



LIQUID AND GRIT

Slots Design Report

Competitive research and data insights for slots designers

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INTRODUCTION



“I dream for a living” – Steven Spielberg

Dear Slots Designer,

At G2E, real money slots creators expanded the limits of slots machines in dimension, location, skill, and presentation.

IGT released impressive 3D and 4D machines. In the highly interactive *Sphinx 4D*, players drew circles by hand to turn the scene from day to night, and grabbed onto the reels with their fingers to spin. This machine also fired high frequency sounds, so players *felt* electrical-like sensations. Aristocrat took another dimensional step forward, showcasing a virtual reality machine that required players use headsets and controllers.

Another IGT release, *Cardless Connect*, lets players save their progress and pick back up on their mobile devices anywhere in the casino. This has several major benefits, including continued play anywhere on the premises, and monetizing progress-based mechanics.

While skill brought a certain amount of buzz, the implementation of skill still feels fairly inconsistent with a slot machine. In most cases, skill-based play was simply a skill game masking a random number generator.

G2E presented larger, better, and newer curved monitors, as well as new combinations of stepper reels, screens, and wheels. This is demonstrated well by Scientific Games' *The Lord of the Rings: Rule Them All* with a stepper reel set for the base game, a large monitor for the bonus game, and a wheel with a video at top center. The variance in presentation of land machines versus mobile machines continues to widen. Closing this gap is a big opportunity for social casino teams.

Make dreams reality.

Brett Nowak
Editor-in-Chief

NEW INNOVATIONS

MULTI-STEP CONVERSIONS

Make an elaborate conversion mechanic with three or more scatter symbols. GSN Casino released *Genie's Touch*, a real money machine licensed from Quick Spin that demonstrates this mechanic



In the base game or free spins, three lamp symbols trigger the *Genie's Touch* feature



When *Genie's Touch* is activated, a random symbol is selected for each lamp symbol



One of the randomly selected symbols will be picked to replace all of the selected symbols, including the lamp symbols



The game will always choose the symbol that creates the best possible payout

SINGLE SLOT MACHINES

Continue to simplify proven mechanics. Caesars Slots' *Devil's Choice* is a great example as a single slot machine (see Deep Dives for more details)



Upon machine-entry, players are presented with a very simple, one reel, one-line machine with three progressive ladders



Once a player has progressed up one of three ladders, they have a choice to COLLECT or SPIN



Players may risk it all to win all three jackpots. Hitting the *Wild Angel* symbol moves all of the ladders up one step

SKILL-BASED BONUS GAMES

Incorporate other types of skill-based games to increase retention with moderate slots players. Mitigate risk of turning hardcore players off by letting players *choose* skill-based play or traditional free spins

7s Aflame: Simulated Skill Game

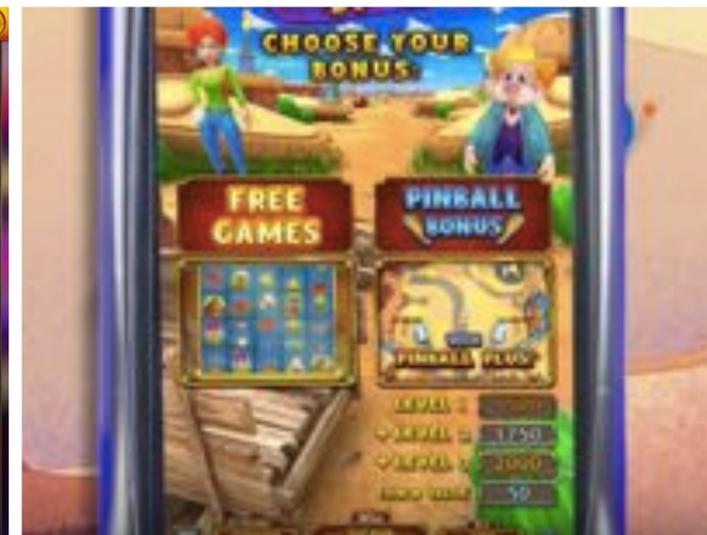
Texas Tea: Skill Game



In House of Fun's *7s Aflame*, any 5-of-a-kind with wilds or 7s triggers a bonus game, *Jackpots Aflame*



Players choose a side and the pinball game plays out without player interaction or skill



In IGT's *Texas Tea*, players may pick to play either a free games bonus or a pinball bonus



IGT's version of pinball is a skill game that awards players based on a random number generator

LINE MULTIPLIERS

Make multipliers more engaging and visually stimulating by attaching a different multiplier to each line. Consider boosting all the multipliers during free spins



During the base game in DoubleU Casino's *Billy the Rockstar*, players receive different multipliers on each line



In the free spins, the multipliers all increase and turn from color boxes to gold

BONUS GAME BOOSTS

Integrate more elaborate awards into your slots-based progression systems. House of Fun's *Brave Red*, released 10/4/17, is an example. This machine's payout will be examined closely in the Deep Dives next month



In House of Fun's *Brave Red*, players collect boosters (like extra royals or extra wilds) during the final round of a three round pick 'em bonus, which is triggered by the map



These boosters are awarded during the free spins, which is triggered on the next major map node

