Figure 3 for the estimated probability of home team wins with the level of salary cap violation incorporated into the analysis with an extended range of variables that have been identified as being important in explaining the success of the Melbourne Storm during the 2005 and 2010 period.

Figure 3. Probability of Home Team Win – Impact of Salary Cap Violations – 2001 to 2012



Of interest at this point are key findings for each team. For the Canterbury Bulldogs their home win percentage has shown a great amount of variation with 2002, 2004 and 2009 being their most successful years with respect to home team wins. They were also Premiers in 2004. The results in Table 3A and Table 5A show that the salary cap variables (both as dummy variables and as the level of the breach) are statistically significant, but as seen in Figure 4, the breaches do not explain the peaks in 2002 and 2004. Note that the issue of matching contract payments to player quality is an issue for 2004 as many of the players took pay cuts to stay together and satisfy the salary cap with a similar squad of players (Walter, 2002; Mascord, Masters and Magnay, 2002). In the case of the New

Zealand Warriors, 2004 and 2005 were the periods where the team was found to have been violating the salary cap and this coincides with a decrease in the probability of a home team win. As noted in Table 2, this period also coincided with a new management, who discovered breaches relating to seasons 2004 and 2005. Hence the poor performance can be associated with a change in coach in 2005, the previous management and the internal environment within a club in financial trouble. The motivations for circumventing the salary cap are unclear, however it may be possible that it was to hide poor management of the salary cap by the club or to try and boost performance, hence revenue through better home crowd attendances. At the end of 2004 notable signings were made, including an Australian representative and the New Zealand national team captain. New management and a new head coach at the club did lead to increased success between the 2005 and 2008 seasons.

The case of the Melbourne Storm is an interesting one as they have been the most successful club in the 2001 to 2012 period and the win percentage of home matches reflects this with a home win rate of over 70% having been sustained in the 2003, 2004 and the post-2006 period. The importance of the utilisation of regression analysis is important here as the probability of home team wins for the Melbourne Storm are likely to be driven by an unshared home ground, a talented coach, the discovery of a number of talented players at a young age, a captain who is known to be instrumental in the success of the teams he plays in (including the Australian and Queensland representative teams), and other auxiliary factors, such as training facilities and player development infrastructures. Indeed, the differences in the probabilities imputed within Table 2A and Table 4A, as reflected in the use of a dummy variable or the level of the salary cap violation, highlight some key issues which may have been driving the success in the 2006 to 2009 period. With a dummy variable utilised in Table 2A, the probability of a home team win is imputed at 82.13% in 2006, 82.04% in 2007, 83.60% in 2008, 85.42% in 2009 and 81.85% in 2010. However, with the amount of the breach included in the regression in Table 4A, the probability of a home team win is imputed at 65.59% in 2006, 69.60% in 2007 and 82.56% in 2008. Indeed, the low amounts of salary cap breaches obtained from the Salary Cap Auditor's report, NRL (2011), for 2006 and 2007 result in lower probability estimates in years

where the team was still comparatively successful. This is especially true for 2007 when the Melbourne Storm won the Premiership.

The breach amounts reported by the Salary Cap Auditor are insufficient in tracking the success which occurred within 2006 and 2007. However, before concluding that this is due to a greater extent of salary cap violations than that reported by the Salary Cap Auditor, even though it was admitted by Ian Schubert that this may be the case, this result also leads to the question of whether the player contracts in this period adequately reflected the talent within the team. With 2007 being the most successful season, the amount of Australian Representatives chosen from the Melbourne Storm in that year was ten players – nine of which are identified within Table 5. Table 5 notes the number of games these players played in the preceding and subsequent seasons and the Player Ratio variable that has been created based on the proportion of matches that these players played with respect to 2007. It may be possible that the salary cap breaches in 2006 and 2007 were minimal and reflect the numbers that the Salary Cap Auditor produced as many of the players were at early stages of their careers and may have been on contracts that did not reflect their true value. In the post-2007 period, keeping the successful combination of players together would have been a challenge as their true value was revealed and Premiership winning players are usually associated with a premium. Within the National Rugby League competition, there are periods where teams outperform others until the true value of players is revealed to the market, upon which it becomes difficult to retain the best players. At one point the Salary Cap Auditor mentions that without the problems created by contract variations before 2009, the Storm's position was still dire and "although it had not won the premiership (in 2008) its playing roster remained extremely deep and strong, with a number of players increasing their market value due to their development". (NRL, 2011: 34)

It is of interest that the Salary Cap Auditor identifies three phases of the 'salary cap rorting', these being between 2005 and 2007, 2008 and then a final phase which commenced in 2008. These phases

are consistent with the success of 2007, large breach amounts after 2007 and the challenge of keeping Premiership winning players together in the period after 2007. Indeed, the Player Ratio variable within Table 5 is statistically significant within the regression and in doing so the salary cap breach amount variable becomes insignificant. Utilising a dummy variable for the salary cap breach results in the variable remaining significant and a similar probability of home team wins. Hence the formulation of the variable matters as the Player Ratio is still significant but numerically smaller – hence showing a correlation between the salary cap breaches and the number of games played by the players listed in Table 5.

