



LIQUID AND GRIT

Slots Design Report

Competitive research and data insights for slots designers

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MAY



2017

INTRODUCTION



Being a visionary has to do with knowing where the market wants to go five minutes ahead of the other guys. - Steven Wynn

Dear Slots Designer,

In December 2015, we reported a shift in the Las Vegas casino industry. Las Vegas casinos turned to non-gaming entertainment to successfully differentiate. As a result, total revenue still continues to climb, while the percentage of gaming revenue declines.

In April 2017, DoubleU Casino acquired DoubleDown Casino. Shortly after, they entered into a content distribution agreement allowing DoubleU Casino to offer IGT's slot machine content. Similar to Las Vegas, content is increasingly shared across locations (apps).

This change places a premium on quality non-gaming entertainment. Yet, there is a major difference between social casino apps and Las Vegas casinos; most app owners are also content creators. This gives app owners more control over revenue generated from gaming.

RMG content will continue to spread across more apps. Therefore, social casino companies will have to become the leaders in slot machine creation and design to continue to drive strong gaming revenue.

Let's make it happen.

Brett Nowak
Editor-in-Chief

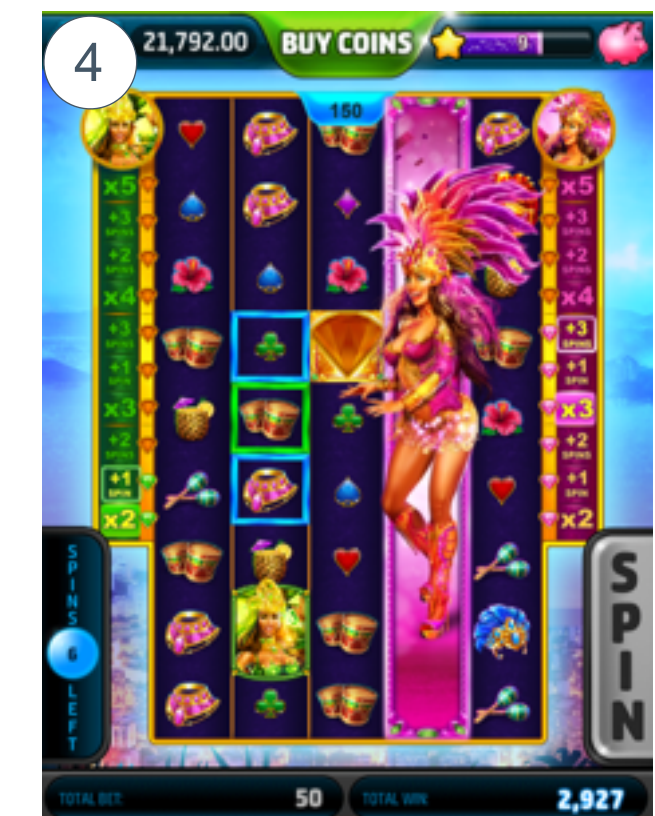
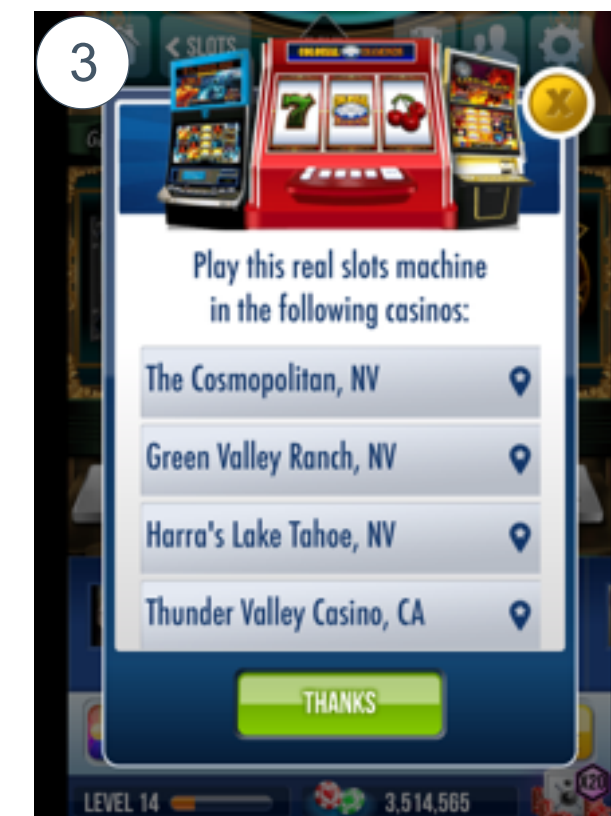
NEW INNOVATIONS

Covering 4/1/17 - 4/30/17

NEW INNOVATIONS

Create group competitions in the bonus game to add meta-game mechanics to machines. Allow players to find nearby RMG machines