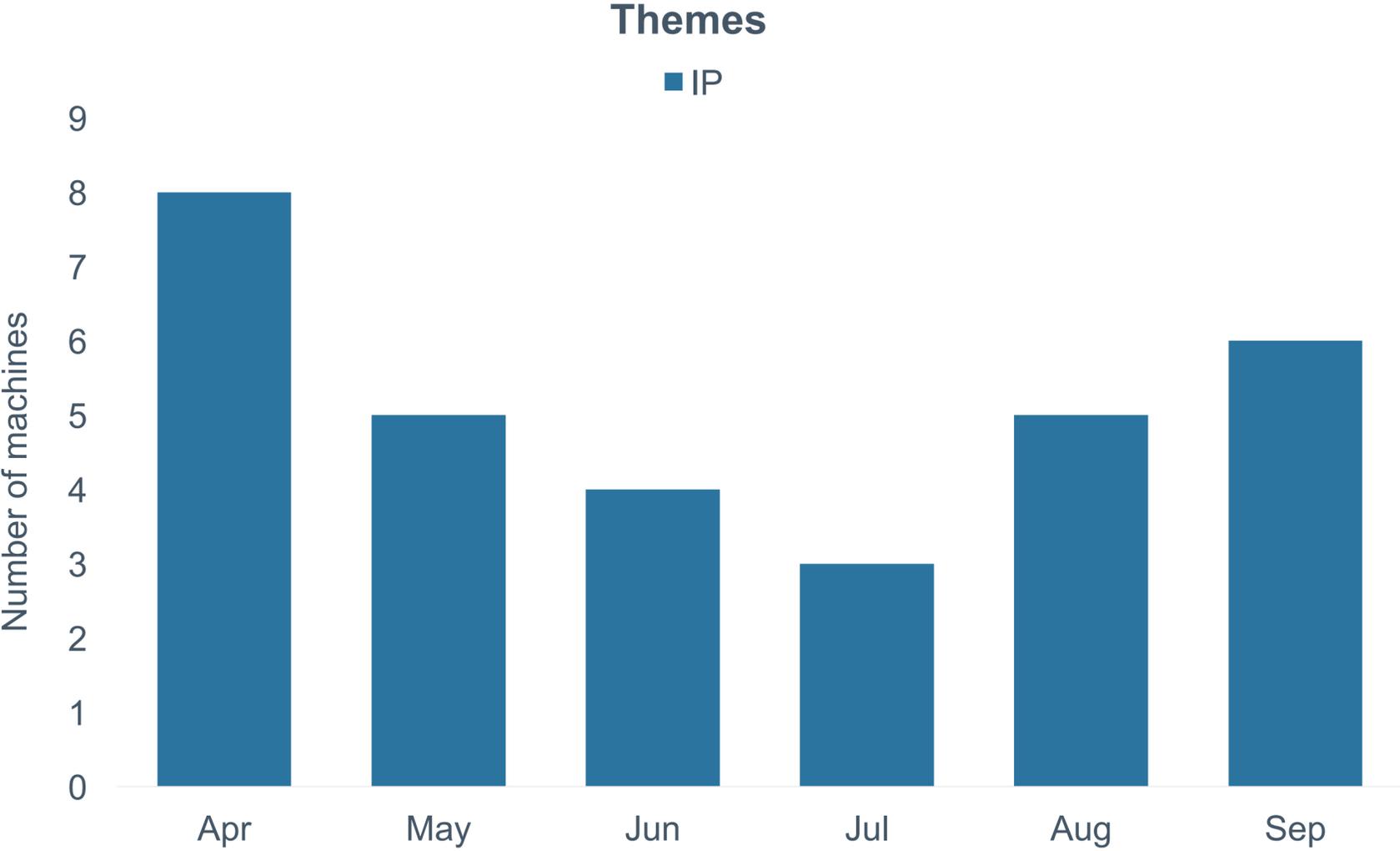
MARKET TRENDS

Apps included in the trend data:

DoubleDown Casino, Heart of Vegas, House of Fun, Goldfish Casino, Slotomania, Jackpot Party, Hit it Rich, Caesars Slots, Quick Hit Slots, and Hot Shot Casino

THEMES

IP-themed machines continue to rebound. IP released: Gold Fish's *The Game of LIFE: Payday*, Hit it Rich's *Pawn Stars*, *Storage Wars*, *Superman The Movie*, *The Princess Bride*, *True Love*, and Jackpot Party's *Johnny Cash*



Jackpot Party's *Johnny Cash*

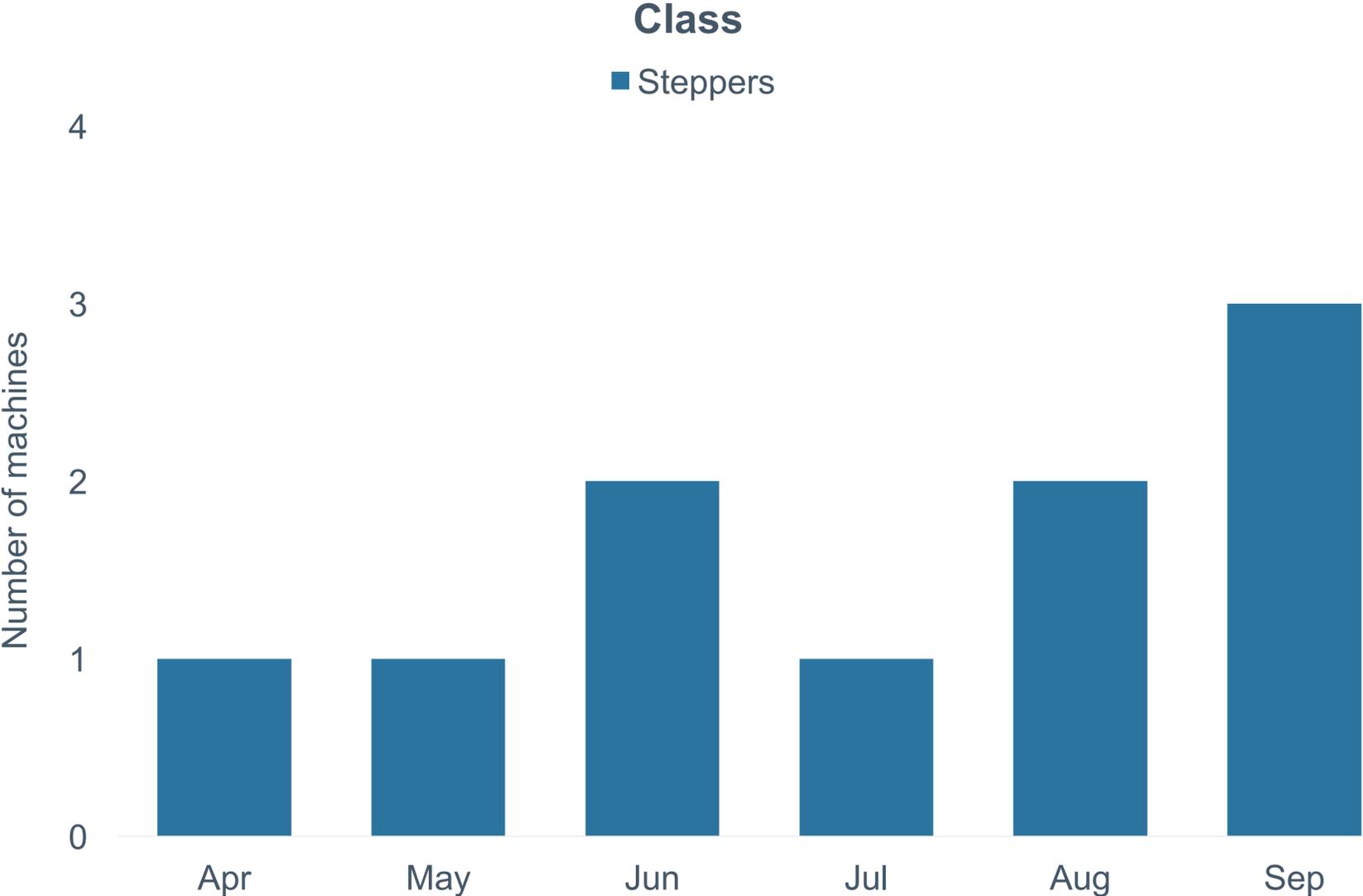


Hit it Rich's *Pawn Shop*

The Princess Bride, released by Hit it Rich, was the third machine released with this IP from this app

CLASS

Stepper machines are trending upwards with featured apps. House of Fun released two Aruze-inspired machines categorized as steppers