Table 5. Australian Representative Players from Melbourne Storm in 2007 and Rep. Player Index

Player Name	Number of Regular Season Matches					Players Scrutinised in Investigations ³
	2005	2006	2007	2008	2009	
FOLAU, Israel	0	0	26	23	0	N
CRONK, Cooper	19	26	24	26	26	Y
HOFFMAN, Ryan	22	26	24	21	24	N
SMITH, Cameron	22	24	23	23	24	Y
SLATER, Billy	0	14	22	22	25	Y
KING, Matt	22	20	22	0	0	N
JOHNSON, Dallas	23	22	22	22	23	Y
INGLIS, Greg	13	18	19	20	22	Y
CROCKER, Michael	0	13	9	19	0	Y
Number Matches	121	163	191	176	144	
Rep. Player Index	0.6335	0.8534	1.0000	0.9215	0.7539	

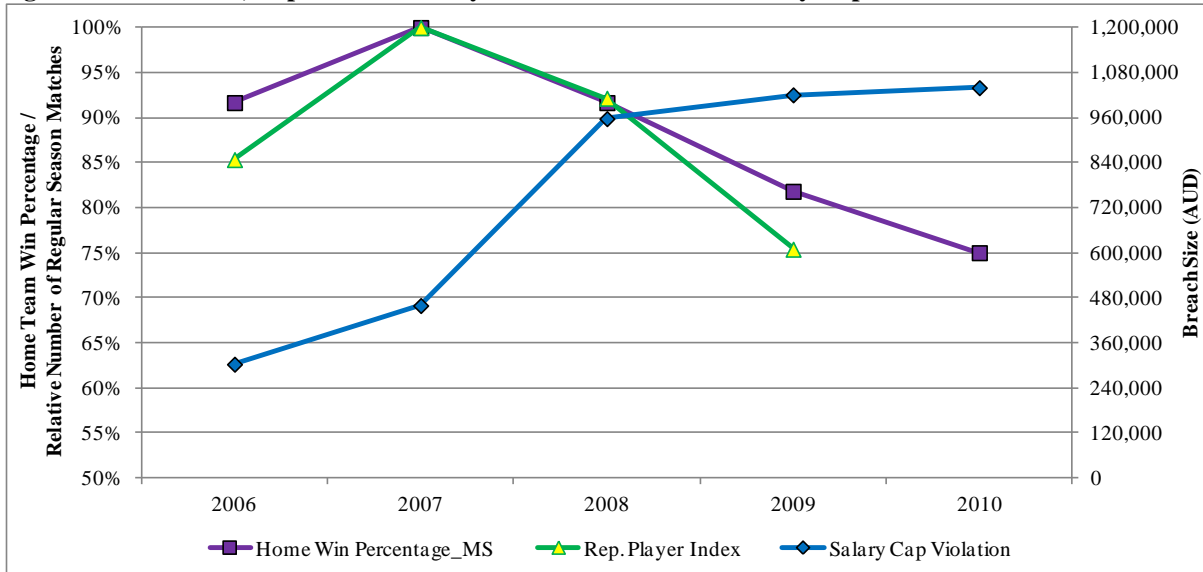
Indeed, our interest in these results concerns the original talent identification of players and the desire to keep the player group together, rather than insufficient valuation of the breaches by the Salary Cap Auditor. Figure 4 shows the trends of interest for this discussion and compares the home win percentage to the representative player index and the amount of salary cap violations. As shown in

³ As identified by the media and noted within Proszenko, A. (2010). While these players had their payments scrutinised as part of investigations as at the time of publication (April 2010) there was no suggestion that the players or their managers were aware of salary cap circumvention. The article does note that these players were “superstars (who) have played an integral role in the Storm’s on-field success in recent seasons”.

Figure 4, significant success in the period before 2007 predated the largest salary cap violations, but closely aligns with the amount of games that the playing group identified in Table 5 played in each year. The relationship between the salary cap violations in 2006 and 2007 to those in 2008 and beyond is not straight forward as in many cases player payments were shifted to the upcoming seasons. Nevertheless, signings and upgraded contracts made in 2006 for the 2007 season and onwards tend to be crucial to the extent of the salary cap violations with eight player contracts having been amended.

The Salary Cap Auditor report identifies June 2007 as being a key point as “while the Storm had superstars coming off contract in 2008” (NRL, 2011: 27) an email by a Storm staff member stated that they had “the game’s elite of elite coming off” (NRL, 2011: 27) contract in 2009. And upon introducing the description of details on the 2008 violations, the Salary Cap Auditor notes that “while the Storm’s on-field success had never been greater its Salary Cap problems, even on its disclosed payments, were now acute” (NRL, 2011: 28). In December 2007 a scheme was proposed to make contract variations in order to reduce the 2008 payments by \$336,000 AUD. This second phase of the violations were then eclipsed as early as the middle of 2008 with 2009 being the impending date to re-sign the ‘game’s elite of elite’. The third phase resulted in the termination of two player contracts, contract re-negotiations with seven players and image rights payments for four players. In April 2010 the violations were made public after a range of escalating issues resulted in a situation where the Melbourne Storm was facing an audit and owed money to “each of its three best players for unfulfilled guaranteed third party payments for the 2009 season.” (NRL, 2011: 41) The violation period coincided with the Storm having played in four successive Grand Finals.

Figure 4. Home Wins, Representative Players and the amount of Salary Cap Violation



Section 4 – Conclusion

Estimating an econometrically derived probability of a home team win has allowed for a detailed review of home team advantage and salary cap violations within the National Rugby League (NRL) in Australia between 2001 and 2012. Focusing upon the within-season competitive balance has shown that home team advantage and salary cap violations can be a statistically significant determinant of home team wins. Allowing for key factors, such as the difference in quality⁴, results in a ranking of the stadium types that is different to the home team win percentage that was realised during the period between 2001 and 2012. As a result, we confirm that a notable home ground advantage can be gained from different stadium types even after a consideration of the quality of the opponent has been made. The benefit of playing at certain stadiums has been speculated upon within the media and we can confirm that playing at a traditional Sydney stadium does provide an advantage to the home team. This advantage tends to be stronger against a rival team from within Sydney.

Figure 2 reviewed the econometrically derived probability of a home team win with respect to home team advantage for each of the years between 2001 and 2012. Overall, marquee and shared Sydney stadiums against a non-sharer have fared the worst with predicted probabilities below 50% in all but one year. The average probabilities estimated across the period are shown in Table 6 with a comparison to the percentage of home team wins (sourced using the average of the untransformed and raw data). Table 6 also reviews the probabilities estimated for the most recent year reviewed, 2012. The order of the probabilities is different to the percentage of home team wins as accounting for key factors notably impacts the ranking, for example, refer to the ranking (and appeal) of playing at a shared Sydney stadium against a team that shares the stadium.