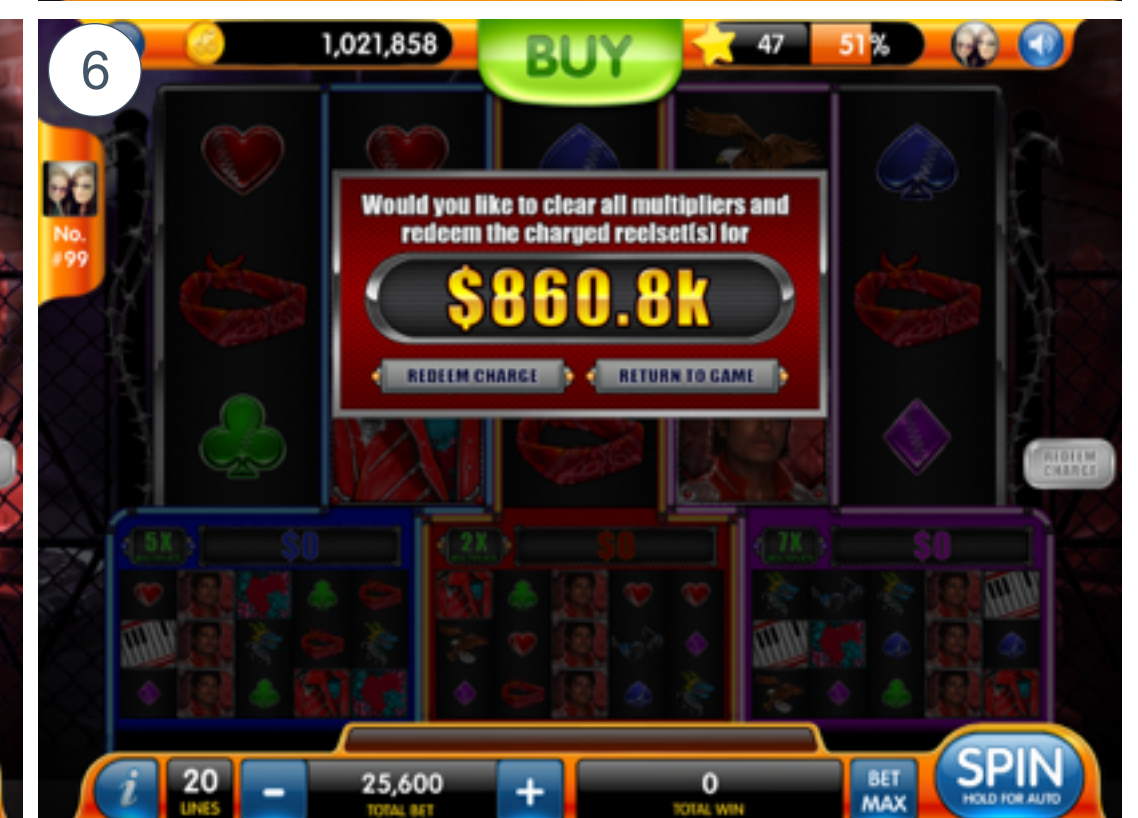
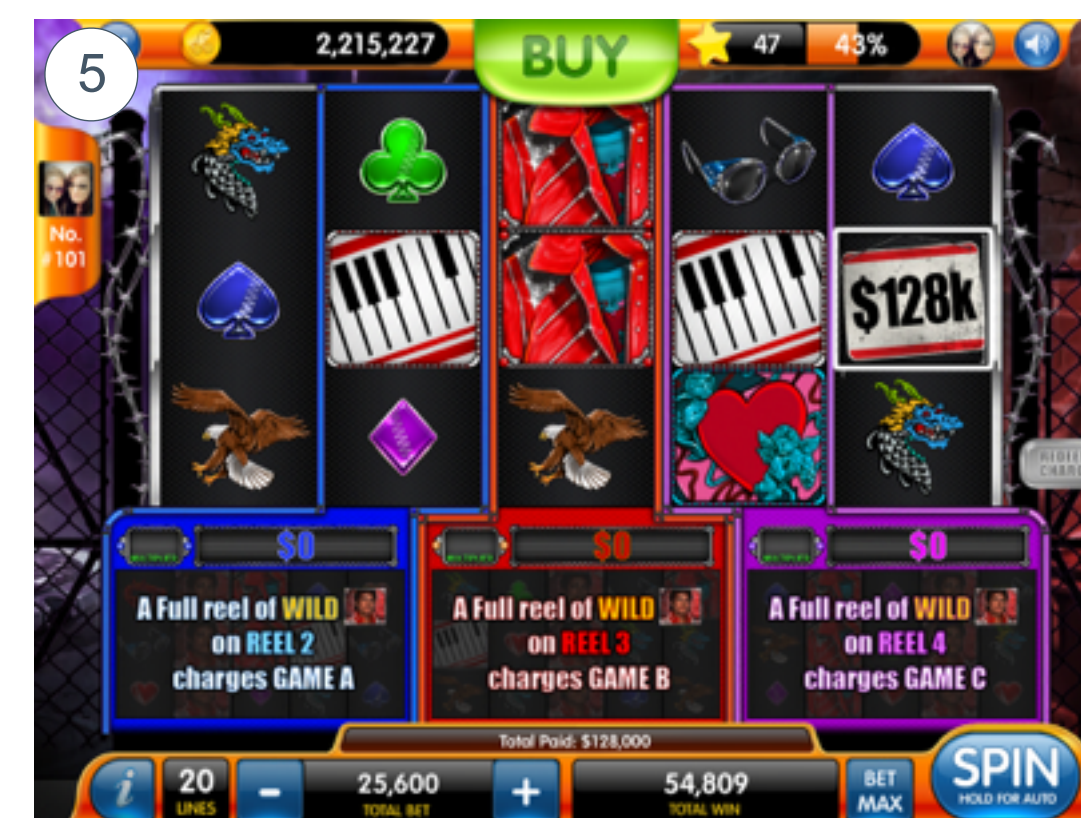
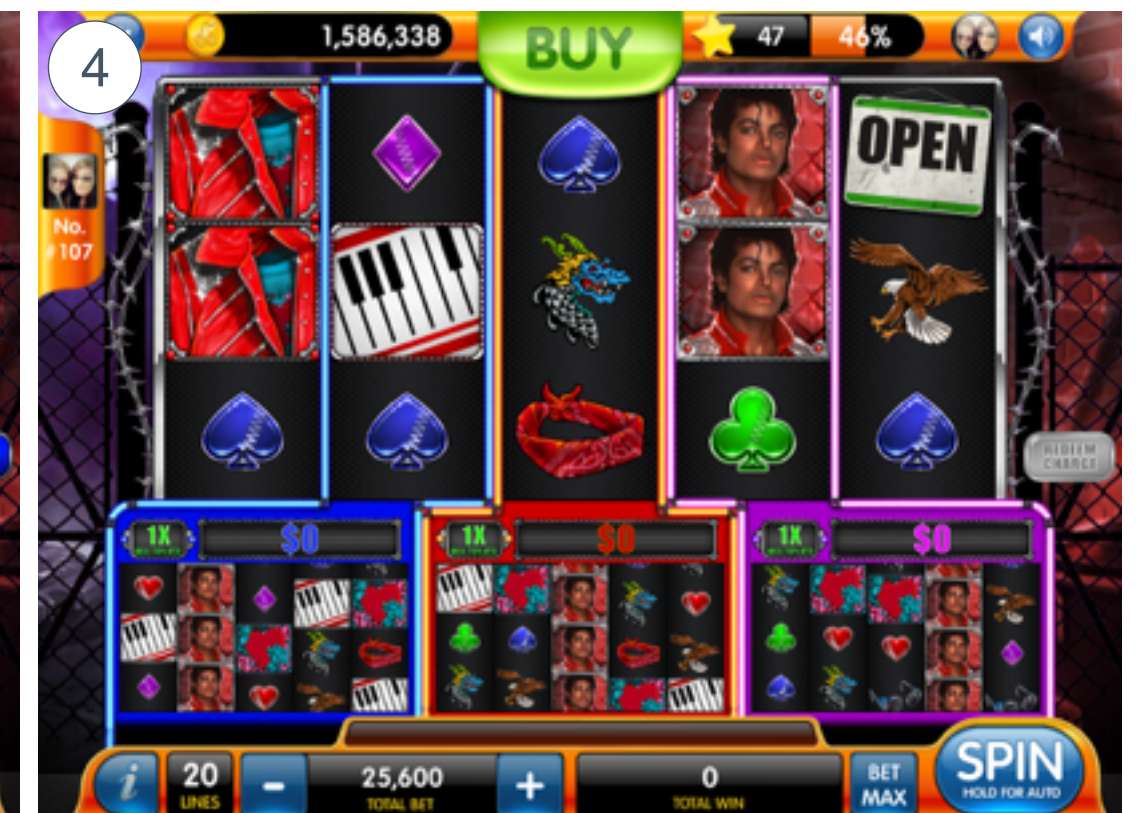
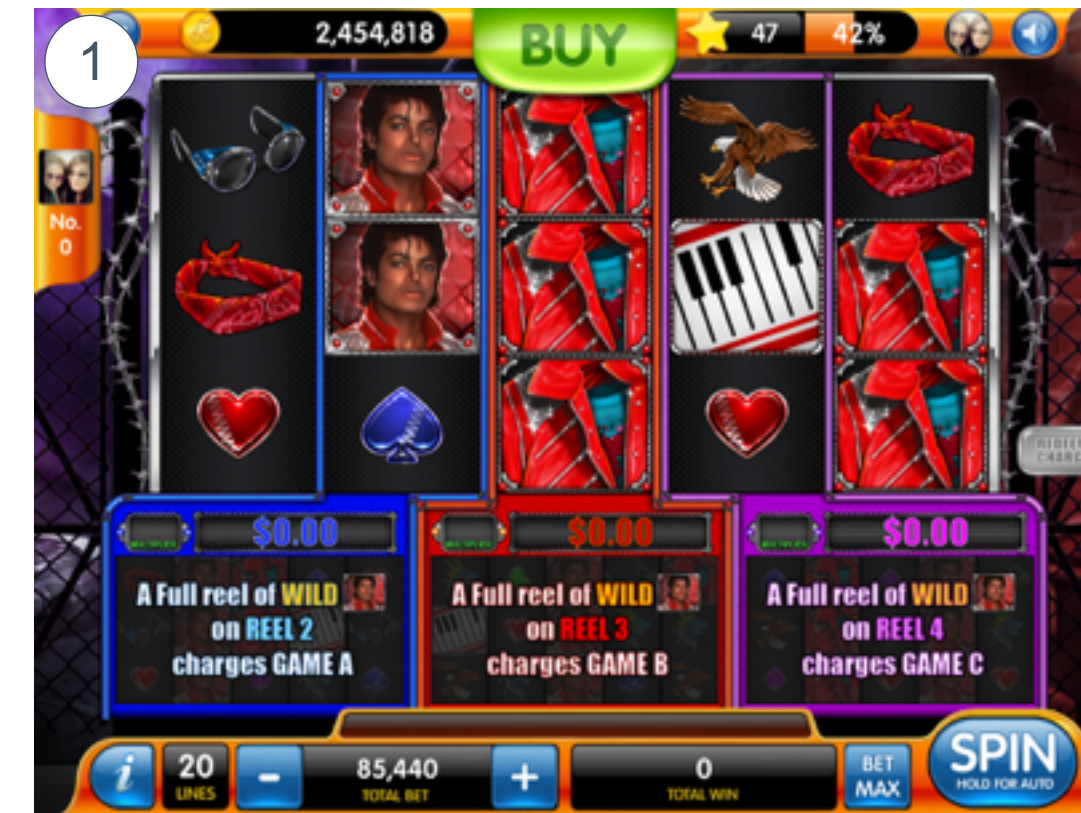
- **Create group battle modes in the bonus:** In POP! Slots' *Pirate's Gems*, the bonus game battle mode has three symbols: *Coins* to multiple bonus credits, *Attack* to conquer more area on the reels, and *Upgrade* to increase the value of gold coins. In the bonus game, the two teams fight to conquer the most symbols on a shared 4 x 10 reel set (images 1 and 2).
- **Point players to RMG machines nearby:** Lucky Play Casino features a button that players may click to locate the same machine in nearby casinos (image 3).
- **Boost colossal reels with two progress bars:** In Slotomania's *Samba Gold*, the free spins expands the reels to a 9 x 5 reel set and adds two progress bars (image 4 and see Deep Dives section for details).
- **Add other game genres to the bonus:** In Hit it Rich's *Slingo Gold*, players are given a bingo card in the bonus game. Each free spin plays the bottom row. When a number on the bottom row appears, that number is daubed (image 5).
- **Showcase ladders in the pick'em bonus to unlock jackpots:** In Caesars Slots' *Lucky Frog*, the pick'em bonus game has four different colored and sized ladders. Each pick of that color awards a rung on the ladder until there are no picks left (image 6).