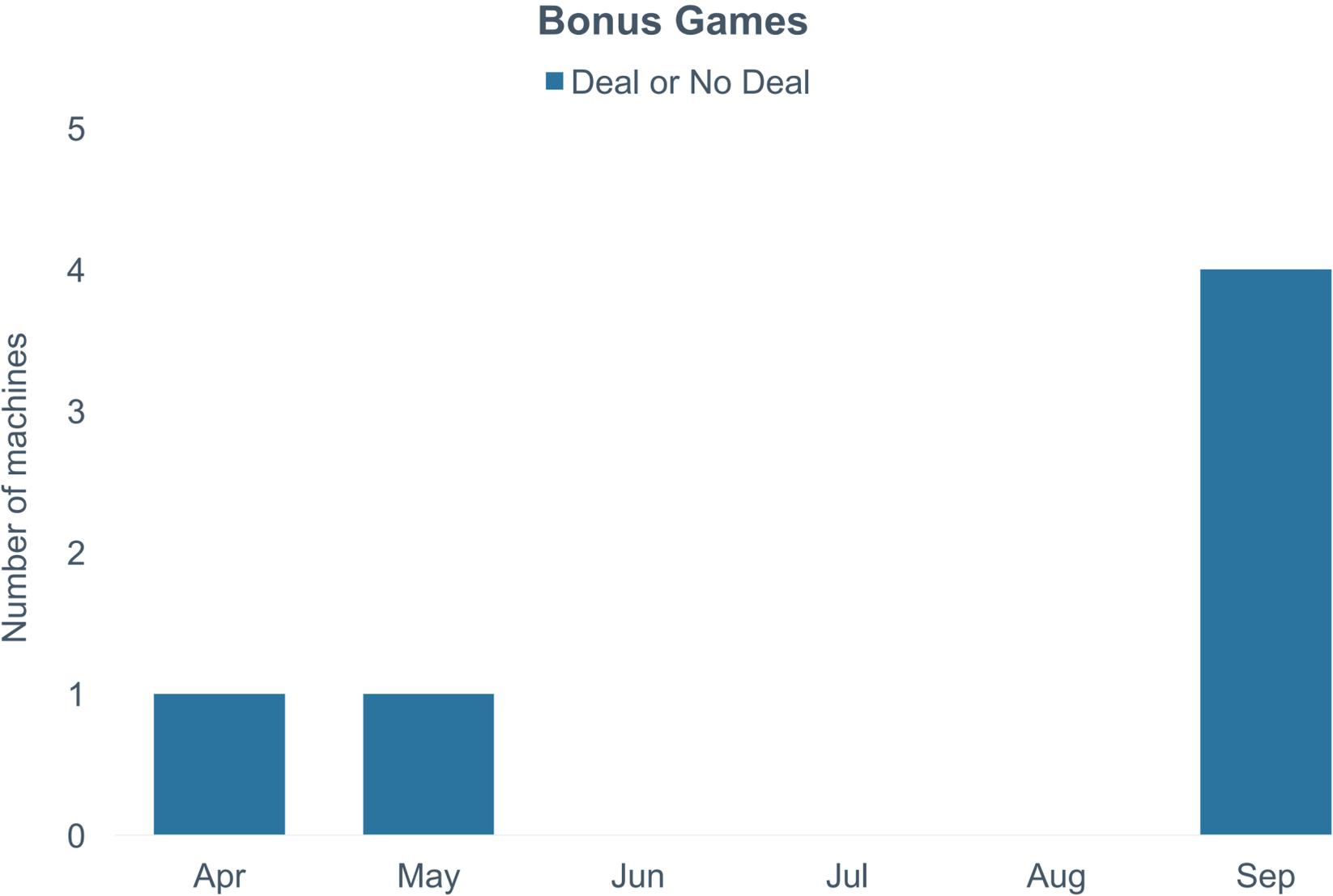
House of Fun's 7s Aflame



DoubleDown Casino's Lucky Hot 7s

BONUS GAMES

‘Deal or No Deal’ in the bonus game was a popular mechanic in September. See Caesars Slots’ *Devil’s Choice* and Slotomania’s *Clover Adventure* in the Deep Dives



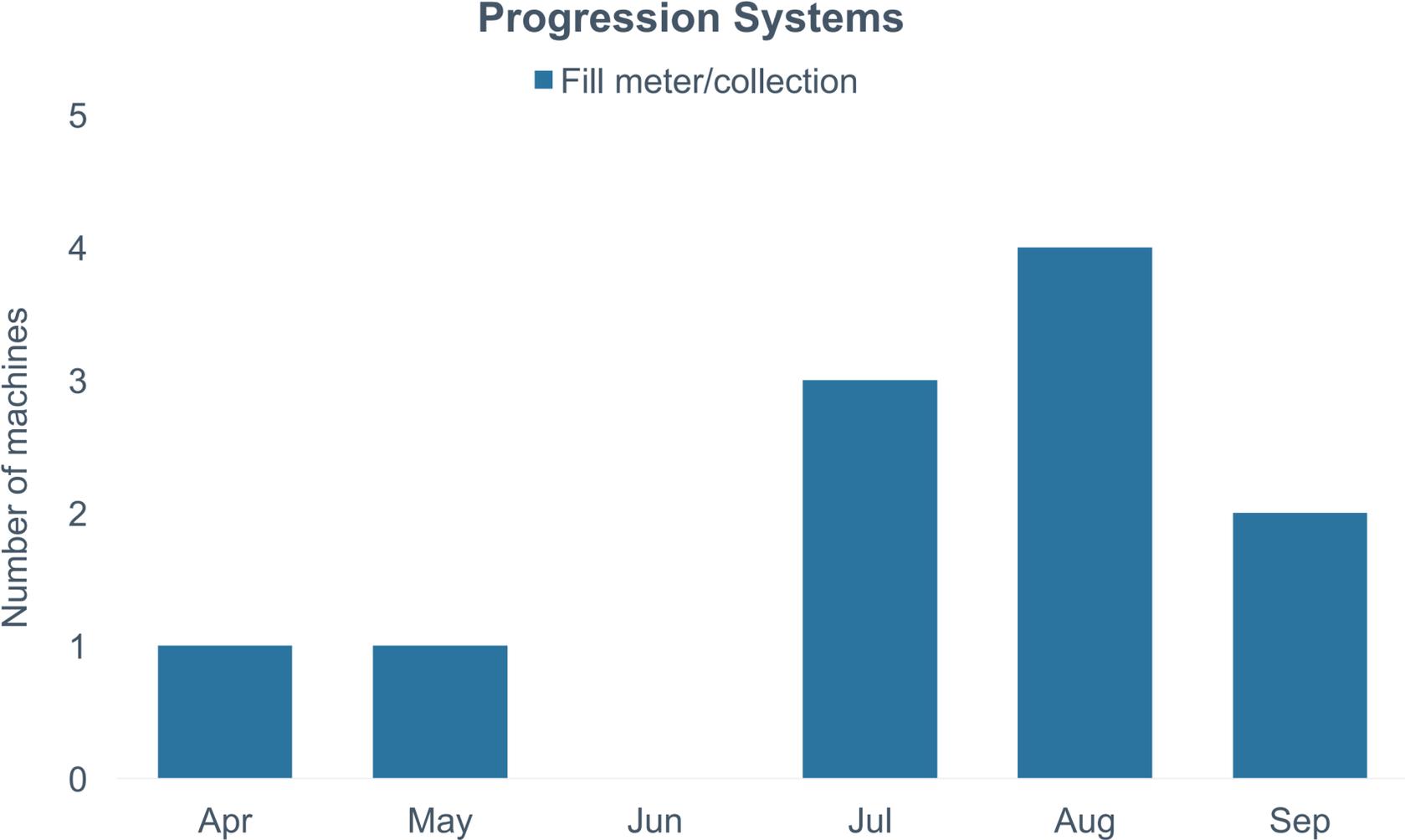
Slotomania’s *Clover Adventure*



Hit it Rich’s *Pawn Stars*

PROGRESSION SYSTEMS

Fill meter/collection systems within progression-based machines are on the rise. Progression-based slots mechanics continue to be an area of opportunity for social casino slots designers (over real money designers)



House of Fun's *Gilded Rome*



Slotomania's *Clover Adventure*

DEEP DIVES

SOCIAL CASINO

- *Devil's Choice* – Caesars Slots
- *Clover Adventure* – Slotomania
- *Lucky Hot 7s* – DoubleDown Casino
- *Black Sail Beauties* – High 5 Casino

DEVIL'S CHOICE

Caesars Slots' *Devil's Choice* is a single symbol payline machine that excites players with a frequent 'SPIN or COLLECT' mechanic *and* three prize towers leading to jackpots

- The machine has a single symbol payline (image 1).
- Hitting a tower symbol advances one space on the correlating tower, offering the prize amount in the box (image 2).
- After each win, players must choose to either SPIN for a higher prize or COLLECT the win. Collecting the win resets the progression of all towers (image 3).
- The *Lady Devil* symbol resets tower progression and clears all wins accumulated. The *Wild Angel* symbol progresses each tower up one space (image 4).
- Reaching the top of a tower instantly awards the top prize ... and again every time the tower symbol lands until the progression is reset (image 5). The prize amount, which is the sum of all the steps in the ladder, is only added once to the jackpot.
- The jackpot is awarded when the top of all three towers is obtained (image 6).