⁴ Measured as the team's success up until that point of the season and based on the difference in competition points and the difference in points scored.

Table 6. Comparison of the Probability and the Percentage of Home Team Wins

	Probability of Home Team Win – 2001/2012 Average	Rank	Home Team Win Percentage – 2001/2012 Average	Rank	Probability of Home Team Win - 2012	Rank
Unsh.	56.50	1	60.87	1	53.24	3
TrSyd.	55.63	2	56.76	3	55.81	1
TrSyd. NonSyd	52.34	3	56.59	4	46.94	4
Shared Syd. Sh.	50.83	4	57.02	2	53.31	2
Marquee	45.48	5	45.12	6	41.71	6
Shared Syd.	44.10	6	52.04	5	44.40	5

A probability of a home team win of 50.83% is estimated in comparison to the home team win percentage of 57.02% for a shared Sydney stadium with a sharer and is an example of the impact of accounting for other factors, such as team quality. A shared Sydney stadium against a non-sharer has been estimated to be the least favourable stadium across the period reviewed (2001 to 2012) with a probability of a home team win of 44.10%. Note that this slightly worse than playing at a marquee stadium (45.48%). In 2012 the probability of a home team win for a shared Sydney stadium against a sharer was 53.31% and the most favourable location was a traditional Sydney stadium against a rival from Sydney (55.81%). It should be noted that the most dramatic change over time is that the probability of a home team win has substantially increased between 2001 and 2012 for the shared Sydney stadiums against a sharer. With the number of games classified as a shared Sydney stadium against a sharer changing over time, the pattern implies that teams have become more comfortable playing in such situations with a greater regularity of games, rather than notable increases in the occurrence of large crowds (with average crowds at such games spiking in 2007 at almost 26 thousand per match).

With respect to salary cap violations, in the period between 2006 and 2010 the probability of a home team win for the Melbourne Storm has been estimated to increase by between 16.8% and 27% for an additional \$1 million AUD of salary cap violations, when the level of salary cap violations have been accounted for and teams are almost evenly matched in terms of quality. The impact of these violations

remain statistically significant even when additional factors are accounted for, such as variables to capture the impact of Craig Bellamy becoming Head Coach of the team, the emergence of Cameron Smith as the Captain of the Melbourne Storm and a variable which captures the impact of the number of matches played by nine Australian Representative players⁵. The impact of salary cap violations on the probability of a home team win for the Melbourne Storm reduces to be between 6.4% and 10.6% for an additional \$1 million AUD of salary cap violations, when the team specific variables have been accounted for and teams are almost evenly matched in terms of quality. This implies that a notable role of the salary cap violations was the retention of a core group of players who were instrumental in the success that occurred in the 2007 season as there is a correlation between the salary cap breaches and the number of games played by the players listed in Table 5. Our interpretation of this result concerns the original talent identification of players and the desire to keep the player group together, rather than insufficient valuation of the breaches by the Salary Cap Auditor. Significant success in the period before 2007 predated the largest salary cap violations, but closely aligns with the amount of games that the playing group identified in Table 5 played in each year.

⁵ These players have been identified by the Authors as being instrumental in achieving an unbeaten home record, the Minor Premiership and the Premiership in the 2007 season.

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Appendix

Table 1A. GEE Population-Averaged Probit Regression – Home Team Win and Stadium Type – 2001 to 2012 – All Teams in Competition

	Home Team Win Dum. Var. (All)	Marginal Effects 2012 Unshared	Marginal Effects 2012 TrSyd	Marginal Effects 2012 TrSyd NonSyd	Marginal Effects 2012 Marque	Marginal Effects 2012 Shared Syd	Marginal Effects 2012 Shared Syd Sh		Home Team Win Dum. Var. (All)	Marginal Effects 2012 Unshared	Marginal Effects 2012 TrSyd	Marginal Effects 2012 TrSyd NonSyd	Marginal Effects 2012 Marque	Marginal Effects 2012 Shared Syd	Marginal Effects 2012 Shared Syd Sh
Unshared	2.171	0.526***	0.483***	0.463***	0.538***	0.584***	0.546***	TT	0.015	0.006	0.006	0.006	0.006	0.006	0.006
	2.32	0.07	7.87	0.00	0.39	0.66	1.00		0.02	0.01	0.69	0.49	-0.01	0.02	1.00
TrSyd	2.047	0.439***	0.482***	0.458***	0.531**	0.575**	0.538***	2002 Dum. Var.	0.138	-	-	-	-	-	-
	2.31	0.15	2.96	0.00	0.15	0.73	0.00		0.13	-	-	-	-	-	-
TrSyd NonSyd	2.129	0.442***	0.481***	0.505***	0.536***	0.581***	0.544***	2003 Dum. Var.	-0.083	-	-	-	-	-	-
	2.33	0.14	3.25	0.00	0.18	0.71	0.00		0.11	-	-	-	-	-	-
Marque	1.909	0.433***	0.470**	0.451**	0.420***	0.561**	0.528***	2007 Dum. Var.	-	-	-	-	-	-	-
	2.29	0.17	2.48	0.01	0.09	0.78	0.00		-	-	-	-	-	-	-
Shared Syd	1.751	0.423**	0.458*	0.440*	0.505	0.365***	0.512**	2008 Dum. Var.	-	-	-	-	-	-	-
	2.33	0.22	1.96	0.05	0.00	0.85	0.00		-	-	-	-	-	-	-
Shared Syd Sh	1.857	0.430***	0.466**	0.448**	0.516*	0.555*	0.410***	2010 Dum. Var.	-0.107	-	-	-	-	-	-
	2.37	0.19	2.25	0.02	0.06	0.80	0.00		0.13	-	-	-	-	-	-
Unshared TT	-0.006	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	2012 Dum. Var.	-0.194*	-0.077*	-0.077*	-0.077*	-0.075*	-0.072*	-0.074*
	0.02	0.01	-0.29	0.77	-0.02	0.01	1.00		0.11	0.04	-1.83	0.07	-0.16	0.01	0.00
TrSyd TT	0.010	0.004	0.004	0.004	0.004	0.004	0.004	Perc. Highest Cwd	-0.003**	-0.001**	-0.001**	-0.001**	-0.001**	-0.001**	-0.001**
	0.01	0.00	1.23	0.22	0.00	0.01	0.00		0.00	0.00	-2.00	0.05	0.00	0.00	48.21
TrSyd NonSyd TT	-0.016	-0.006	-0.006	-0.006	-0.006	-0.006	-0.006	Diff. Comp. Pts	0.014**	0.005**	0.005**	0.005**	0.005**	0.005**	0.005**
	0.04	0.01	-0.42	0.67	-0.04	0.02	0.00		0.01	0.00	2.20	0.03	0.00	0.01	1.00
Marque TT	-0.009	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	Diff. Pts	0.001***	0.001***	0.001***	0.001***	0.001***	0.000***	0.001***
	0.05	0.02	-0.16	0.87	-0.04	0.04	0.00		0.00	0.00	4.38	0.00	0.00	0.00	1.00
Shared Syd TT	0.010	0.004	0.004	0.004	0.004	0.004	0.004	No. Finals Wins	0.026***	0.010***	0.010***	0.010***	0.010***	0.010***	0.010***
	0.03	0.01	0.31	0.76	-0.02	0.03	0.00		0.01	0.00	3.15	0.00	0.00	0.02	6.86
Shared Syd Sh TT	0.020	0.008	0.008	0.008	0.008	0.008	0.008								
	0.02	0.01	0.91	0.36	-0.01	0.03	0.00	n – no. Games	2209	84	33	28	7	25	14
No. Referee	0.009	0.004	0.004	0.004	0.004	0.004	0.004	i – no. Teams	16	8	6	6	5	5	6
	0.13	0.05	0.07	0.95	-0.10	0.11	0.00	Chi Sq (14)	86.93***	-	-	-	-	-	-
CPI adj Salary Cap	-0.628	-0.249	-0.250	-0.250	-0.248	-0.240	-0.247	Probability	-	53.24%	55.81%	46.94%	41.71%	44.40%	53.31%
	0.73	0.29	-0.85	0.40	-0.83	0.33	0.35								

