Fixed stakes and doubling: the full analytical model

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What was modelled

The model compares 20,000 independent runs for each of two policies. It pays gross 2× with probability 0.485 and gross 0 with probability 0.515, for an expected RTP of 97%. It does not reproduce Tower Rush floor probabilities. Both policies start with 2,000 INR, use an initial 20 INR stake and allow at most 100 rounds.

Policy A keeps the stake at 20 INR. Policy B doubles after a loss and resets to 20 INR after a success. A run stops after settlement at balance ≤1,700 INR (at least 300 INR loss) or ≥2,300 INR (at least 300 INR profit). It also stops before a stake exceeding the remaining bankroll or the 10,000 INR stake cap. There is no hidden all-in. A stop threshold may be overshot, and a settled outcome is not changed retrospectively.

Metric	Fixed	Doubling
Runs	20,000	20,000
Mean net INR	−55.58	−33.56
Median net INR	−80.00	300.00
Q05 INR	−300.00	−580.00
Q95 INR	300.00	300.00
Share with net >0	34.405%	55.685%
95% Wilson interval	33.750–35.066%	54.996–56.372%
Mean turnover INR	1,803.80	1,182.79
Mean rounds	90.190	22.503
Stop-loss count	4,143	8,863
Final balance <10 INR	0	0
SE of positive-session proportion	0.003359	0.003513

Quantiles use linear interpolation in sorted arrays. A larger share of positive sessions is not positive mathematical expectation. Doubling changes the loss distribution and actual turnover. Ruin is defined here as balance below 10 INR, the TR-IN-97 minimum; a stop-loss with money remaining is a different outcome.

The loss sequence and permitted next stake

Step	Stake INR	Prior losses INR	Bank before stake INR	Eligibility
1	20	0	2,000	Allowed
2	40	20	1,980	Allowed
3	80	60	1,940	Allowed
4	160	140	1,860	Allowed
5	320	300	1,700	Not accepted after stop-loss
6	640	620	1,380	Not accepted after stop-loss
7	1,280	1,260	740	Not accepted after stop-loss

Uncertainty and losing streaks

With zero ruin events in 20,000 runs, the one-sided 95% upper bound is 1−0.05^(1/20000)=0.01498%, not zero. Proportions use binomial standard errors and 95% Wilson intervals.

In the separate iid loss model with q=0.515, five losses in a preselected block have probability q^5=0.03622731. The dynamically calculated probability of at least one five-loss run over 100 trials is 0.84943675. The expected waiting time for the first such run is $(1-q^5)/[(1-q)q^5]$=54.8525 trials. Overlapping windows are not treated as independent. These values are not the original game’s floor-fall frequencies.