DEVIL'S CHOICE STATS

Game play

Hit frequency	5%
Volatility	7.0
Spins until a bonus	5,000

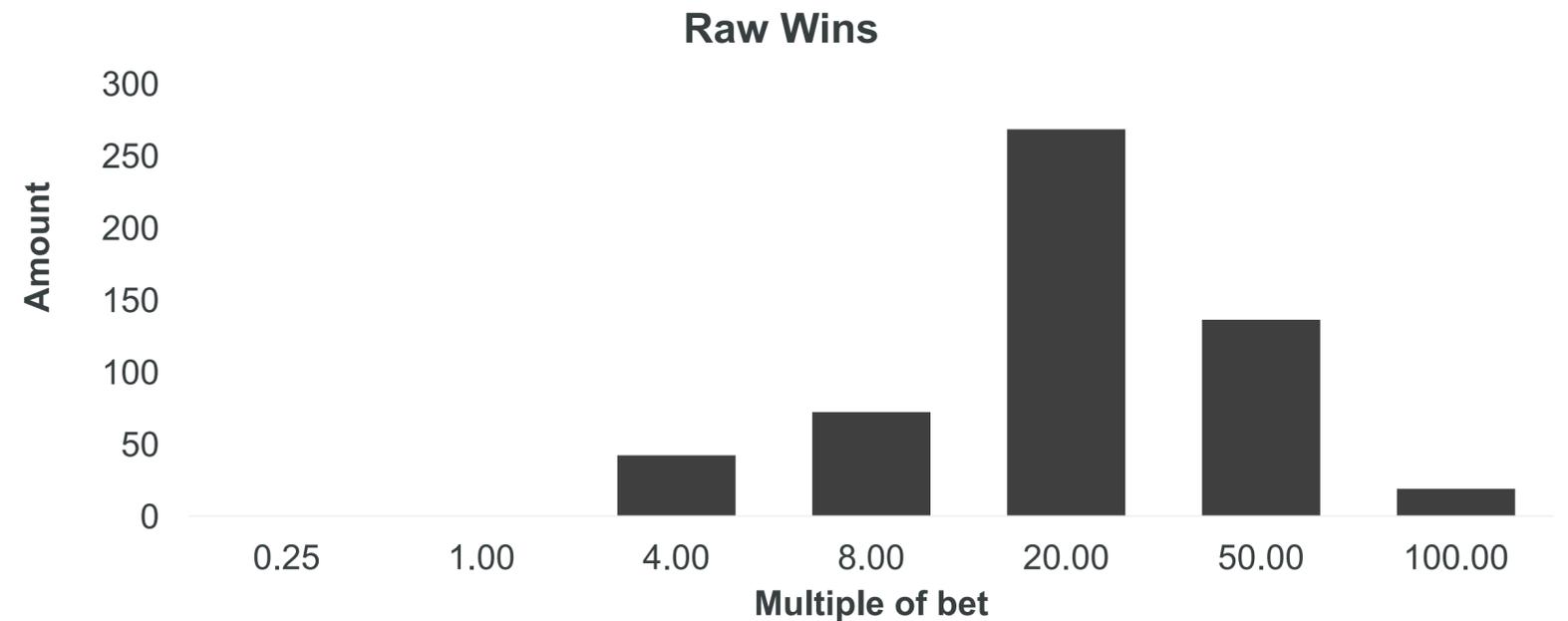
Distribution of RTP as % of total RTP

Base game	100%
Bonus game	0%
Sinister Jackpot	0.3%

RTP range

Minimum range	87%
Median	99%
Maximum range	110%

- Volatility is the standard deviation of the 10K payouts
- The distribution of RTP is base or bonus game RTP over total RTP
- RTP range is 90% confidence with 10K spins. See the Appendix for more details
- Jackpots are payouts greater than 1000 x bet and are removed from the RTP range numbers



CLOVER ADVENTURE

Slotomania's *Clover Adventure* utilizes a multiple map progression system increasing awards for heavy players

- Players must bet at a minimum level to unlock the progress meter (image 1).
- Coins that land during play fill the meter above the reel set. Once the meter is filled, players progress a step forward on the first map. Each step on the map awards coins (image 2).
- Reaching the end of a map unlocks the next map and awards a Leprechaun's Prize. Players pick either a coin prize or a random mystery prize (image 3).
- Three or more bonus symbols trigger 15 free spins (image 4).
- The free spins bonus is played on two reel sets. Players collect *Clover Symbols* to unlock additional reel sets and full reel wilds (images 5 & 6).



CLOVER ADVENTURE STATS

Game play

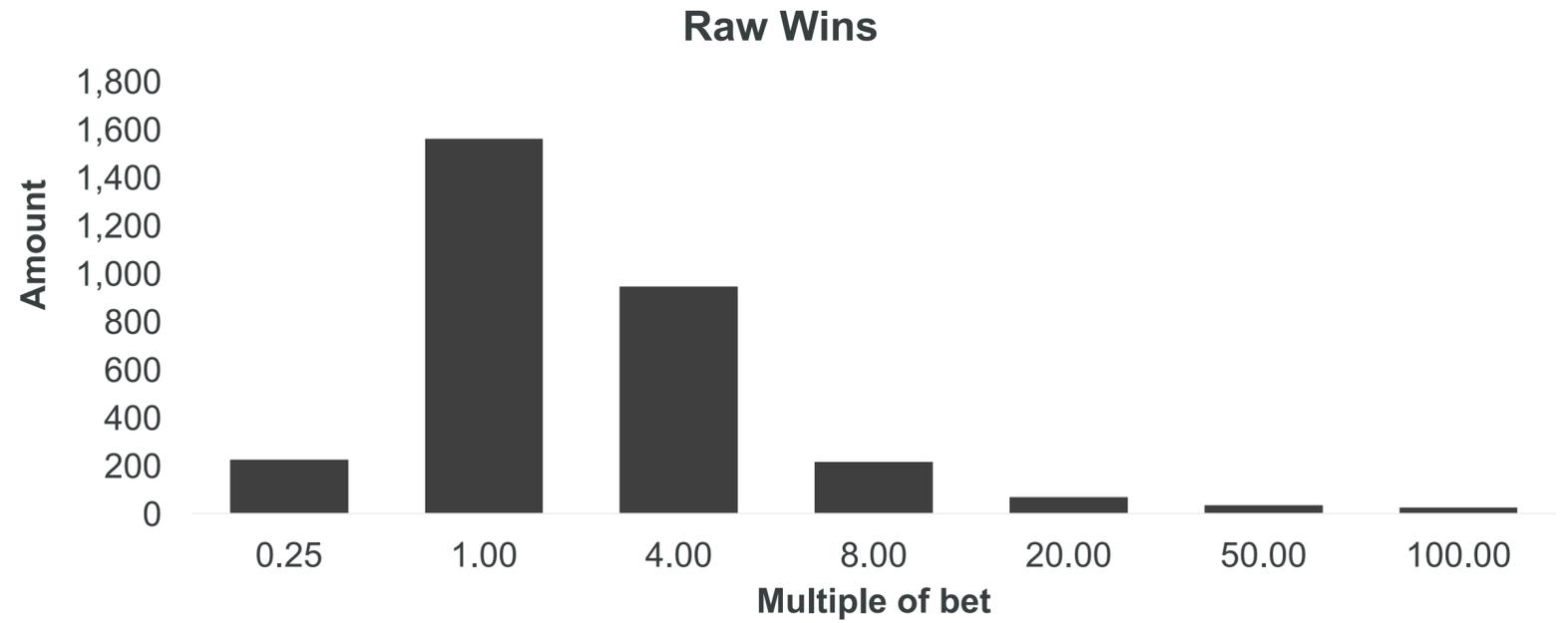
Hit frequency	31%
Volatility	5.2
Spins until a bonus	72