Statistical Significant - P Value: 1% - ***, 5% - **, 10% - *.

Table 2A. GEE Population-Averaged Probit Regression – Home Team Win and Salary Cap Breach Dummy Var. – 2001 to 2012 – Melbourne Storm

	Home Team Win Dum. Var. (All)	Marginal Effects 2006 MS	Marginal Effects 2007 MS	Marginal Effects 2008 MS	Marginal Effects 2009 MS	Marginal Effects 2010 MS		Home Team Win Dum. Var. (All)	Marginal Effects 2006 MS	Marginal Effects 2007 MS	Marginal Effects 2008 MS	Marginal Effects 2009 MS	Marginal Effects 2010 MS
Unshared	2.326	0.798***	0.797***	0.809***	0.822***	0.796***	2008 Dum. Var.	-	-	-	-	-	-
	2.10	0.09	0.09	0.11	0.13	0.10		-	-	-	-	-	-
TrSyd	2.194	0.179***	0.179***	0.164***	0.146**	0.181***	2010 Dum. Var.	-0.119	-0.030	-0.030	-0.028	-0.026	-0.027
	2.07	0.05	0.06	0.05	0.06	0.07		0.13	0.04	0.04	0.03	0.03	0.03
TrSyd NonSyd	2.248	0.179***	0.179***	0.164***	0.146**	0.181***	2012 Dum. Var.	-0.170*	-0.045	-0.045	-0.043	-0.040	-0.046
	2.09	0.05	0.06	0.05	0.06	0.07		0.10	0.03	0.03	0.03	0.03	0.03
Marque	1.961	0.178***	0.179***	0.164***	0.146**	0.181***	Perc. Highest Cwd	-0.003*	-0.001	-0.001	-0.01***	-0.001	-0.001
	2.08	0.06	0.06	0.05	0.06	0.07		0.00	0.00	0.00	0.00	0.00	0.00
Shared Syd	1.863	0.178***	0.179***	0.164***	0.146**	0.181***	Diff. Comp. Pts	0.015***	0.004**	0.004**	0.004**	0.003**	0.004**
	2.09	0.06	0.06	0.05	0.06	0.07		0.01	0.00	0.00	0.00	0.00	0.00
Shared Syd Sh	2.052	0.179***	0.179***	0.164***	0.146**	0.181***	Diff. Pts	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***
	2.15	0.06	0.06	0.05	0.06	0.07		0.01	0.01	0.01	0.01	0.01	0.01
Unshared TT	-0.012	-0.004	-0.004	-0.004	-0.003	-0.004	No. Finals Wins	0.011	0.004**	0.004**	0.003**	0.003**	0.004**
	0.02	0.01	0.01	0.00	0.00	0.00		0.01	0.00	0.00	0.00	0.00	0.00
TrSyd TT	0.007	0.002	0.002	0.002	0.002	0.002	Breach MS – H	0.659***	0.255***	0.256***	0.247***	0.236***	0.257***
	0.01	0.00	0.00	0.00	0.00	0.00		0.09	0.04	0.04	0.04	0.04	0.04
TrSyd NonSyd TT	-0.010	-0.002	-0.002	-0.002	-0.002	-0.002	Breach CB – H	0.449***	0.057**	0.057**	0.053**	0.049**	0.057**
	0.04	0.01	0.01	0.01	0.01	0.01		0.09	0.03	0.03	0.02	0.02	0.03
Marque TT	0.000	-0.001	-0.001	-0.001	-0.001	-0.001	Breach NZ – H	-0.493***	-0.16***	-0.16***	-0.16***	-0.15***	-0.16***
	0.05	0.01	0.01	0.01	0.01	0.01		0.08	0.04	0.04	0.03	0.04	0.04
Shared Syd TT	0.017	0.004	0.004	0.003	0.003	0.004	Breach MS – A	-0.196	-0.054	-0.055	-0.052	-0.048	-0.055
	0.03	0.01	0.01	0.01	0.01	0.01		0.18	0.05	0.05	0.05	0.05	0.06
Shared Syd Sh TT	0.017	0.004	0.004	0.004	0.003	0.004	Breach CB – A	-0.754***	-0.261**	-0.262**	-0.253**	-0.242*	-0.263**
	0.03	0.01	0.01	0.01	0.01	0.01		0.31	0.13	0.13	0.13	0.13	0.13
No. Referee	0.036	0.007	0.007	0.007	0.007	0.008	Breach NZ – A	0.324	0.067	0.067	0.062	0.057	0.067
	0.13	0.03	0.03	0.03	0.03	0.04		0.36	0.07	0.07	0.07	0.06	0.07
CPI adj Salary Cap	-0.640	-0.214	-0.215	-0.203	-0.187	-0.216							
	0.67	0.20	0.20	0.18	0.18	0.19							
TT	0.011	0.002	0.002	0.002	0.002	0.002							
	0.02	0.01	0.01	0.01	0.01	0.01							
2002 Dum. Var.	0.151	0.035	0.035	0.033	0.031	0.036							
	0.12	0.03	0.03	0.03	0.03	0.03							
2003 Dum. Var.	-0.065	-0.017	-0.017	-0.016	-0.015	-0.017	n	2209					
	0.11	0.03	0.03	0.03	0.03	0.03	i	16					
2007 Dum. Var.	-	-	-	-	-	-	Chi Sq (14)	200.59***	-	-	-	-	-
	-	-	-	-	-	-	Probability	-	82.13%	82.04%	83.60%	85.42%	81.85%

