Handicap Modelling Executive Highlights

Synopsis

In this paper, a number of terms are introduced which are briefly described here:

- **Blended** – a handicap system where a variable number of best rounds out of twenty is taken, taking fewer for the high markers, more for the low markers. This has the effect of reducing the handicaps of the higher markers without changing those of the lower markers.
- **Hybrid** – a handicap system where the lower of a fast moving average (say best eight of sixteen) and a slower moving average (say best sixteen of thirty two) is taken. This has the objective of reducing the handicaps of improved form players faster, while reducing the speed with which handicaps are eased for poor form.
- **Handicap Bias** - the proportion of winners in a given handicap range compared to the proportion of the field in that range. 100% is neutral, greater than 100% is favourable, and less than 100% is unfavourable.
- **Weighted Handicap Bias** – the Handicap Bias weighted by the number of competitors in the relevant handicap range. This gives the percentage of the field by which a given handicap range is winning above or below their proportion of the field.
- **Tilt Index** - related to the gradient of a line of best fit to the weighted handicap bias values for the various handicap groups. A negative tilt implies that the bias favours the low marker; a positive tilt implies the bias favours the high marker. In the following two tables, a tilt favouring the high marker is reddish, a tilt favouring the low marker is blue, a close to zero tilt is green.
- **Level Index** - related to the standard deviation of these weighted handicap bias values. In the following two tables, green is more level, orange is more lumpy.
- **Anchor 4/4** – a secondary handicap rule where a handicap cannot exceed four more than the fourth best handicap over the prior twelve months.

Following an earlier report, in which it was demonstrated that the Old Australian Handicap System was biased in favour of the low markers, and that the Current Australian Handicap System was biased, especially for the men's fields, in favour of the higher markers, a number of different options were considered with the objective of removing some of the current bias.

These ranged from simply changing the Bonus For Excellence (BFE) to reducing the number of flagged rounds, eg take only eight from the last twenty rounds, to more complex systems such as the Blended and the Hybrid.

Fifteen clubs were chosen as representative. Each of the club's home competitions was recalculated on the various handicap methods, using data from December 2007 through November 2010.

A "good" system would be one in which the playing field was tilted neither in favour of the low markers nor the high markers, and where the playing field was relatively smooth.

No system will achieve a perfect zero tilt and a perfect zero Level. The following analysis, it is hoped, will allow a decision to be made which achieves the best result, or possibly, the least worse result.

The best eight of twenty rounds, with a BFE of 0.93, (Eight20 0.93), together with the Anchor 4/4, is recommended for the following reasons:

- On average, for Men, it has a slightly negative Tilt, slightly favouring the lower marker.
- It achieves this while allowing 12 out of the 15 clubs to meet the goal of allowing the low marker to be competitive, ie have negative Tilt.
- It has one of the lowest values of the Level Index, implying a relatively good fit, or not too many large deviations from the ideal.
- Dynamically it will react to improved form faster than the Ten20.
- The Anchor actually achieves a similar result to the Hybrid, but is less complex. It prevents too rapid an increase in a handicap in the face of poor form.
- It is seen to be adjusting on three fronts, but without the complexity for less or little gain, of the Blended and Hybrid methods.
- In the case of Women golfers, although it increases an already negative Tilt in favour of the low markers, it fits with the culture of seeking aspirational handicaps rather than ones reflecting current form.

Considering the alternatives, Eight20 0.92 goes too far. The tilt becomes more negative for those clubs where it was already negative, and for the three clubs where it remained positive, they stay positive. Further the Level deteriorates as well.

The Blended at 0.96, gave a similar Tilt result to the less complex Eight20 0.93. Any BFE's here less than 0.96 were far too severe on the high markers, and in all cases the Blended had a less favourable Level Index.

Methods with fewer than eight in the sample start to become more volatile dynamically – especially the higher markers' handicaps would show excess variation over time.

The Hybrid 0.94 gave similar results to the Eight20 0.93, and with a slightly lower (better) Level Index. However it is considerably more complex, and the marginal benefits seem to be more than balanced by the simplicity of the Eight20 0.93 combined with the Anchor 4/4.

