

Every factor, the exact model and the Bookmaker

How many first-over and early-over factors there are, what a backtest of every one of them says about who wins, how the per-ball model should work, and what the paper trader now does with the answer.

Data

1,652 decided matches with a complete card record, 7 Aug to 22 Sep 2026

Prepared

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Code

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The answer

The cards decide who wins, and the exact model already counts them. None of the first-over or early-over factors adds anything to it, and the Bookmaker counts the same cards, so there is nothing to bet at equal information.

COMBINATIONS TESTED 4,561,910	BEAT THE CARDS 1 pair family, no mechanism	EXACT MODEL BRIER 0.1708 vs 0.1814	BOOKMAKER MARGIN +1.11 points, both sides
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- The exact card model computes each moment's chances from the cards left in the 70-card deck, with nothing fitted. It picks the winner 73.0% of the time against 71.4% for the 64-neighbour model the live daemon has used since August.
- Runs, dots, 1s, 2s, 3s, 4s, 6s, boundaries and wickets over every run of overs were tested alone, in pairs and in triples, at ten points in the match: 4,561,910 families and 69.9 million cells. None of your tables beats the cards. One pair family survives correction: dots in the first innings' overs 2-3. It cannot work mechanically, because the two innings are dealt independently, and it does not predict out of sample.
- Your exact-twin rule is built and tested. When a past match stood in exactly the same state, using only its outcome makes the model worse at every threshold: one or two twins give a raw rate of 0, 0.5 or 1. The exact model is the no-blending idea taken to its limit: it needs no twin at all.
- The Bookmaker's price is the same card count plus 1.11 points. The 80-90% "candidate" (+9.8%) compared a model that had seen one more ball than the price; at equal information it returns -0.1% over 253 bets.
- The paper trader now runs the exact model as its own arm and strikes only a quote the book set after the ball the model saw. The 138 earlier win-model fills that did not were voided.
- Still open: the chaser wins 52.66% of decided matches, and the chase's first twelve cards run slightly rich in sixes. Neither is significant yet.

The size of the factor space

A factor is a count over a run of completed overs: the nine counts above over every contiguous run of overs (over 1, over 2, overs 1-2, overs 2-3, and so on), plus the last card and the over-to-over trend, the target and runs needed in the chase, the exact sequence of cards as a twin key, and the winner history before a ball is dealt. Each is read at ten points in the match. A combination is two or three factors taken together, and each of its cells is one joint value, like "2 sixes in over 1 and fewer than 12 runs in over 2".

A combination is worth testing when it is known at that point in the match (nothing from a later ball), when it splits the matches differently from every combination already listed, and when at least two of its cells hold 30 matches, the fewest that measure a win rate to within about nine points.

Every combination, and how many of them were testable with this history.

POINT	MATCHES	SINGLES: ALL / TESTED	PAIRS: ALL / TESTED	TRIPLES: ALL / TESTED
before the match	1,859	9 / 8	36 / 14	84 / 5
after over 1	1,652	13 / 10	45 / 45	120 / 106
after over 2	1,652	33 / 29	406 / 406	3,654 / 3,196
after over 3	1,652	61 / 56	1,540 / 1,540	27,720 / 24,220
after over 4	1,652	98 / 92	4,186 / 4,185	125,580 / 111,362
innings break	1,652	144 / 137	9,316 / 9,308	419,220 / 374,658
chase, after over 1	1,652	158 / 146	10,878 / 10,577	529,396 / 459,523
chase, after over 2	1,652	178 / 165	13,861 / 13,522	762,355 / 675,425
chase, after over 3	1,642	206 / 192	18,721 / 18,324	1,198,144 / 1,075,290
chase, after over 4	1,443	243 / 228	26,335 / 25,855	2,001,460 / 1,753,286
all checkpoints		1,143 / 1,063	85,324 / 83,776	5,067,733 / 4,477,071

Behind those factors sits the full history they summarise, which no dataset could cover:

One innings, from a fresh deck. The exact model conditions on the combination.

BALLS DEALT	ORDERED CARD SEQUENCES	CARD COMBINATIONS
6	1.18×10^5	924
12	1.38×10^{10}	18,515
18	1.63×10^{15}	122,584
24	1.91×10^{20}	404,439
30	2.22×10^{25}	771,155

No exact twin key (the same card sequence or combination) is shared by 30 matches at any point, so twins could not be tested as factors. Section 5 tests them as a model instead.

Your tables against the cards

For each cell, "AUS won" is what happened and "cards said" is the exact model's expectation for those same matches. AUS always bats first. The raw win rate moves a lot from cell to cell, because more runs early mean more runs in total. The cards already account for all of it. The p value tests whether the cells differ from the cards by more than chance, after allowing for the chaser's overall lean.