Table 3A. GEE Population-Averaged Probit Regression – Home Team Win and Salary Cap Breach Dummy Var. – 2001 to 2012 – Canterbury and New Zealand

	Home Team Win Dum. Var. (All)	Marginal Effects 2001 CB	Marginal Effects 2002 CB	Marginal Effects 2003 CB	Marginal Effects 2004 NZ	Marginal Effects 2005 NZ		Home Team Win Dum. Var. (All)	Marginal Effects 2001 CB	Marginal Effects 2002 CB	Marginal Effects 2003 CB	Marginal Effects 2004 NZ	Marginal Effects 2005 NZ
Unshared	2.326	0.646***	0.675***	0.648***	0.390***	0.404***	2008 Dum. Var.	-	-	-	-	-	-
	2.10	0.04	0.05	0.04	0.06	0.06		-	-	-	-	-	-
TrSyd	2.194	0.347***	0.317***	0.345***	0.603***	0.589***	2010 Dum. Var.	-0.119	-0.041	-0.040	-0.041	-0.041	-0.041
	2.07	0.06	0.07	0.07	0.09	0.09		0.13	0.05	0.05	0.05	0.05	0.05
TrSyd NonSyd	2.248	0.347***	0.317***	0.345***	0.604***	0.590***	2012 Dum. Var.	-0.170*	-0.061	-0.059	-0.061	-0.060	-0.061
	2.09	0.06	0.07	0.07	0.09	0.08		0.10	0.04	0.04	0.04	0.04	0.04
Marque	1.961	0.346***	0.316***	0.345***	0.599***	0.585***	Perc. Highest Cwd	-0.003*	-0.001*	-0.001*	-0.001*	-0.001*	-0.001*
	2.08	0.06	0.07	0.07	0.11	0.10		0.00	0.00	0.00	0.00	0.00	0.00
Shared Syd	1.863	0.345***	0.315***	0.344***	0.594***	0.581***	Diff. Comp. Pts	0.015***	0.005***	0.005***	0.005**	0.006**	0.006**
	2.09	0.07	0.07	0.07	0.13	0.12		0.01	0.00	0.00	0.00	0.00	0.00
Shared Syd Sh	2.052	0.346***	0.316***	0.345***	0.600***	0.587***	Diff. Pts	0.001***	0.000***	0.000***	0.000***	0.000***	0.000***
	2.15	0.06	0.07	0.07	0.11	0.10		0.00	0.00	0.00	0.00	0.00	0.00
Unshared TT	-0.012	-0.005	-0.005	-0.005	-0.006	-0.006	No. Finals Wins	0.011	0.005***	0.005***	0.005***	0.005***	0.005***
	0.02	0.01	0.01	0.01	0.01	0.01		0.01	0.00	0.00	0.00	0.00	0.00
TrSyd TT	0.007	0.003	0.003	0.003	0.003	0.003	Breach MS – H	0.659***	0.222***	0.208***	0.221***	0.292***	0.291***
	0.01	0.00	0.00	0.00	0.00	0.00		0.09	0.03	0.03	0.03	0.03	0.03
TrSyd NonSyd TT	-0.010	-0.003	-0.003	-0.003	-0.004	-0.004	Breach CB – H	0.449***	0.094***	0.091***	0.093***	0.096***	0.096***
	0.04	0.01	0.01	0.01	0.01	0.01		0.09	0.04	0.04	0.04	0.04	0.04
Marque TT	0.000	-0.002	-0.002	-0.002	-0.002	-0.002	Breach NZ – H	-0.493***	-0.19***	-0.19***	-0.19***	-0.20***	-0.20***
	0.05	0.02	0.02	0.02	0.02	0.02		0.08	0.03	0.03	0.03	0.03	0.03
Shared Syd TT	0.017	0.005	0.005	0.005	0.005	0.005	Breach MS – A	-0.196	-0.073	-0.071	-0.073	-0.071	-0.072
	0.03	0.01	0.01	0.01	0.01	0.01		0.18	0.07	0.07	0.07	0.06	0.06
Shared Syd Sh TT	0.017	0.005	0.005	0.005	0.006	0.006	Breach CB – A	-0.754**	-0.29***	-0.29***	-0.29***	-0.24***	-0.25***
	0.03	0.01	0.01	0.01	0.01	0.01		0.31	0.12	0.12	0.12	0.08	0.08
No. Referee	0.036	0.010	0.010	0.010	0.011	0.011	Breach NZ – A	0.324	0.101	0.097	0.101	0.116	0.117
	0.13	0.05	0.05	0.05	0.05	0.05		0.36	0.11	0.10	0.11	0.14	0.14
CPI adj Salary Cap	-0.640	-0.303	-0.292	-0.302	-0.314	-0.317							
	0.67	0.25	0.24	0.25	0.23	0.24							
TT	0.011	0.003	0.003	0.003	0.004	0.004							
	0.02	0.01	0.01	0.01	0.01	0.01							
2002 Dum. Var.	0.151	0.052	0.053	0.052	0.056	0.057							
	0.12	0.04	0.04	0.04	0.05	0.05							
2003 Dum. Var.	-0.065	-0.024	-0.022	-0.024	-0.024	-0.024	n	2209					
	0.11	0.04	0.04	0.04	0.04	0.04	i	16					
2007 Dum. Var.	-	-	-	-	-	-	Chi Sq (14)	200.59***	-	-	-	-	-
	-	-	-	-	-	-	Probability	-	65.24%	68.27%	65.40%	39.03%	40.48%