Modelling shows that 4% of rounds would be "anchored" with 13.8% of men and 15.6% of women having had at least one round anchored over a three years period. More work is needed to fully model the 4/4 Anchor in competition, but its impact is expected to be neutral or favourable.

As a belt and braces confirmation, it is proposed that a further sample of half a dozen clubs be tested against the recommended method, as an out of sample check.

Combining Eight20 0.93 with the Anchor 4/4 gives an elegant solution to the current imbalances for most clubs, and is at least an improvement for the handful which would retain some bias. Dare one say it is better than a least worse result?

Tilt & Level – Men

Club	Belmont	Brisbane	Carnarvon	Cumberland	Kooyonga	Lake Karrinyup	Lakelands	Maitland	Narrabri	New South Wales	Pacific	Royal Canberra	Tea Tree Gully	The Lakes	Victoria	Average	Number of Clubs with Tilt Favouring the Low Marker	Level
Method																		
Old System	-48	-78	-53	-43	-78	-83	-36	-15	-17	61	-86	-76	-87	-76	-12	-48	14	34
Ten20 0.96 Apr-Nov 2010	43	17	17	55	-4	19	31	18	23	99	4	18	33	-34	34	25	2	33
Ten20 0.96 Dec08-Mar10	-11	-30	5	22	-21	3	-2	29	3	107	-33	-2	-15	-37	51	5	8	27
Ten20 0.96	0	-9	10	31	-18	5	15	23	9	99	-23	7	3	-32	46	11	4	24
Ten20 0.95	-4	-15	0	26	-21	-1	6	11	7	95	-29	1	-8	-41	32	4	8	23
Ten20 0.94	-11	-20	-9	11	-30	-10	0	3	0	87	-42	-5	-13	-48	29	-4	10	21
Ten20 0.93	-22	-27	-20	12	-42	-17	-10	-2	5	91	-43	-15	-18	-50	21	-9	11	21
Ten20 0.92	-32	-34	-27	0	-42	-27	-14	-11	-3	94	-50	-22	-31	-51	9	-16	12	22
Ten20 0.91	-34	-35	-38	-9	-47	-33	-25	-19	-16	83	-57	-32	-50	-57	1	-25	13	24
Ten20 0.9	-44	-43	-44	-15	-55	-40	-33	-24	-23	81	-67	-37	-57	-61	-8	-31	14	25
Nine20 0.96	0	-11	7	36	-18	-2	14	14	10	99	-24	8	4	-30	39	10	5	23
Nine20 0.93	-24	-23	-19	9	-42	-25	-15	-3	6	90	-44	-15	-30	-45	18	-11	11	21
Nine20 0.90	-47	-40	-49	-24	-65	-44	-30	-21	-13	75	-63	-36	-58	-64	-6	-32	14	26
Eight20 0.96	-6	-4	4	29	-24	2	7	15	7	98	-23	8	-4	-36	37	7	6	20
Eight20 0.95	-9	-8	-4	25	-26	-5	3	10	4	95	-29	3	-11	-39	33	3	8	20
Eight20 0.94	-13	-12	-12	21	-29	-12	0	4	2	93	-36	-2	-19	-41	30	-2	10	20
Eight20 0.93	-16	-16	-19	17	-32	-18	-4	-1	-1	90	-43	-7	-27	-44	26	-6	12	21
Eight20 0.92	-27	-24	-31	3	-42	-26	-15	-10	-6	84	-52	-18	-40	-51	16	-16	12	23
Eight20 0.91	-37	-32	-42	-11	-51	-34	-26	-18	-11	78	-62	-29	-53	-58	6	-25	13	25
Eight20 0.90	-48	-40	-53	-26	-61	-42	-37	-27	-16	72	-71	-40	-66	-65	-4	-35	14	27
Blended 0.96	-14	-19	-9	7	-32	-13	-10	-1	-4	88	-43	-10	-23	-57	24	-8	12	22
Blended 0.94	-34	-29	-37	-7	-48	-25	-24	-18	-7	82	-56	-23	-35	-57	13	-20	13	23
Blended 0.92	-52	-46	-50	-27	-55	-41	-38	-29	-16	77	-67	-42	-60	-71	-4	-35	14	27
Hybrid 0.96	2	-12	0	30	-17	-1	6	17	8	90	-40	3	-4	-39	31	5	6	21
Hybrid 0.95	-10	-19	-9	21	-24	-10	-2	7	5	85	-47	-5	-14	-44	23	-3	10	20
Hybrid 0.94	-23	-26	-19	12	-32	-19	-10	-4	2	79	-53	-13	-25	-49	16	-11	11	19

The table header spans: **Tilt - Men** (columns Belmont through Average); **Number of Clubs with Tilt Favouring the Low Marker**; **Level**.