QUICK HIT SLOTS

Provide exciting options to players with *Supercharged Reels*

- In Quick Hit Slots' *Beat It* machine, a large 3 x 5 main reel set sits above three locked mini reel sets (image 1).
- Full reel wilds that land on reels 2, 3, or 4 unlock and Supercharge the corresponding mini reel set (image 2).
- Once a mini reel set is *Supercharged*, a full reel wild landing on the corresponding main reel increases the multiplier (image 3).
- The 'Open' symbol landing on reel 5 triggers one spin of each Supercharged mini reel (image 4).
- The 'Closed' symbol landing on reel 5 resets all *Supercharged* mini reel sets (image 5).
- Clicking the 'Redeem Charge' button gives players the option to take a credit award in exchange for resetting all Supercharged reel sets (image 6).



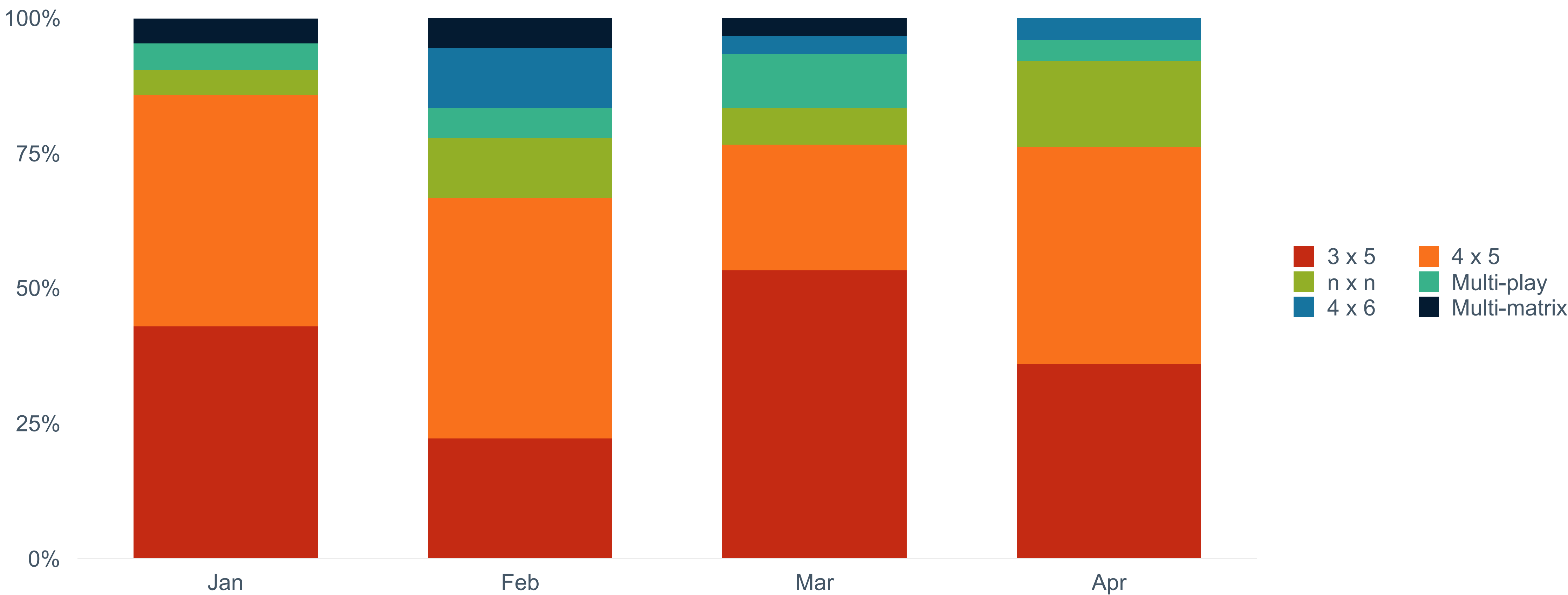
MARKET TRENDS

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

REEL CONFIGURATIONS



3 x 5 and 4 x 5 are still the standard, but n x n is an emerging trend. For n x n inspiration see: House of Fun’s *Happy Panda* and *Puss the Scoundrel*, Hit it Rich’s *Sex and the City: Carrie & Co.*, and Gold Fish’s *Neptune’s Quest*