Table 4A. GEE Population-Averaged Probit Regression – Home Team Win and Salary Cap Breach Level – 2001 to 2012 – Melbourne Storm

	Home Team Win Dum. Var. (All)	Marginal Effects 2006 MS	Marginal Effects 2007 MS	Marginal Effects 2008 MS	Marginal Effects 2009 MS	Marginal Effects 2010 MS		Home Team Win Dum. Var. (All)	Marginal Effects 2006 MS	Marginal Effects 2007 MS	Marginal Effects 2008 MS	Marginal Effects 2009 MS	Marginal Effects 2010 MS
Unshared	2.783	0.647***	0.684***	0.793***	0.812***	0.790***	2008 Dum. Var.	-	-	-	-	-	-
	2.09	0.05	0.05	0.14	0.17	0.14		-	-	-	-	-	-
TrSyd	2.626	0.343***	0.303***	0.174***	0.146**	0.179***	2010 Dum. Var.	-0.116	-0.044	-0.042	-0.031	-0.028	-0.029
	2.07	0.09	0.08	0.05	0.06	0.07		0.13	0.05	0.05	0.04	0.03	0.03
TrSyd NonSyd	2.675	0.343***	0.303***	0.174***	0.146**	0.179***	2012 Dum. Var.	-0.159	-0.060	-0.058	-0.044	-0.039	-0.044
	2.09	0.08	0.08	0.05	0.06	0.07		0.10	0.04	0.04	0.03	0.03	0.03
Marque	2.441	0.342***	0.302***	0.174***	0.145**	0.179***	Perc. Highest Cwd	-0.003*	-0.001*	-0.001*	-0.001*	-0.001	-0.001
	2.07	0.09	0.09	0.05	0.06	0.07		0.00	0.00	0.00	0.00	0.00	0.00
Shared Syd	2.301	0.341***	0.302***	0.174***	0.145**	0.179***	Diff. Comp. Pts	0.015**	0.005**	0.005**	0.004**	0.003**	0.004**
	2.08	0.09	0.09	0.06	0.06	0.07		0.01	0.00	0.00	0.00	0.00	0.00
Shared Syd Sh	2.497	0.342***	0.303***	0.174***	0.145**	0.179***	Diff. Pts	0.001***	0.000***	0.000***	0.000***	0.000**	0.000***
	2.13	0.09	0.09	0.05	0.06	0.07		0.00	0.00	0.00	0.00	0.00	0.00
Unshared TT	-0.014	-0.005	-0.005	-0.004	-0.003	-0.004	No. Finals Wins	0.016***	0.006***	0.005***	0.004**	0.004*	0.004**
	0.02	0.01	0.01	0.01	0.00	0.00		0.01	0.00	0.00	0.00	0.00	0.00
TrSyd TT	0.007	0.003	0.003	0.002	0.002	0.002	Breach MS – H	0.734***	0.270***	0.257***	0.189***	0.168***	0.192***
	0.01	0.00	0.00	0.00	0.00	0.00		0.10	0.05	0.05	0.05	0.05	0.05
TrSyd NonSyd TT	-0.011	-0.004	-0.004	-0.003	-0.002	-0.003	Breach CB – H	0.357***	0.131**	0.125**	0.092**	0.082**	0.093**
	0.04	0.01	0.01	0.01	0.01	0.01		0.14	0.06	0.06	0.04	0.04	0.05
Marque TT	-0.006	-0.002	-0.002	-0.001	-0.001	-0.002	Breach NZ – H	-0.929***	-0.34***	-0.33***	-0.24***	-0.21***	-0.24***
	0.05	0.02	0.02	0.01	0.01	0.01		0.14	0.06	0.06	0.06	0.07	0.07
Shared Syd TT	0.014	0.005	0.005	0.004	0.003	0.004	Breach MS – A	-0.081	-0.030	-0.028	-0.021	-0.019	-0.021
	0.03	0.01	0.01	0.01	0.01	0.01		0.25	0.09	0.09	0.06	0.06	0.07
Shared Syd Sh TT	0.014	0.005	0.005	0.004	0.003	0.004	Breach CB – A	-1.139**	-0.419**	-0.398**	-0.293**	-0.260**	-0.298**
	0.03	0.01	0.01	0.01	0.01	0.01		0.47	0.18	0.17	0.14	0.13	0.15
No. Referee	0.026	0.010	0.009	0.007	0.006	0.007	Breach NZ – A	0.540	0.199	0.189	0.139	0.123	0.141
	0.14	0.05	0.05	0.03	0.03	0.04		0.65	0.24	0.23	0.17	0.16	0.18
CPI adj Salary Cap	-0.779	-0.287	-0.273	-0.201	-0.178	-0.204							
	0.66	0.26	0.26	0.19	0.18	0.19							
TT	0.009	0.003	0.003	0.002	0.002	0.002							
	0.02	0.01	0.01	0.01	0.01	0.01							
2002 Dum. Var.	0.150	0.053	0.050	0.036	0.032	0.037							
	0.12	0.04	0.04	0.03	0.03	0.03							
2003 Dum. Var.	-0.077	-0.029	-0.027	-0.021	-0.018	-0.021	n	2209					
	0.11	0.04	0.04	0.03	0.03	0.03	i	16					
2007 Dum. Var.	-	-	-	-	-	-	Chi Sq (14)	180.97***	-	-	-	-	-
	-	-	-	-	-	-	Probability	-	65.59%	69.60%	82.56%	85.44%	82.08%