Distribution of RTP as % of total RTP

Base game	63%
Bonus game	37%
Multi-Reel Free Spins	29%
Leprechaun Adventure Map	8%

RTP range

Minimum range	77%
Median	85%
Maximum range	94%



LUCKY HOT 7s

DoubleDown Casino's classic machine *Lucky Hot 7s* incorporates stacked symbols with guaranteed wilds

- *Lucky Hot 7s* is a 5 x 5 reel set with 50 paylines (image 1).
- As large clusters of paying symbols land, they are transformed to mega symbols (image 2).
- Any combination of three or more *Lucky Hot 7* symbols triggers 5 to 25 free games (image 3).
- At the beginning of each free game, the *Kings Stacks* feature randomly places a stack of symbols on each reel and wild symbols over 3 to 10 positions (image 4).



LUCKY HOT 7s STATS



Game play

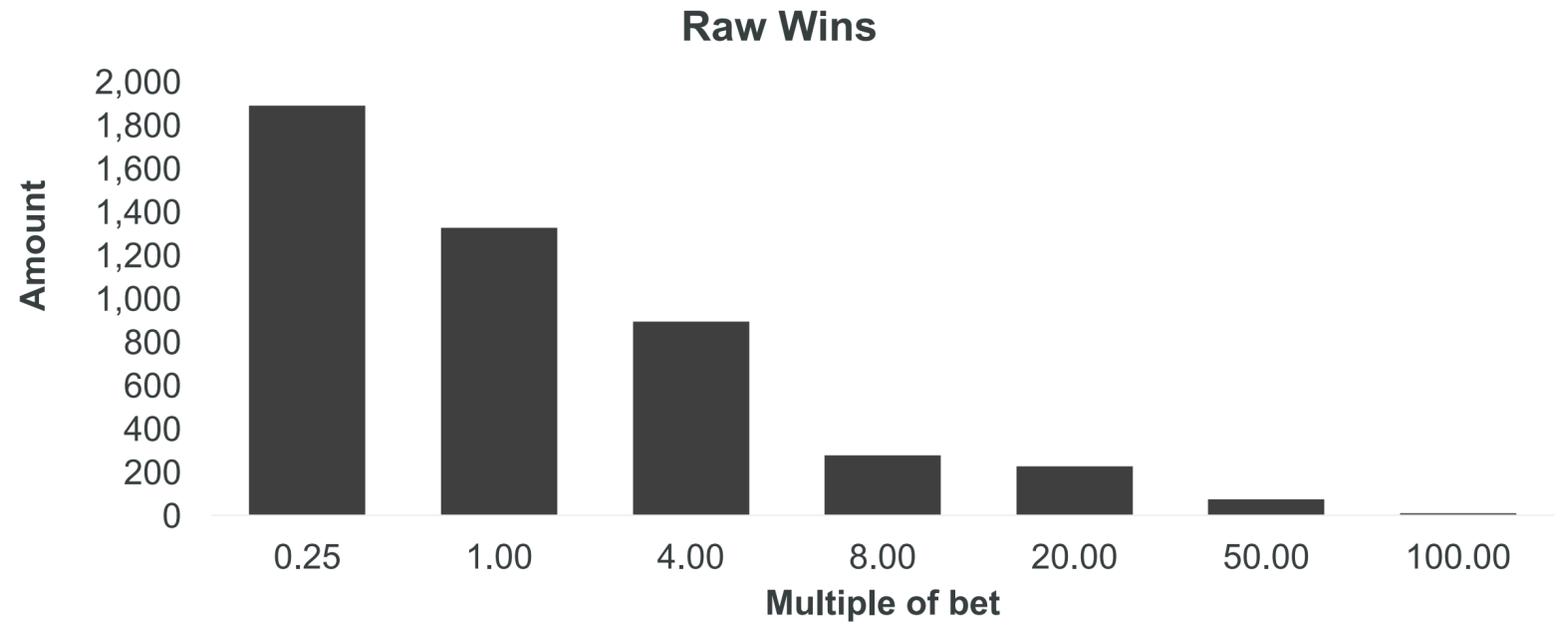
Hit frequency	47%
Volatility	3.9
Spins until a bonus	104

Distribution of RTP as % of total RTP

Base game	78%
Bonus game	22%
Lucky Hot Free Games	22%

RTP range

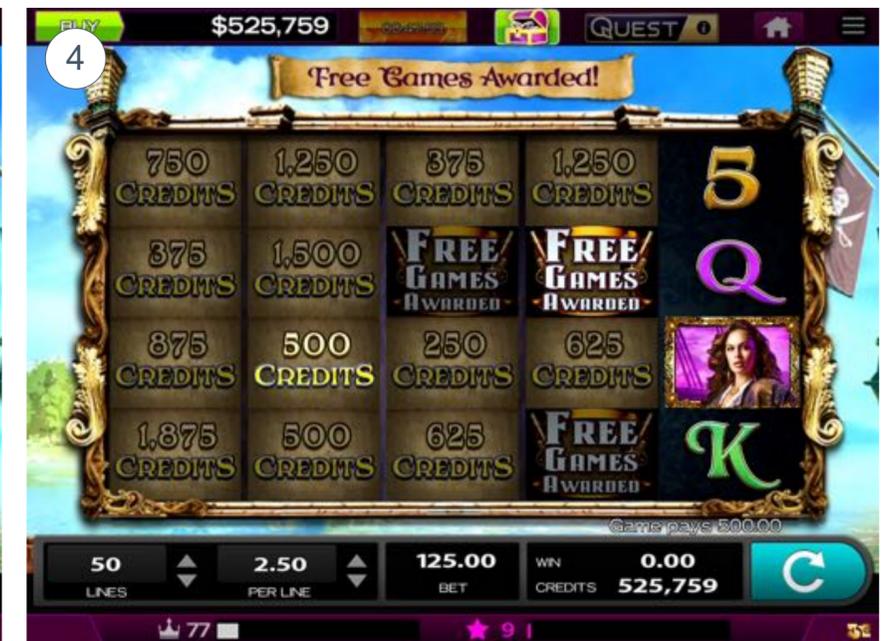
Minimum range	92%
Median	99%
Maximum range	105%



BLACK SAIL BEAUTIES

High 5 Casino's *Black Sail Beauties*, a reskin of *Rum Runners*, offers super-stacked symbols with an on-reel pick 'em bonus that may trigger free spins

- *Black Sail Beauties* is a 4 x 5 reel set, 50 line machine (image 1).
- During play, three or more stacks of high symbols may convert to a mega symbol, triggering an on-reel pick 'em bonus (image 2).
- The total number of pick options, number of picks, and prize awards depend on the triggering stacks (image 3):
 - 3 reels with one pick from 12 options: 2x to 10x coin prizes or free games awarded
 - 4 reels with two picks from 16 options: 2x to 15x coin prizes or free games awarded
 - 5 reels with three picks from 20 options: 2x to 30x coin prizes or free games awarded
- Free spins may only be won with the *Super Select* feature. The *Super Select* may be triggered during free spins (image 4).