FIRST-OVER BOUNDARIES (AFTER OVER 1; P = 0.26)

VALUE	MATCHES	AUS WON	CARDS SAID
0	190	33.7%	36.2%
1	554	40.3%	44.2%
2	551	51.2%	52.4%
3	277	54.9%	60.2%
≥ 4	80	76.2%	68.7%

FIRST-OVER SIXES (AFTER OVER 1; P = 0.50)

VALUE	MATCHES	AUS WON	CARDS SAID
0	650	40.8%	42.4%
1	673	46.7%	51.3%
2	276	59.4%	60.0%
≥ 3	53	73.6%	71.0%

FIRST-OVER RUNS, QUINTILES (AFTER OVER 1; P = 0.16)

VALUE	MATCHES	AUS WON	CARDS SAID
≤ 10	437	32.3%	37.6%
11-12	247	43.3%	45.2%
13-15	409	50.1%	50.6%
16-18	285	50.5%	56.9%
≥ 19	274	67.5%	65.4%

FIRST-OVER RUNS, EVERY VALUE WITH ≥ 30 MATCHES (AFTER OVER 1; P = 0.19)

VALUE	MATCHES	AUS WON	CARDS SAID
≤ 5	50	28.0%	29.8%
6	46	39.1%	33.6%
7	59	35.6%	35.6%
8	82	26.8%	37.7%
9	89	29.2%	39.8%
10	111	36.0%	41.9%
11	123	39.8%	44.1%
12	124	46.8%	46.2%
13	141	44.0%	48.4%
14	131	53.4%	50.6%
15	137	53.3%	52.8%
16	104	41.3%	55.0%
17	107	54.2%	57.2%
18	74	58.1%	59.3%
19	91	60.4%	61.5%
20	58	58.6%	63.6%
21	48	79.2%	65.7%
≥ 22	77	75.3%	71.2%

RUNS IN OVERS 1+2, QUINTILES (AFTER OVER 2; P = 0.61)

VALUE	MATCHES	AUS WON	CARDS SAID
≤ 22	396	29.0%	29.8%
23-26	358	40.2%	42.9%
27-29	312	47.4%	51.2%
30-33	310	54.8%	59.7%
≥ 34	276	74.3%	73.1%

OVER-1 RUNS X OVER-2 RUNS, TERTILES (AFTER OVER 2; P = 0.72)

VALUE	MATCHES	AUS WON	CARDS SAID
$\leq 11 \times \leq 11$	176	26.7%	26.2%
$\leq 11 \times 12-16$	216	31.5%	38.0%
$\leq 11 \times \geq 17$	168	44.6%	51.8%
$12-16 \times \leq 11$	222	36.5%	37.8%
$12-16 \times 12-16$	255	50.6%	50.8%
$12-16 \times \geq 17$	160	60.0%	63.4%
$\geq 17 \times \leq 11$	158	51.9%	51.5%
$\geq 17 \times 12-16$	173	62.4%	64.5%
$\geq 17 \times \geq 17$	124	77.4%	76.7%

CHASE FIRST-OVER BOUNDARIES (CHASE, AFTER OVER 1; P = 0.79)

VALUE	MATCHES	AUS WON	CARDS SAID
0	197	64.5%	65.3%
1	515	55.5%	57.2%
2	543	44.6%	48.9%
3	305	33.1%	35.5%
≥ 4	92	28.3%	30.3%

CHASE FIRST-OVER SIXES (CHASE, AFTER OVER 1; P = 0.12)

VALUE	MATCHES	AUS WON	CARDS SAID
0	605	56.5%	60.2%
1	687	46.3%	48.0%
2	298	33.6%	38.0%
≥ 3	62	35.5%	28.6%

CHASE FIRST-OVER RUNS, QUINTILES (CHASE, AFTER OVER 1; P = 0.92)

VALUE	MATCHES	AUS WON	CARDS SAID
≤ 10	417	63.1%	65.7%
11-12	252	55.2%	57.6%
13-15	378	45.8%	48.3%
16-18	300	37.0%	41.4%
≥ 19	305	31.5%	32.7%

CHASE FIRST-OVER RUNS, EVERY VALUE WITH >= 30 MATCHES (CHASE, AFTER OVER 1; P = 0.75)

VALUE	MATCHES	AUS WON	CARDS SAID
≤ 5	61	72.1%	69.3%
6	33	63.6%	76.2%
7	71	60.6%	66.5%
8	83	68.7%	67.5%
9	81	64.2%	64.2%
10	88	52.3%	58.1%
11	124	55.6%	58.3%
12	128	54.7%	56.9%
13	110	50.9%	51.3%
14	124	40.3%	47.2%
15	144	46.5%	47.0%
16	106	42.5%	46.1%
17	104	34.6%	40.5%
18	90	33.3%	36.8%
19	84	36.9%	34.9%
20	60	30.0%	35.9%
21	42	26.2%	30.6%
22	48	27.1%	32.0%
≥ 23	71	32.4%	28.9%