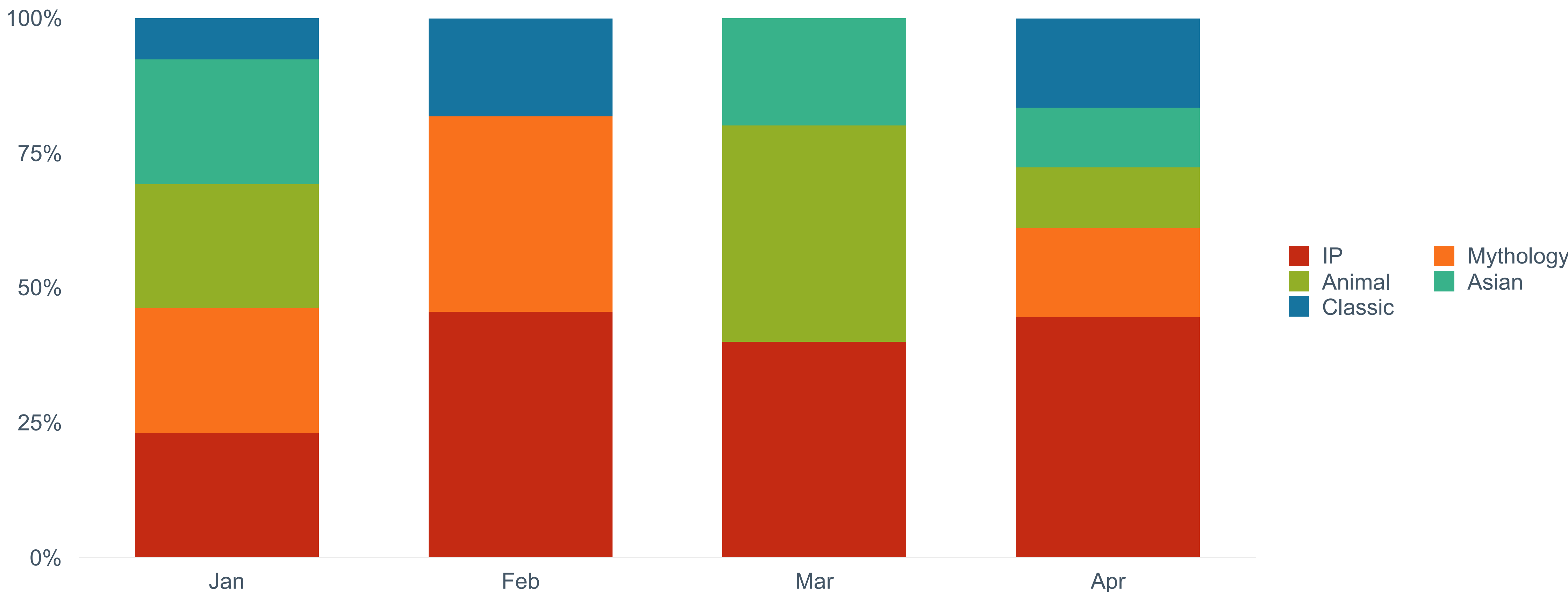


4 x 4, 2 x 3, 3 x 3, 3 x 6, and 5 x 5 made up 7% of all the machines released in 2017 and were omitted from the graph above

THEMES



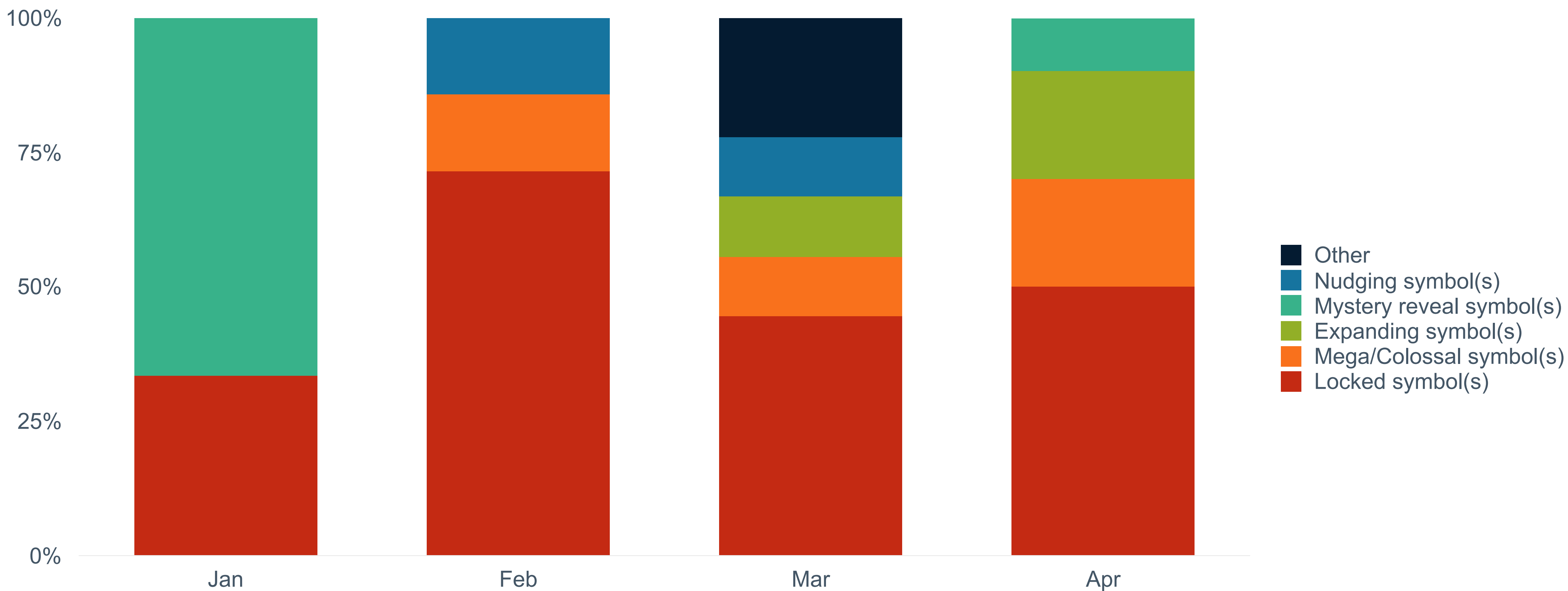
There are no dominate themes—the five themes below only represent 51% of total machines released