BLACK SAIL BEAUTIES STATS

Game play

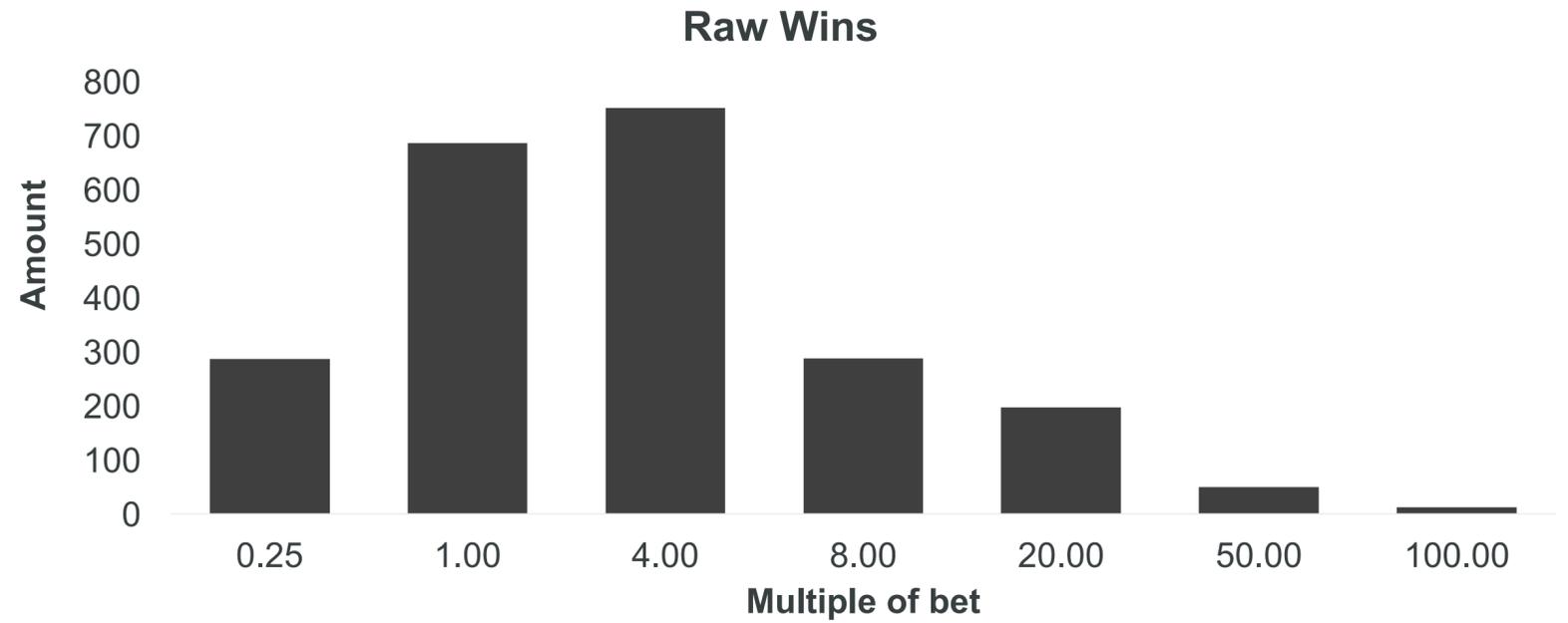
Hit frequency	23%
Volatility	4.6
Spins until a bonus	51

Distribution of RTP as % of total RTP

Base game	64%
Bonus game	36%
Pick 'Em Bonus Free Spins	16%
Pick 'Em Bonus Coins	21%

RTP range

Minimum range	79%
Median	86%
Maximum range	94%



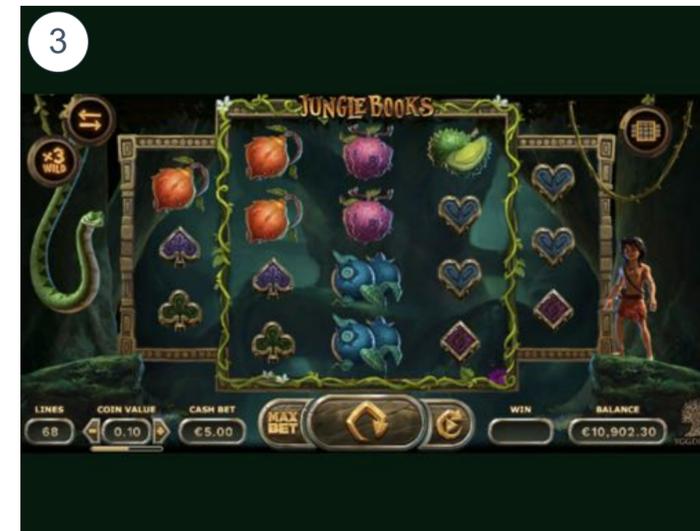
REAL MONEY

- *Jungle Books* – Yggdrasil Gaming
- *Dragon Spin* – Bally

JUNGLE BOOKS

Yggdrasil Gaming's *Jungle Books* combines characters with special features to offer 45 variations of special pays and various reel configurations

- The machine offers various side characters and features during play. There are five characters called *Hosts*. Each offer two special features (image 1).
- The reels may change depending on the active character(s) and features (image 2).
- A character is always displayed with two icons, representing the special features. Randomly during play, a new character may appear making the previous character a *Guest Host* to the right of the reels (image 3).
- *Guest Hosts* remain for a random number of spins with only one of their two special features. This creates *Triple Feature Combo* wins—bonuses that use all three features from both characters (image 4).
- During the tiger's *Sticky Re-Spin*, any winning combination and any wilds lock for one spin (image 5).
- The bear's feature is a *Honeycomb Pick 'Em*, triggered when the *Honeycomb* symbol lands. Players pick from nine coin awards (image 6).