Table 5A. GEE Population-Averaged Probit Regression – Home Team Win and Salary Cap Breach Level – 2001 to 2012 – Canterbury and New Zealand

	Home Team Win Dum. Var. (All)	Marginal Effects 2001 CB	Marginal Effects 2002 CB	Marginal Effects 2003 CB	Marginal Effects 2004 NZ	Marginal Effects 2005 NZ		Home Team Win Dum. Var. (All)	Marginal Effects 2001 CB	Marginal Effects 2002 CB	Marginal Effects 2003 CB	Marginal Effects 2004 NZ	Marginal Effects 2005 NZ
Unshared	2.783	0.657***	0.697***	0.622***	0.392***	0.406***	2008 Dum. Var.	-	-	-	-	-	-
	2.09	0.04	0.06	0.04	0.06	0.05		-	-	-	-	-	-
TrSyd	2.626	0.333***	0.289***	0.369***	0.598***	0.585***	2010 Dum. Var.	-0.116	-0.043	-0.041	-0.045	-0.044	-0.044
	2.07	0.06	0.06	0.07	0.11	0.10		0.13	0.05	0.05	0.05	0.05	0.05
TrSyd NonSyd	2.675	0.333***	0.289***	0.370***	0.599***	0.586***	2012 Dum. Var.	-0.159	-0.059	-0.056	-0.061	-0.059	-0.060
	2.09	0.06	0.06	0.07	0.10	0.10		0.10	0.04	0.04	0.04	0.04	0.04
Marque	2.441	0.332***	0.289***	0.368***	0.592***	0.579***	Perc. Highest Cwd	-0.003*	-0.001*	-0.001*	-0.001*	-0.001**	-0.001**
	2.07	0.06	0.06	0.08	0.13	0.12		0.00	0.00	0.00	0.00	0.00	0.00
Shared Syd	2.301	0.331***	0.288***	0.367***	0.586***	0.574***	Diff. Comp. Pts	0.015***	0.005**	0.005***	0.006**	0.006**	0.006**
	2.08	0.07	0.07	0.08	0.16	0.14		0.01	0.00	0.00	0.00	0.00	0.00
Shared Syd Sh	2.497	0.332***	0.289***	0.369***	0.594***	0.581***	Diff. Pts	0.001***	0.000***	0.000***	0.000***	0.000***	0.000***
	2.13	0.06	0.06	0.07	0.13	0.11		0.00	0.00	0.00	0.00	0.00	0.00
Unshared TT	-0.014	-0.005	-0.005	-0.005	-0.005	-0.006	No. Finals Wins	0.016***	0.006***	0.005**	0.006***	0.006***	0.006***
	0.02	0.01	0.01	0.01	0.01	0.01		0.01	0.00	0.00	0.00	0.00	0.00
TrSyd TT	0.007	0.003	0.003	0.003	0.003	0.003	Breach MS – H	0.734***	0.267***	0.251***	0.277***	0.282***	0.285***
	0.01	0.00	0.00	0.00	0.00	0.00		0.10	0.04	0.04	0.04	0.04	0.04
TrSyd NonSyd TT	-0.011	-0.004	-0.004	-0.004	-0.004	-0.004	Breach CB – H	0.357***	0.130***	0.122**	0.135***	0.137***	0.138***
	0.04	0.01	0.01	0.01	0.01	0.01		0.14	0.05	0.05	0.05	0.05	0.05
Marque TT	-0.006	-0.002	-0.002	-0.002	-0.002	-0.002	Breach NZ – H	-0.929***	-0.34***	-0.32***	-0.35***	-0.36***	-0.36***
	0.05	0.02	0.02	0.02	0.02	0.02		0.14	0.06	0.06	0.06	0.05	0.05
Shared Syd TT	0.014	0.005	0.005	0.005	0.006	0.006	Breach MS – A	-0.081	-0.030	-0.028	-0.031	-0.031	-0.032
	0.03	0.01	0.01	0.01	0.01	0.01		0.25	0.09	0.08	0.09	0.10	0.10
Shared Syd Sh TT	0.014	0.005	0.005	0.005	0.005	0.005	Breach CB – A	-1.139**	-0.42***	-0.390**	-0.430**	-0.438**	-0.442**
	0.03	0.01	0.01	0.01	0.01	0.01		0.47	0.17	0.18	0.18	0.19	0.19
No. Referee	0.026	0.009	0.009	0.010	0.010	0.010	Breach NZ – A	0.540	0.196	0.185	0.204	0.208	0.209
	0.14	0.05	0.05	0.05	0.05	0.05		0.65	0.24	0.22	0.24	0.25	0.25
CPI adj Salary Cap	-0.779	-0.284	-0.267	-0.295	-0.300	-0.302							
	0.66	0.25	0.24	0.26	0.24	0.25							
TT	0.009	0.003	0.003	0.003	0.004	0.004							
	0.02	0.01	0.01	0.01	0.01	0.01							
2002 Dum. Var.	0.150	0.053	0.053	0.055	0.059	0.059							
	0.12	0.04	0.04	0.04	0.05	0.05							
2003 Dum. Var.	-0.077	-0.028	-0.026	-0.029	-0.029	-0.030	n	2209					
	0.11	0.04	0.04	0.04	0.04	0.04	i	16					
2007 Dum. Var.	-	-	-	-	-	-	Chi Sq (14)	180.97***	-	-	-	-	-
	-	-	-	-	-	-	Probability	-	66.59%	71.01%	62.90%	39.30%	40.69%