The graph above only includes the top five themes in 2017

SYMBOLS

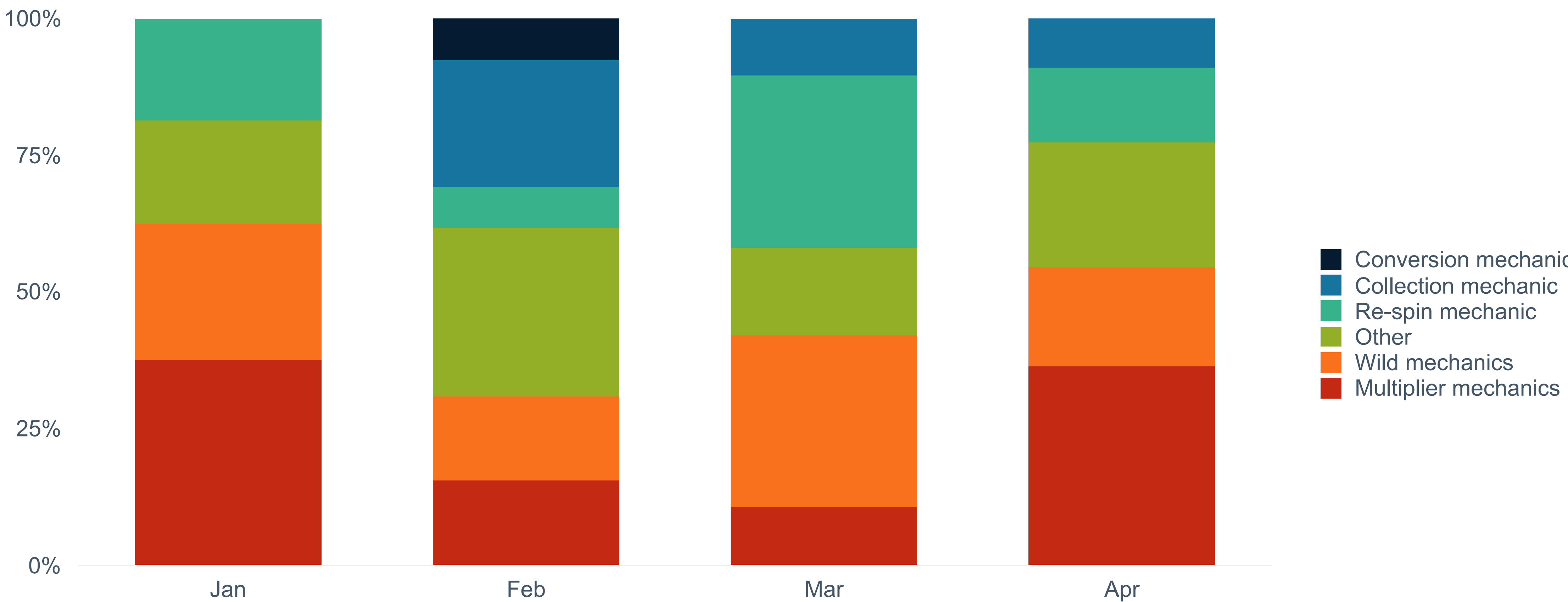
Locked symbol(s) is the most common symbol mechanic. This mechanic is particularly popular with the RMG-inspired machines. See Heart of Vegas' *Miss Kitty Gold*, Jackpot Party's *Alice & the Mad Tea Party*, and Hot Shot Casino's *Monopoly: Corners* as strong references



The graph above includes all features categorized as symbol features in 2017

BASE GAMES

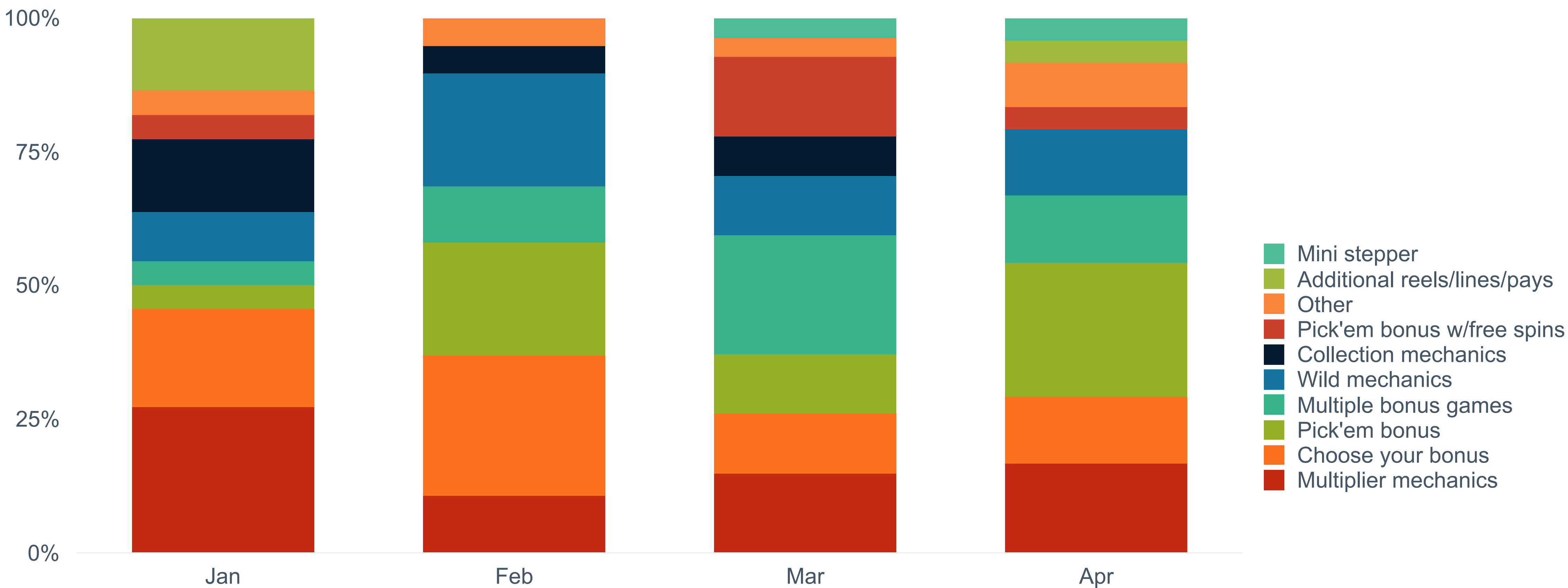
While multiplier and wild mechanics are still the most popular, collection mechanics on the base game are an up-and-coming trend. See House of Fun’s *Mystery of the Amazon* in the Deep Dives section and *Puss the Scoundrel* for recent base game collection practices



The graph above includes all features categorized as base game features in 2017

BONUSES

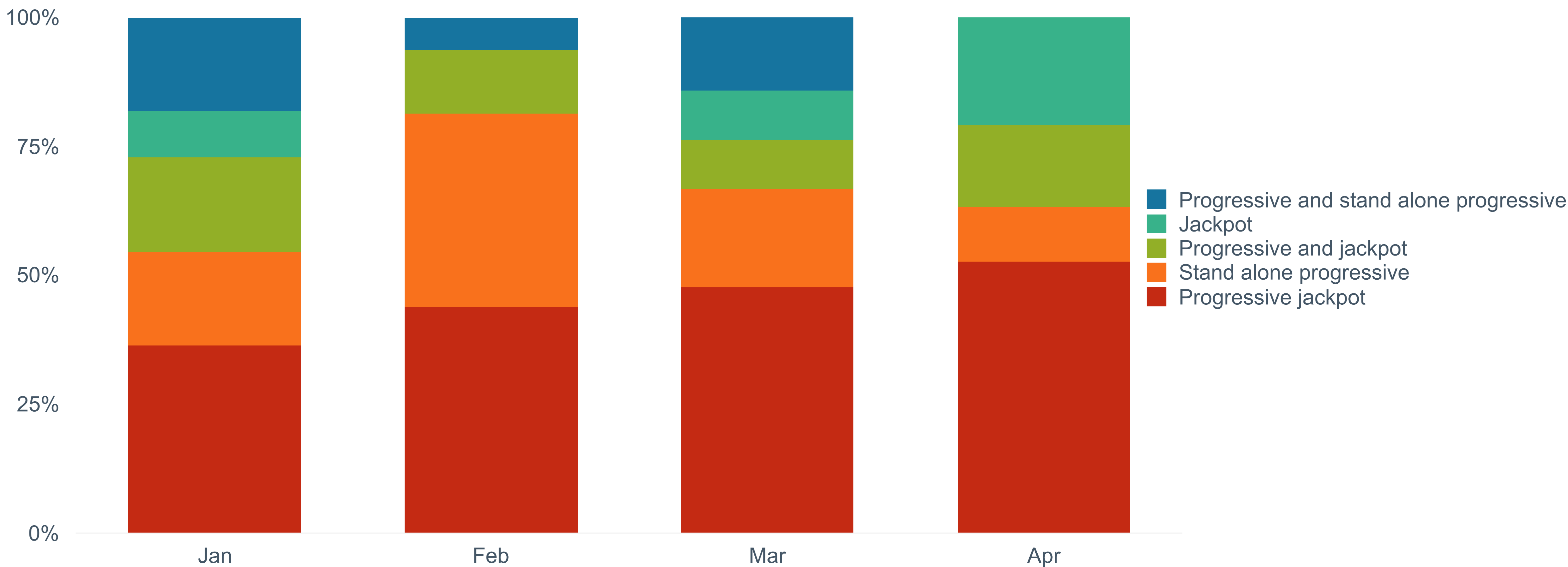
There is a wide range of bonus features released. Multiple bonus games (see House of Fun’s *Mystery of the Amazon* in the Deep Dives section) and mini steppers (see *Hot Shot: Blazing 777* in the Deep Dives section) are new trends to consider