CHASE RUNS IN OVERS 1+2, QUINTILES (CHASE, AFTER OVER 2; P = 0.97)

VALUE	MATCHES	AUS WON	CARDS SAID
≤ 22	338	69.2%	70.4%
23-26	371	56.9%	58.4%
27-29	288	49.0%	51.3%
30-33	327	33.9%	37.1%
≥ 34	328	25.9%	27.8%

CHASE OVER-1 RUNS X OVER-2 RUNS, TERTILES (CHASE, AFTER OVER 2; P = 0.48)

VALUE	MATCHES	AUS WON	CARDS SAID
≤ 12 × ≤ 12	237	70.9%	71.2%
≤ 12 × 13-16	207	61.8%	64.3%
≤ 12 × ≥ 17	225	47.1%	50.0%
13-16 × ≤ 12	205	58.0%	58.0%
13-16 × 13-16	141	39.7%	47.6%
13-16 × ≥ 17	138	31.2%	32.5%
≥ 17 × ≤ 12	206	45.1%	44.1%
≥ 17 × 13-16	152	28.3%	30.2%
≥ 17 × ≥ 17	141	18.4%	23.4%

The backtest of every combination

METHOD

Each cell's actual winners against the exact model's expectation for the same matches, after one constant log-odds lean per checkpoint for the chaser (IND wins more than the cards say: AUS won 47.3% against 50.4% at the break). With millions of tests, some look significant by chance, so three guards: Benjamini-Hochberg and Holm corrections; the same scan rerun 20 times on outcomes simulated from the cards, which keeps the overlap between related combinations; and ranking on one half of the history and checking the other.

Survivors of the corrections, by order.

ORDER	TESTED	P < 0.05: REAL VS SIMULATED	P < 0.001: REAL VS SIMULATED	SMALLEST P	BH	HOLM
1	1,063	100 vs 58 ± 14	10 vs 1 ± 1	1.1e-04	0	0
2	83,776	7,649 vs 4,482 ± 809	344 vs 99 ± 38	4.7e-07	5	1
3	4,477,071	308,731 vs 237,100 ± 31,150	8,653 vs 5,222 ± 1,566	1.2e-07	0	0

At order 2 there are five BH survivors (one Holm, p 0.039), and they are one signal: dots in the first innings' overs 2-3 read at the break or in the chase. The scan as a whole also has more small p values than any of the 20 simulations at orders 1 and 2, and the excess sits in the same overs. When no dot fell in overs 2-3 (214 matches), AUS won 46.3% against 60.1% expected, in both halves of the history. But the cut was found by looking, the half-to-half replication runs one way only, and used as a predictor on the other half it does not beat the cards plus the lean.

The signal has no mechanism. A first-innings count can move the chase only if the chase deal depends on the first innings. It does not: of 80 correlations between first-innings and chase cards over by over, 2 pass $|z| \geq 2$ against 3.6 expected by chance, and a chase card matches the first-innings card at the same position 14.19% of the time against 14.29% for independent decks. This is the largest coincidence among four and a half million tries.

The deal check did find one thing. Each innings should look like twelve cards of a fair deck:

Fresh deck: 27.43 runs and 14.29% of each rank.

CARDS	RUNS	Z	SIXES (Z)	ALL RANKS, CHI-SQUARE
innings 1, cards 1-12	27.23	-1.26	14.06% (-0.9)	5.2 on 6
innings 1, cards 13-24	27.57	+0.88	14.50% (+0.9)	4.9 on 6
chase, cards 1-12	27.85	+2.67	14.79% (+2.1)	9.4 on 6

The first innings deals fair. The chase's first twelve cards run slightly rich, mostly in sixes. That points the same way as the chaser lean and is the only mechanism in view for it, but it is one window of several looked at and not significant on its own. The results from 23 September on are its test.

The per-ball model: exact twins against the cards

Your rule: when the state on screen has happened before, answer with what happened then, and do not blend in neighbours that only look like it. It is built into the live model as an option and scored on 94,587 moments from 1,629 matches, each moment seeing only matches that had already finished.

The same moments for every model. A twin is a finished match that stood in exactly this state.

