Surfbreak Baccarat

Simulation Comparison: Surfbreak Baccarat vs. Traditional Baccarat

A Monte Carlo simulation was conducted to compare the behavior of Surfbreak Baccarat (no-raise variant) with traditional banked baccarat. The simulation used 10,000 tables with 4 players per table (40,000 total player-paths), and each player began with a bankroll equal to 20 times the base bet.

Surfbreak Baccarat was modeled as a non-banked, pooled system in which players wager a fixed base bet each round with no raises, and winnings are redistributed among the players. Traditional baccarat was modeled using standard probabilities with a 5% commission on Banker wins.

Overall Results

Table 1: Overall Simulation Results, Max 200 Rounds

Metric	Surfbreak Baccarat (No Raises)	Traditional Baccarat
Players simulated	40,000	40,000
Average rounds before bankruptcy	1,427.47	1,667.34
Median rounds before bankruptcy	510	596
Standard deviation (rounds)	2,158.51	3,260.70
Players bankrupt (total)	30,000	40,000
Survivors (end-state)	10,000	0

Bankruptcy Within 100 Rounds

Table 2: Bankruptcy Within 100 Rounds

Metric	Surfbreak Baccarat (No Raises)	Traditional Baccarat
Players bankrupt $\leq$ 100 rounds	2,164	3,918
Percent bankrupt $\leq$ 100 rounds	5.41%	9.80%

Bankruptcy Within 200 Rounds

Table 3: Bankruptcy Within 200 Rounds

Metric	Surfbreak Baccarat (No Raises)	Traditional Baccarat
Players bankrupt $\leq$ 200 rounds	7,010	7,336
Percent bankrupt $\leq$ 200 rounds	17.53%	18.34%

Peak Balance Statistics

Table 4: Peak Balance Comparison

Metric	Surfbreak Baccarat	Traditional Baccarat
Average peak balance	46.31	42.77
Median peak balance	38.50	32.45
Average peak + 1 SD	68.78	71.95

A key structural difference is that Surfbreak Baccarat is a zero-sum, non-banked system. As a result, one player per table necessarily remains solvent, whereas all players eventually lose in traditional baccarat due to the house edge. This leads to a persistent survivor population in Surfbreak Baccarat and contributes to its slightly higher median peak balances.

Traditional baccarat, by contrast, exhibits greater variance in outcomes, as reflected in the higher standard deviation of rounds to bankruptcy and higher extreme peak balances. The presence of the house edge produces a long-term drift toward zero for all players, despite the slower rate of early elimination.

Overall, the Surfbreak Baccarat structure reduces early volatility while preserving long-session play characteristics, making it comparable to traditional baccarat in duration but distinct in its redistribution dynamics and long-term outcomes.

Table 5: Bankruptcy Within 100 Rounds

Game	Total Players Simulated	Players Bankrupt	Percent Bankrupt
Surfbreak Baccarat	40,000	2,164	5.41%
Traditional Baccarat	40,000	3,918	9.80%

Table 6: Bankruptcy by 200 Rounds

Game	Total Players Simulated	Players Bankrupt	Percent Bankrupt
Surfbreak Baccarat	40,000	7,010	17.53%
Traditional Baccarat	40,000	7,336	18.34%

Surfbreak Poker

Key Probability Insights

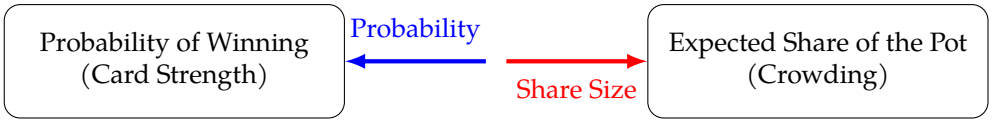
The head-to-head probability matrix reveals several important structural properties of the game.

- **Moderate Informational Edge:** The visible upcard provides a meaningful but not decisive advantage. Even the strongest matchup (e.g.,  vs ) yields only approximately 60%

win probability. This ensures that outcomes remain uncertain and engaging.

- **Compressed Probability Range:** Most matchups fall within a narrow band of roughly 45% to 55%. This compression prevents the game from becoming deterministic and maintains consistent tension across rounds.
- **Smooth Rank Gradient:** Win probabilities change gradually across ranks, typically by 1–2% per step. This creates an intuitive hierarchy for players while avoiding extreme discontinuities.
- **Non-Dominance of High Cards:** Higher cards confer an advantage, but no single card guarantees success. Lower-ranked upcards remain competitive, supporting contrarian betting strategies.

Tension Between Card Strength and Share of Pot



- **Strategic Implication:** Optimal decisions are not based solely on card strength. Because payouts depend on how many players choose the same side, players must balance:
  - Probability of winning (card strength)
  - Expected share of the pot (crowding)

This interaction between probability and participation creates the core strategic dynamic of the game, distinguishing it from traditional fixed-odds table games.

	A	K	Q	J	T	9	8	7	6	5	4	3	2
A	50.0	53.5	55.0	56.0	57.0	58.0	58.5	59.0	59.5	60.0	60.2	60.4	60.5
K	46.5	50.0	52.5	53.5	54.5	55.5	56.0	56.5	57.0	57.5	58.0	58.5	59.0
Q	45.0	47.5	50.0	52.0	53.0	54.0	54.5	55.0	55.5	56.0	56.5	57.0	57.5
J	44.0	46.5	48.0	50.0	52.0	53.0	53.5	54.0	54.5	55.0	55.5	56.0	56.5
T	43.0	45.5	47.0	48.0	50.0	52.0	53.0	53.5	54.0	54.5	55.0	55.5	56.0
9	42.0	44.5	46.0	47.0	48.0	50.0	52.0	53.0	53.5	54.0	54.5	55.0	55.5
8	41.5	44.0	45.5	46.5	47.5	48.5	50.0	52.0	53.0	53.5	54.0	54.5	55.0
7	41.0	43.5	45.0	46.0	47.0	48.0	48.5	50.0	52.0	53.0	53.5	54.0	54.5
6	40.5	43.0	44.5	45.5	46.5	47.5	48.0	48.5	50.0	52.0	53.0	53.5	54.0
5	40.0	42.5	44.0	45.0	46.0	47.0	47.5	48.0	48.5	50.0	52.0	53.0	53.5
4	39.8	42.0	43.5	44.5	45.5	46.5	47.0	47.5	48.0	48.5	50.0	52.0	53.0
3	39.6	41.5	43.0	44.0	45.0	46.0	46.5	47.0	47.5	48.0	48.5	50.0	52.0
2	39.4	41.0	42.5	43.5	44.5	45.5	46.0	46.5	47.0	47.5	48.0	48.5	50.0

Table 7: Head-to-head win probabilities (6-card model, one upcard each)

Player Experience

The game creates a distinct dynamic:

- Players balance:
  - Strength of visible card
  - Distribution of bets on each side
- Encourages:
  - Contrarian betting
  - Social reading of table behavior
  - High engagement per round

Summary

In considering the mathematics of these two games, both have interesting probability-based outcomes couples with "crowding" considerations, which is unique to casino floor games. Both have reduced rate of bankruptcy per round allowing for longer time spent playing.