The graph above includes all features categorized as bonus features in 2017

JACKPOTS

Try more progressive and jackpot combinations. See House of Fun's *Trident Sea* and Caesars Slots' *Rapid Fire: Hot Vegas Thrills* as strong examples



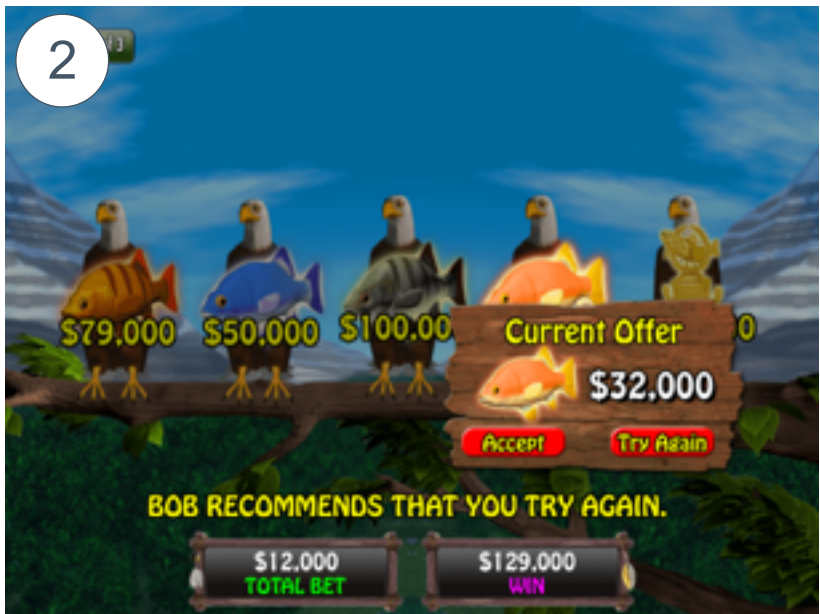
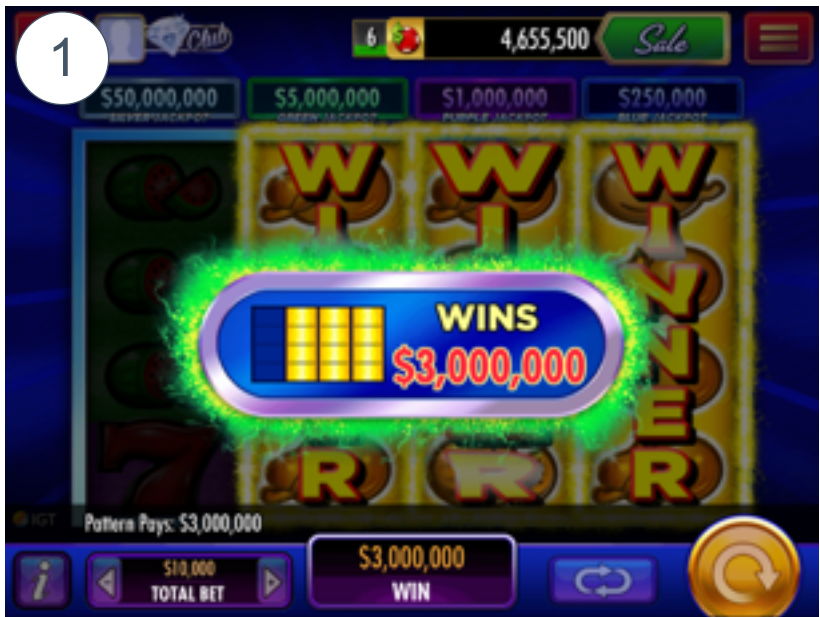
The graph above includes all features categorized as jackpot features in 2017

MARKET WATCH: FEATURED GAMES

Covering 4/1/17 - 4/30/17

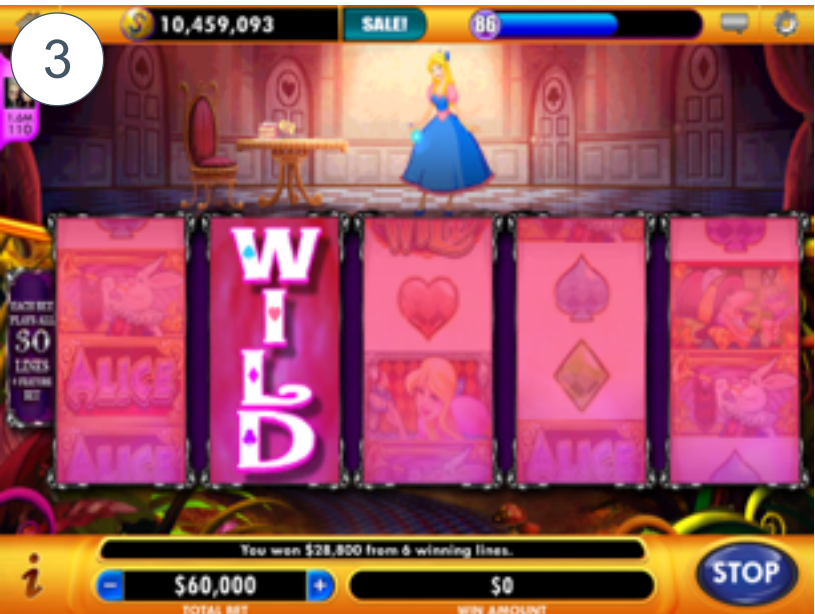
ALL RELEASED MACHINES

GAME	MACHINE	REELS	LINES	THEME	TYPE	NOTABLE FEATURES
DoubleDown Casino	Wheel of Fortune: Winning Wedges	4 x 4	Line	Classic	Video	- Pattern Pay is triggered by full reel symbols (image 1) - See Deep Dives section for details - More information: Wheel of Fortune
	Fishing Bob	4 x 5	Line	Other	Video	- Bonus game utilizes a ‘Deal or no Deal’ option (image 2) - Reskin of <i>Lobstermania 2</i> - More information: Fishing Bob
Heart of Vegas	Fire II Light	4 x 5	Multi-way	Cultural	Video	- Free spins match symbols on reel 1 with 2 and on reel 4 with 5 (image 3) - More information: Fire II Light
	Miss Kitty Gold	4 x 5	Line	Animal	Video	More information: Miss Kitty Gold
	Helen of Troy	3 x 5	Line	Mythology	Video	- Potential to win 100 free games (image 4) - More information: Helen of Troy