JUNGLE BOOKS STATS

Game play

Hit frequency	26%
Volatility	8.8
Spins until a bonus	16

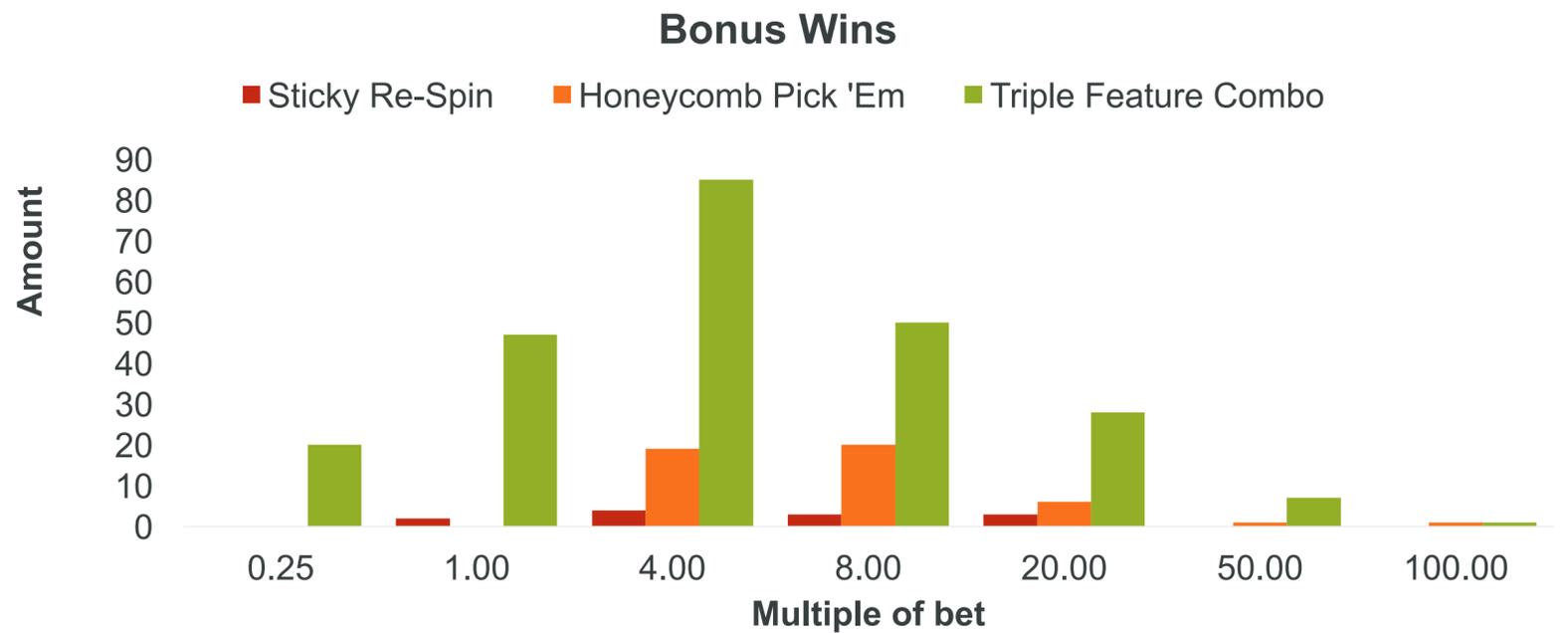
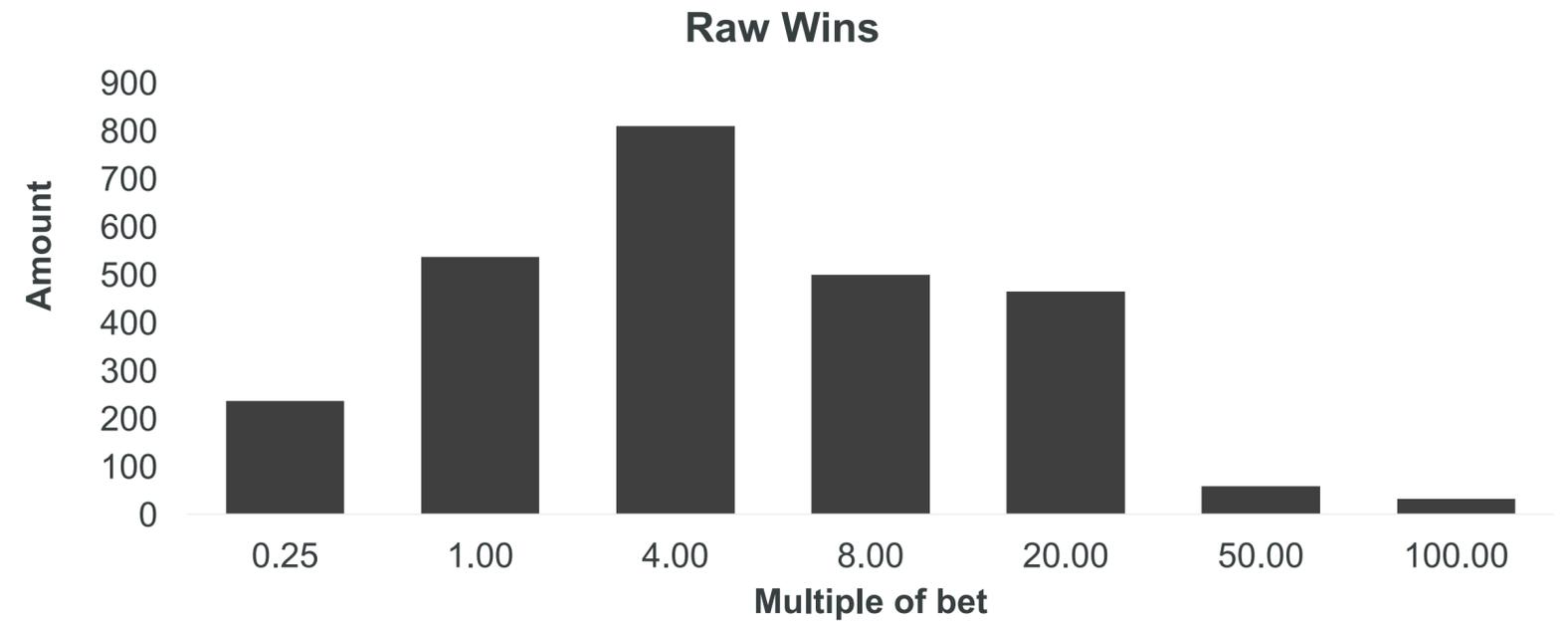
Distribution of RTP as % of total RTP

Base game	90%
Bonus game	10%
Sticky Re-Spin	0.4%
Honeycomb Pick 'Em	2.5%
Triple Feature Combo	6.8%

Sticky Re-Spin	0.4%
Honeycomb Pick 'Em	2.5%
Triple Feature Combo	6.8%

RTP range

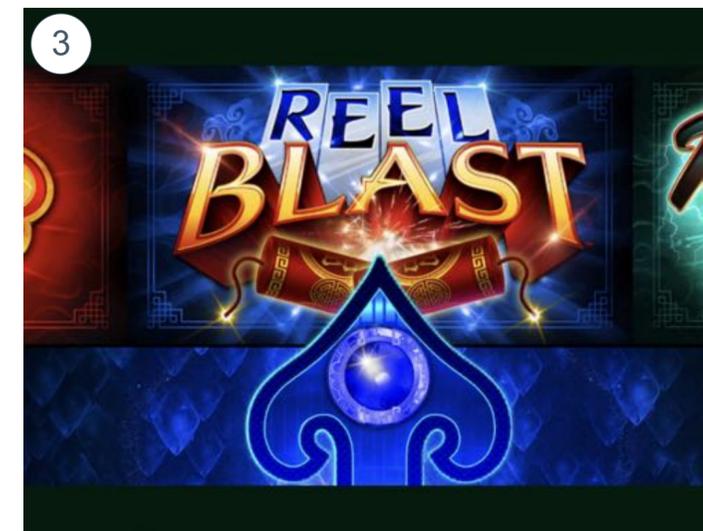
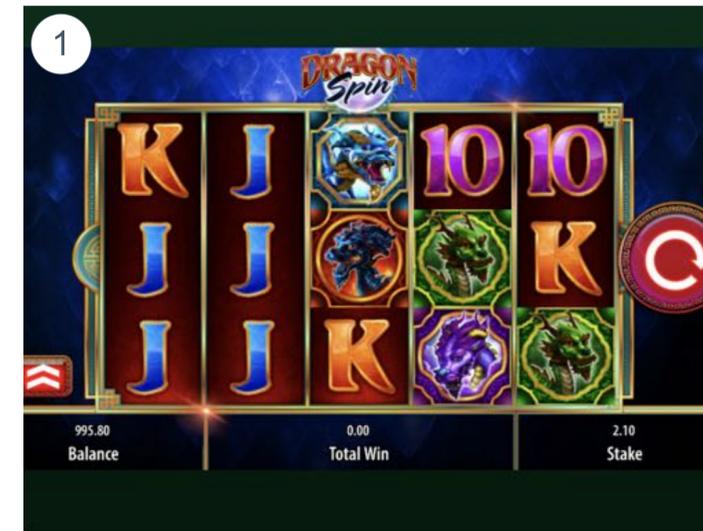
Minimum range	148%
Median	162%
Maximum range	177%