MODEL	BRIER (LOWER IS BETTER)	PICKS THE WINNER	VS THE BLEND, PER MATCH
exact card model	0.1708	73.0%	-0.01019 (t -8.0)
64-neighbour blend (the live model)	0.1814	71.4%	
twins first, k = 1	0.2147	70.1%	+0.03318 (t +41.1)
twins first, k = 3	0.1848	71.2%	+0.00332 (t +16.5)
twins first, k = 10	0.1817	71.4%	+0.00032 (t +6.5)
twins first, k = 30	0.1815	71.4%	+0.00003 (t +1.3)
score twins first, k = 1	0.2149	69.0%	+0.03318 (t +35.2)
card twins first, k = 1	0.2032	70.6%	+0.02171 (t +33.7)

Brier on only the moments that have twins: the case the rule is for:

MOMENTS WITH TWINS	MOMENTS	TWINS' OWN RATE	BLEND	EXACT CARDS
at least 1	32,591	0.3182	0.2218	0.2167
at least 3	15,826	0.2533	0.2334	0.2293
at least 10	9,241	0.2426	0.2394	0.2362
at least 30	5,647	0.2469	0.2465	0.2427

With one or two twins the raw rate can only be 0, 0.5 or 1, so it swings on luck. The blend smooths that noise at the cost of mixing in states that differ. The exact model has neither problem: it prices each state from the cards left, exactly, and it wins in every over of both innings. It now runs live alongside the blend.

The Bookmaker counts the same cards

32,322 Bookmaker quotes, matched to the ball each one was set for:

COMPARED WITH THE EXACT MODEL	CORRELATION	MEAN ABSOLUTE GAP
at the state the quote was set for	0.9979	0.0127
one ball earlier	0.8757	0.0641
one ball later	0.8515	0.0646

The book's implied probability is the exact model plus 1.11 points, the same on AUS and IND. It publishes a new price about 12 s after each over, and after each ball late in the chase.

A model only seemed to beat it because of timing. The model's output for ball N was compared with the last price on screen when ball N arrived, and in about half those cases that price was still the one set before ball N. The 80-90% candidate reproduces exactly (321 bets, +9.8%, t 3.64), and 290 of its 300 checkable bets were struck one ball stale. The gain tracks what the extra ball did: largest after a boundary, negative after one to three runs.

First qualifying bet per match, at equal information: a quote set after the model's ball, still showing two seconds later, before the next ball.

MODEL	BETS	MEAN ODDS	WON	RETURN PER UNIT	T
exact card model	328	1.74	59.9%	+0.3%	+0.06
exact, with the chaser lean	1,690	1.98	52.1%	+3.1%	+1.27
64-neighbour blend	916	1.68	60.9%	+0.1%	+0.04

Across 30,766 priced states the book's own Brier is 0.1697 against 0.1694 for the exact model: the book knows what the cards know. The one persistent thing is the chaser lean, whose bets are almost all IND before the first ball at 1.98, about +3% in both halves of the history. That is not significant, and the same lean in Super Over decayed.

Changes in production

The live daemon writes the exact model

Every ball signal now carries `model.exact` beside the `blend`, or a null with the reason when the card record has a gap. Replayed over 300 real rounds, 97.16% of ball events carry it and every comparable one equals the offline model to 2×10^{-16} . Deployed 23 September 17:06 UTC.

The paper trader strikes only equal-information quotes

A win-model bet is struck only on a quote the book set after the frame of the ball the model saw, still showing two seconds later, before the next ball. One SQL function defines that quote and agrees with the analysis on all 205,098 state-sides of the history. The innings break is bet on the ball that ended the first innings, and fills there are no longer cut off at 120 s, because the book publishes the break price about two and a half minutes after the innings ends.

Two new accounts run the exact model, `cricketv3.exact.value` and `.every`. Replayed over the history at equal information, the value arm would have placed 108 bets at +16.3% a unit (t 1.73) and the 64-neighbour value arm 931 bets at -0.1%. 108 bets is not evidence; the forward record decides. The 138 earlier win-model fills struck on stale quotes are voided, both win-model accounts are back at 1,00,000, and the ledger replay reads ok on all 24 accounts.

The dashboard compares at equal information

The model-vs-price card on `/analysis/cricket` used the quote on screen when the ball arrived and said it had no look-ahead. It now compares both models only with the equal-information quote, and the live card leads with the exact model's line. Priced this way the book sits above the exact model in every band and the result sits below the book: in the 80-90% band, exact 85.15%, implied 86.66%, AUS won 80.74%.

5FIVE HAS BEEN FROZEN SINCE 22 SEP 23:29 IST

The provider stopped dealing the table, so no round has run on the new code yet. The first round after it resumes should show a `model.exact` entry in the log and, when a priced state appears, an exact-arm bet whose quote came after its ball.

Open questions

- The chaser lean: IND wins 52.66% of decided matches, and the chase's first twelve cards carry +0.42 runs against a fair deck. If both hold from here on, backing IND before the first ball at 1.98 would clear the book's margin. Today it is +3% at t 1.27.
- Coverage of the live exact model is 97.16%. A gap in the first innings also blanks the chase, and five rounds in three hundred arrive with frames out of order. Neither is wrong, only missing.
- No factor, combination or twin on the cricket page improves on the cards. More history will not change that unless the dealing itself is not what the rules say.