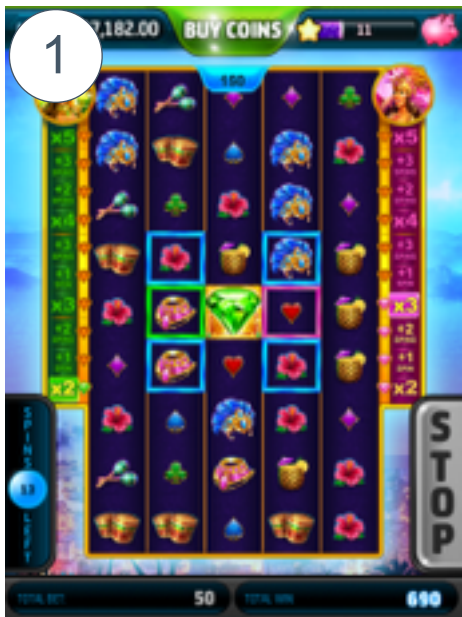
ALL RELEASED MACHINES

GAME	MACHINE	REELS	LINES	THEME	TYPE	NOTABLE FEATURES
Jackpot Party	<i>Dean Martin's VIP Party</i>	4 x 5	Line	IP	Video	- Wheel feature that determines the bonus round with the outer circle and modifier with the inner circle (image 1) - See Deep Dives section for details - More information: Dean Martin's VIP Party
	<i>Double Jackpot: Black & White</i>	3 x 3	Line	Classic	Stepper	- Black and white stepper (image 2) - More information: Double Jackpot
	<i>Alice & the Mad Tea Party</i>	3 x 5	Locked	Faux IP	Video	- Alice may randomly appear on non-win bonus spins to change 1 to 5 reels into a stacked wild reel (image 3) - More information: Alice & the Mad Tea Party
House of Fun	<i>Dinero De Dorado</i>	3 x 5	Multi-way	Cultural	Video	- Golden symbol machine reskin - More information: Dinero De Dorado
	<i>Mystery of the Amazon</i>	3 x 5	Multi-way	Jungle	Video	- See Deep Dives section for details - More information: Mystery of the Amazon
	<i>Puss the Scoundrel</i>	n x n	Line	Faux IP	Video	- Pick'em bonus with involved story (image 4) 3, 3, 4, 4, 4 reel set configuration - More information: Puss the Scoundrel
	<i>Trident Sea</i>	3 x 5	Line	Mythology	Video	<i>Lightning Link</i> style jackpot symbols and colossal symbols during free spins - More information: Trident Sea
	<i>Happy Panda</i>	n x n	Multi-way	Asian	Video	- Portrait view reskin of <i>Gorilla Grand</i> - More information: Happy Panda



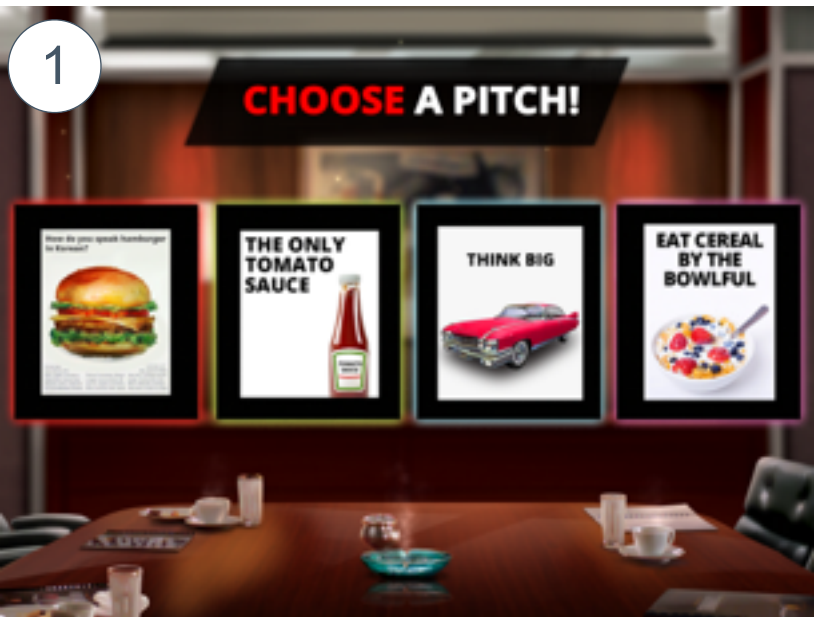
ALL RELEASED MACHINES

GAME	MACHINE	REELS	LINES	THEME	TYPE	NOTABLE FEATURES
Slotomania	<i>Samba Fever</i>	3 x 5	Line	Other	Video	9 x 5 free spins with two fill meters (image 1) - See Deep Dives section for details - More information: Samba Fever
	<i>Genie's Tale</i>	4 x 5	Line	Mystical	Video	More information: Genie's Tale
Caesars Slots	<i>Lucky Frog</i>	3 x 5	Line	Asian	Video	- Multi-ladder bonus game system (image 2) - See New Innovations section for details - More information: Lucky Frog
	<i>Hippo Stampede</i>	4 x 5	Multi-way	Animal	Video	- Similar to the <i>Buffalo Stampede</i> machine but with hippos extending the reels (image 3) - More information: Hippo Stampede
	<i>Rapid Fire: Hot Vegas Thrills</i>	4 x 5	Line	Las Vegas	Video	- Another machine with the rapid fire mechanic (image 4) - More information: Rapid Fire: Hot Vegas Thrills



ALL RELEASED MACHINES

GAME	MACHINE	REELS	LINES	THEME	TYPE	NOTABLE FEATURES
Hit it Rich	<i>Mad Men</i>	4 x 4	Line	IP	Video	- Well integrated IP mechanics (image 1) - More information: Mad Men
	<i>Sex and the City</i>	4 x 5	Line	IP	Video	More information: Sex and the City
	<i>Sex and the City: Carrie & Co.</i>	n x n	Multi-way	IP	Video	More information: Sex and the City: Carrie & Co.
	<i>Slingo Gold</i>	4 x 5	Line	IP	Video	<i>Slingo Gold Free Spins</i> plays the bottom row only, filling numbers on the card shown on the bottom row (image 2) - See New Innovations section for details - More information: Slingo Gold
Quick Hit Slots	<i>Ole Jalapenos: Hot & Spicy</i>	3 x 5	Line	Cultural	Video	More information: Ole Jalapenos: Hot & Spicy
	<i>Hot Shot: Blazing 777</i>	3 x 5	Line	Classic	Video	- Mini stepper on reels (image 3) - See Deep Dives section for details - More information: Hot Shot: Blazing 777
	<i>Beat It</i>	Multi-play	Line	IP	Video	<i>Supercharged Reel</i> mechanic with three smaller reel sets and one larger reel set (image 4) - See New Innovations section for details - More information: Beat It



ALL RELEASED MACHINES

GAME	MACHINE	REELS	LINES	THEME	TYPE	NOTABLE FEATURES
Gold Fish	<i>The Godfather: My Daughter's Wedding</i>	Locked	Locked	Locked	Locked	Locked
	<i>Neptune's Quest</i>	n x n	Line	Mythology	Video	- Two 2 x 2 and a 6 x 3 reel set (image 1) - More information: Neptune's Quest
Hot Shot Casino	<i>Kiss: Destroyer</i>	4 x 5	Line	IP	Video	- Free spins trigger by landing band members with a full reel bonus symbol (image 2). Multiplier, scatter, and spin awards are then shown (image 3) - More information: Kiss: Destroyer
	<i>Monopoly: Corners</i>	4 x 6	Line	IP	Video	- A piece (the thimble in this image) travels randomly around the board each spin and acts as a wild (image 4) - More information: Monopoly: Corners