Tilt & Level – Women

Tilt - Women																	Number of Clubs with Tilt Favouring the Low Marker	Level
Club	Belmont	Brisbane	Carnarvon	Cumberland	Kooyonga	Lake Karrinyup	Lakelands	Maitland	Narrabri	New South Wales	Pacific	Royal Canberra	Tea Tree Gully	The Lakes	Victoria	Average		
Method																		
Old System	-65	-58	-51	-41	-42	19	-34	-23	-25	-30	-105	-28	-25	-18	-3	-35	14	32
Ten20 0.96 Apr-Nov 2010	-10	5	-3	-17	-18	51	3	0	-12	-16	-54	-18	-10	-19	15	-7	10	33
Ten20 0.96 Dec08-Mar10	-31	-33	-25	-30	-30	30	-24	-20	-9	-22	-88	-11	-10	-5	-7	-21	14	26
Ten20 0.96	-23	-23	-18	-27	-29	36	-16	-16	-18	-18	-75	-12	-9	-8	4	-17	13	24
Ten20 0.95	-35	-24	-24	-32	-32	32	-23	-19	-17	-19	-79	-19	-13	-9	4	-21	13	24
Ten20 0.94	-42	-33	-33	-37	-35	29	-21	-20	-21	-24	-84	-22	-16	-14	1	-25	13	25
Ten20 0.93	-52	-33	-39	-37	-38	24	-26	-23	-22	-26	-90	-24	-24	-18	-3	-29	14	27
Ten20 0.92	-57	-40	-40	-42	-37	17	-29	-22	-21	-26	-91	-29	-24	-21	-2	-31	14	28
Ten20 0.91	-61	-49	-49	-46	-40	13	-29	-24	-30	-28	-98	-33	-27	-20	-8	-35	14	29
Ten20 0.9	-73	-54	-56	-43	-47	8	-33	-27	-33	-31	-101	-38	-36	-23	-11	-40	14	32
Nine20 0.96	-36	-27	-20	-30	-29	32	-16	-19	-16	-19	-78	-18	-8	-9	6	-19	13	24
Nine20 0.93	-51	-38	-34	-38	-32	20	-25	-18	-20	-25	-89	-26	-20	-19	-1	-28	14	26
Nine20 0.90	-69	-54	-55	-47	-45	5	-31	-27	-30	-31	-105	-38	-39	-24	-13	-40	14	32
Eight20 0.96	-32	-18	-24	-26	-29	34	-19	-18	-21	-19	-85	-16	-13	-10	4	-19	13	24
Eight20 0.93	-43	-35	-32	-34	-33	21	-24	-16	-23	-24	-87	-26	-19	-19	-3	-26	14	26
Eight20 0.90	-72	-55	-55	-47	-47	10	-32	-27	-36	-33	-104	-37	-37	-24	-13	-41	14	32
Blended 0.96	-39	-35	-34	-33	-35	23	-25	-20	-22	-23	-86	-22	-18	-16	-4	-26	14	26
Blended 0.94	-58	-40	-50	-45	-45	20	-31	-23	-29	-31	-92	-30	-31	-22	-9	-34	14	30
Blended 0.92	-68	-49	-56	-49	-48	11	-39	-29	-34	-33	-102	-36	-35	-26	-12	-40	14	33
Hybrid 0.96	-38	-30	-19	-29	-29	33	-16	-16	-19	-23	-80	-21	-12	-16	7	-20	13	24
Hybrid 0.94	-44	-36	-29	-36	-29	21	-19	-20	-20	-27	-84	-26	-19	-22	2	-26	13	26