DRAGON SPIN

Bally Technology's *Dragon Spin* engages players with a multi-reel free spins bonus that has mega symbols on shared reel sets

- The base game is a 3 x 5 with 30 paylines (image 1).
- Three bonus symbols on reels 2, 3, and 4 trigger the *Dragon Spin Bonus Feature* (image 2).
- Once triggered, one spin of the wheel awards one of three possible free games (image 3).
- If the wheel lands on the 'Wild' symbol, players receive the *Raining Wilds Free Games*. At the beginning of five free games, 3 to 10 wilds are randomly placed on the reels (image 4).
- *Persisting Wilds Free Games* awards five free games with locking wilds added at the start of each spin until the bonus concludes. Free games 1, 2, and 3 award up to two locking wilds each spin, and up to three wilds on the fourth spin. Up to seven wilds may be awarded on the last free game (image 5).
- *Reel Blast Free Games* is five free games played on three reel sets connected by a shared center reel. The shared reel displays mega symbols comprised of reels 2, 3, and 4 for each of the reel sets (image 6).



DRAGON SPIN STATS

Game play

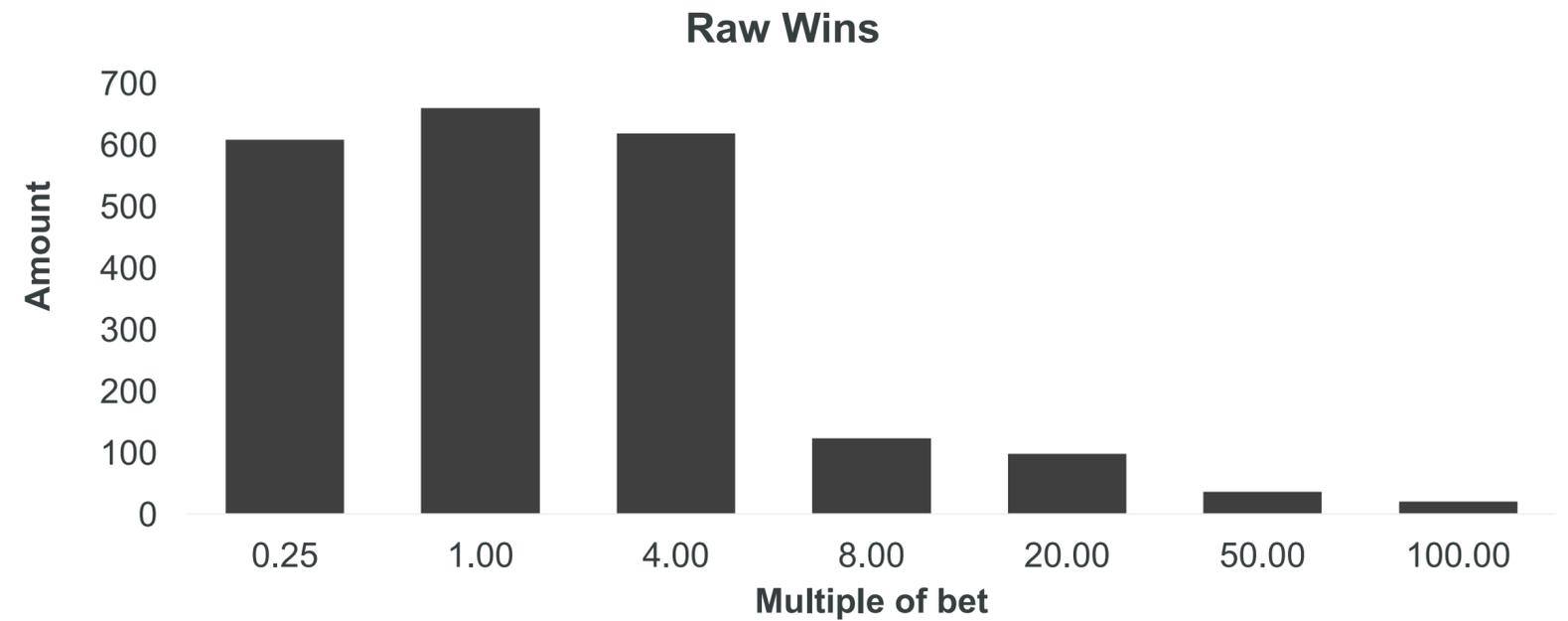
Hit frequency	22%
Volatility	4.6
Spins until a bonus	159

Distribution of RTP as % of total RTP

Base game	60%
Bonus game	40%
Raining Wilds Free Games	13%
Persisting Wilds Free Games	12%
Reel Blast Free Games	15%

RTP range

Minimum range	60%
Median	68%
Maximum range	76%



APPENDIX

SLOTS PLAYER PERSONAS

	PLAIN JANE	NIGHT-OUT NANCY	ENTERTAIN-ME EDDIE	MR. AND MRS. RICARDO
Desire	Utility	Excitement	Multi-Purpose	Relaxation
Motivation	Looking for something to do: kill time and reduce boredom	Wants a buzz: thrill of winning a jackpot, relaxing, and having a good time	Considers machines “lucky” or fun to play	Socialization, have fun, and relieve day-to-day stress
Features for choosing one game over another	Denomination that I want to play	Bet within budget, fun game to play	Fun game to play, good chance of winning	Fun game to play, denomination want to play
% of machines played with progressives	29%	40%	37%	25%
Player Income	Medium-high	High	Low	Medium-low
% female	54%	59%	45%	48%
Size of group	20%	28%	27%	26%

- Data adapted from Sandy C. Chen, “Segmenting slot machine players: a factor-cluster analysis,” College of Business, Oregon State University, Bend, Oregon, USA. 2013

DATA COLLECTION PROCESS

Machine observations are from 10,000 spins and an real money gaming accepted statistical process to determine 90% confidence levels of a machine's RTP. Recommendations, information and data comes from market research, app intelligence tools and deep analysis of the games

Machine information

- The RTP range is found using a sample of 10,000 spins, which is approximately 20 hours of play.
- To find the RTP range with 90% confidence, the median payout of the 10K spin +/- (standard error) x (z-score for 90% confidence) is calculated.
- The standard error is $(\text{standard deviation}) / \sqrt{\text{sample size}}$ and the z-score for 90% confidence is 1.65.
- For example, the median payout for *Zombie Prom* after 10K spins was 103% with a standard deviation of 3.3.
- The standard error is $3.3 / (\sqrt{10,000})$, which equals 3.3%
- The RTP range for *Zombie Prom* is then 103% +/- (1.65 x 3.3%).
- Based on this sample, the result is a 90% confidence that the real RTP of *Zombie Prom* falls between 97% and 109%.
- The volatility is the standard deviation, expressed in excel as =STDEV(A1:A10001), of the 10K payouts. Payouts are in the form of multiples of bet

Market research

- Each game is reviewed daily for updates, regardless of whether the game has been updated through the App Store.
- Transaction information comes from the iOS App Store's In-App Purchases tab. These transactions are ranked based on the number of transactions.
- Las Vegas player insights come from online sources, such as the Las Vegas Convention and Visitors Authority and the UNLV Center for Gaming Research.
- Progressive jackpot information comes from online research, specifically from wizardofodds.
- Trending revenue, downloads and package-rank data come from Priori Data, a Liquid and Grit partner.

Immature poets imitate; mature poets steal; bad poets deface what they take, and good poets make it into something better, or at least something different

– T.S. Elliot

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