Table 6A. GEE Population-Averaged Probit Regression – Home Team Win, Salary Cap Breach Level and Other Factors – 2001 to 2012 – Melbourne Storm

	Home Team Win Dum. Var. (All)	Marginal Effects 2005 MS	Marginal Effects 2006 MS	Marginal Effects 2007 MS	Marginal Effects 2008 MS	Marginal Effects 2009 MS		Home Team Win Dum. Var. (All)	Marginal Effects 2005 MS	Marginal Effects 2006 MS	Marginal Effects 2007 MS	Marginal Effects 2008 MS	Marginal Effects 2009 MS
Unshared	2.650	0.647***	0.816***	0.817***	0.818***	0.819***	2008 Dum. Var.	-	-	-	-	-	-
	2.15	0.06	0.28	0.29	0.31	0.33		-	-	-	-	-	-
TrSyd	2.478	0.340***	0.112**	0.106**	0.100**	0.094**	2010 Dum. Var.	-0.081	-0.035	-0.019	-0.018	-0.017	-0.017
	2.14	0.07	0.05	0.05	0.04	0.05		0.13	0.05	0.03	0.03	0.03	0.02
TrSyd NonSyd	2.527	0.340***	0.112**	0.106**	0.100**	0.094**	2012 Dum. Var.	-0.157	-0.061	-0.034	-0.033	-0.031	-0.030
	2.16	0.07	0.05	0.05	0.04	0.05		0.10	0.04	0.02	0.02	0.02	0.02
Marque	2.291	0.338***	0.112**	0.106**	0.100**	0.094**	Perc. Highest Cwd	-0.003*	-0.001	-0.001	0.000	0.000	0.000
	2.14	0.08	0.05	0.05	0.04	0.05		0.00	0.00	0.00	0.00	0.00	0.00
Shared Syd	2.168	0.337***	0.112**	0.106**	0.099**	0.094**	Diff. Comp. Pts	0.012*	0.005**	0.003*	0.003*	0.002*	0.002*
	2.14	0.08	0.05	0.05	0.04	0.05		0.01	0.00	0.00	0.00	0.00	0.00
Shared Syd Sh	2.358	0.339***	0.112**	0.106**	0.100**	0.094**	Diff. Pts	0.001***	0.000***	0.000***	0.000***	0.000***	0.000**
	2.19	0.08	0.05	0.05	0.04	0.05		0.00	0.00	0.00	0.00	0.00	0.00
Unshared TT	-0.018	-0.007	-0.004	-0.003	-0.003	-0.003	No. Finals Wins	0.011**	0.004**	0.002	0.002	0.002	0.002
	0.02	0.01	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
TrSyd TT	0.007	0.003	0.001	0.001	0.001	0.001	Breach MS – H	-0.049	0.106***	0.071**	0.069**	0.066**	0.064**
	0.01	0.00	0.00	0.00	0.00	0.00		0.10	0.03	0.03	0.04	0.03	0.03
TrSyd NonSyd TT	-0.010	-0.003	-0.002	-0.002	-0.002	-0.002	Breach CB – H	0.415***	0.091***	0.043**	0.041**	0.039**	0.037*
	0.04	0.01	0.01	0.01	0.01	0.01		0.12	0.03	0.02	0.02	0.02	0.02
Marque TT	-0.006	-0.002	-0.001	-0.001	-0.001	-0.001	Breach NZ – H	-0.921***	-0.20***	-0.13***	-0.12***	-0.12***	-0.12***
	0.05	0.02	0.01	0.01	0.01	0.01		0.14	0.03	0.04	0.04	0.03	0.04
Shared Syd TT	0.016	0.005	0.003	0.003	0.003	0.002	Breach MS – A	-0.070	-0.072	-0.041	-0.039	-0.038	-0.036
	0.03	0.01	0.01	0.01	0.01	0.01		0.25	0.07	0.04	0.04	0.04	0.04
Shared Syd Sh TT	0.015	0.006	0.003	0.003	0.003	0.003	Breach CB – A	-1.155***	-0.30***	-0.218*	-0.213*	-0.206*	-0.200*
	0.03	0.01	0.01	0.00	0.00	0.00		0.47	0.12	0.12	0.12	0.12	0.12
No. Referee	0.039	0.011	0.006	0.005	0.005	0.005	Breach NZ – A	0.559	0.102	0.047	0.045	0.043	0.041
	0.14	0.05	0.02	0.02	0.02	0.02		0.65	0.11	0.05	0.05	0.04	0.04
CPI adj Salary Cap	-0.726	-0.270	-0.140	-0.135	-0.129	-0.123	Coach Bellamy	-0.019	-0.010	-0.005	-0.005	-0.005	-0.005
	0.69	0.26	0.16	0.16	0.14	0.14		0.07	0.03	0.01	0.01	0.01	0.01
TT	0.007	0.003	0.002	0.002	0.002	0.002	Captain C Smith	0.649***	0.169***	0.136***	0.132***	0.127***	0.123***
	0.02	0.01	0.00	0.00	0.00	0.00		0.08	0.02	0.03	0.03	0.03	0.03
2002 Dum. Var.	0.145	0.049	0.024	0.023	0.022	0.021	Player Ratio	0.484***	0.083***	0.043***	0.042**	0.040**	0.038**
	0.12	0.04	0.02	0.02	0.02	0.02		0.08	0.03	0.02	0.02	0.02	0.02
2003 Dum. Var.	-0.075	-0.025	-0.013	-0.013	-0.012	-0.012	n	2209					
	0.11	0.04	0.02	0.02	0.02	0.02	i	16					
2007 Dum. Var.	-	-	-	-	-	-	Chi Sq (14)	178.94***	-	-	-	-	-
	-	-	-	-	-	-	Probability	-	71.57%	88.86%	89.94%	89.78%	89.69%