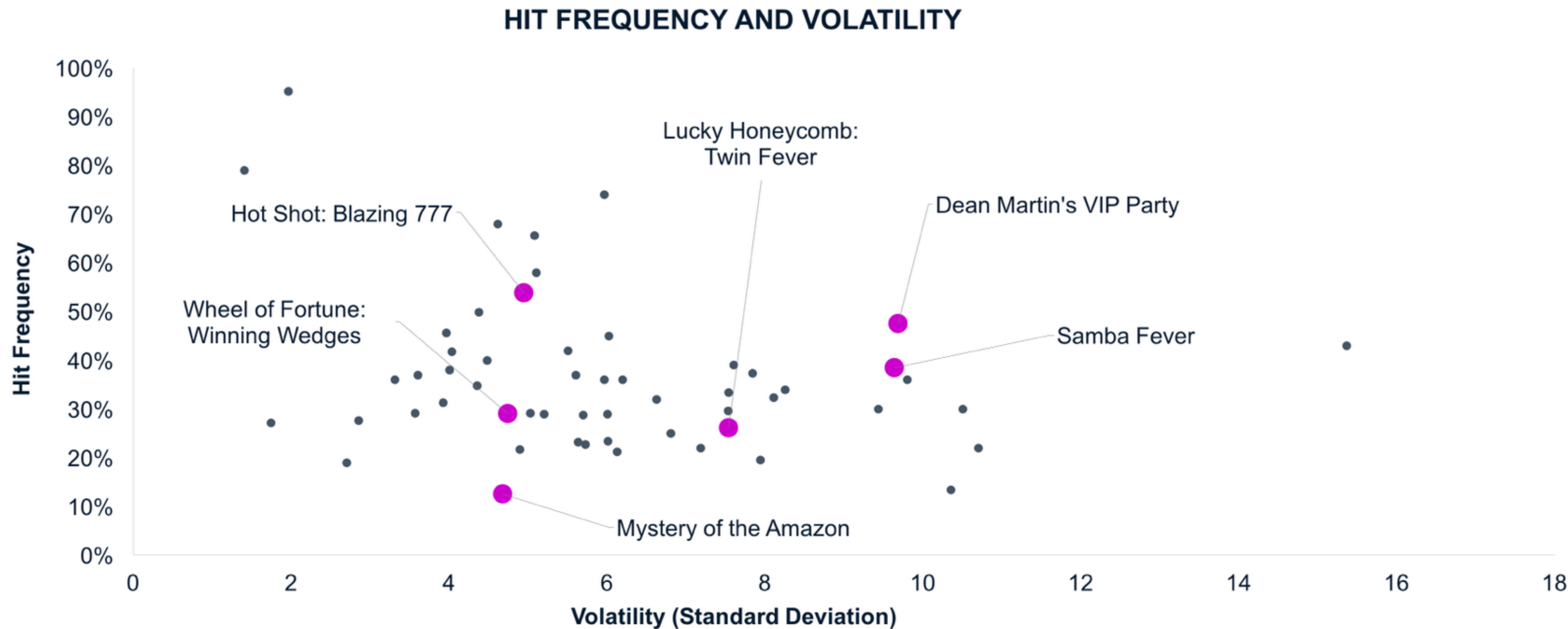


DEEP DIVES

- *Samba Fever* – Slotomania
- *Hot Shot: Blazing 777* – Quick Hit Slots
- *Mystery of the Amazon* – House of Fun
- *Wheel of Fortune: Winning Wedges* – DoubleDown Casino
- *Lucky Honeycomb: Twin Fever* – myKONAMI Slots
- *Dean Martin's VIP Party* – Jackpot Party

HIT FREQUENCY AND VOLATILITY

Blazing 777 has low volatility when not including the x2.5K bet jackpot recorded (including the jackpot volatility is massive at 25.5). *Mystery of the Amazon* has a very low hit frequency at 13%

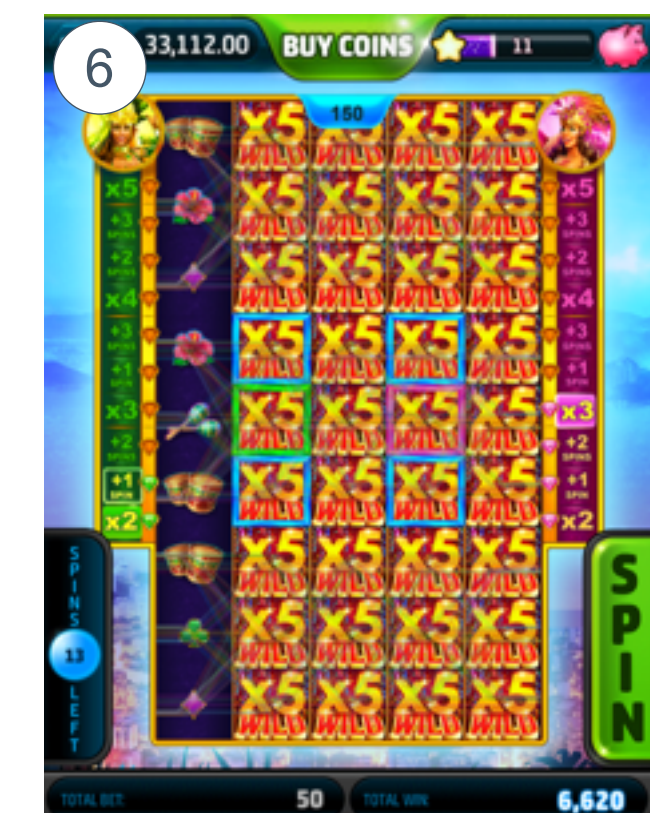
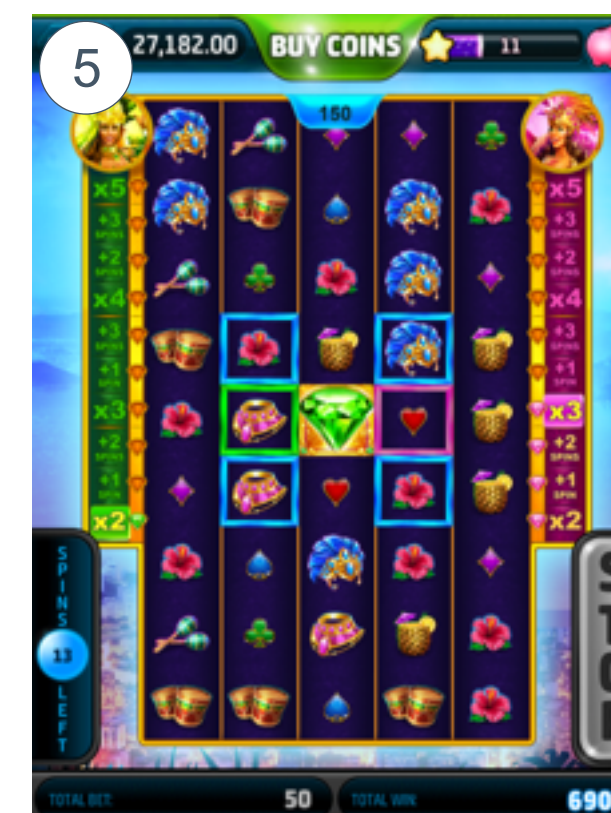
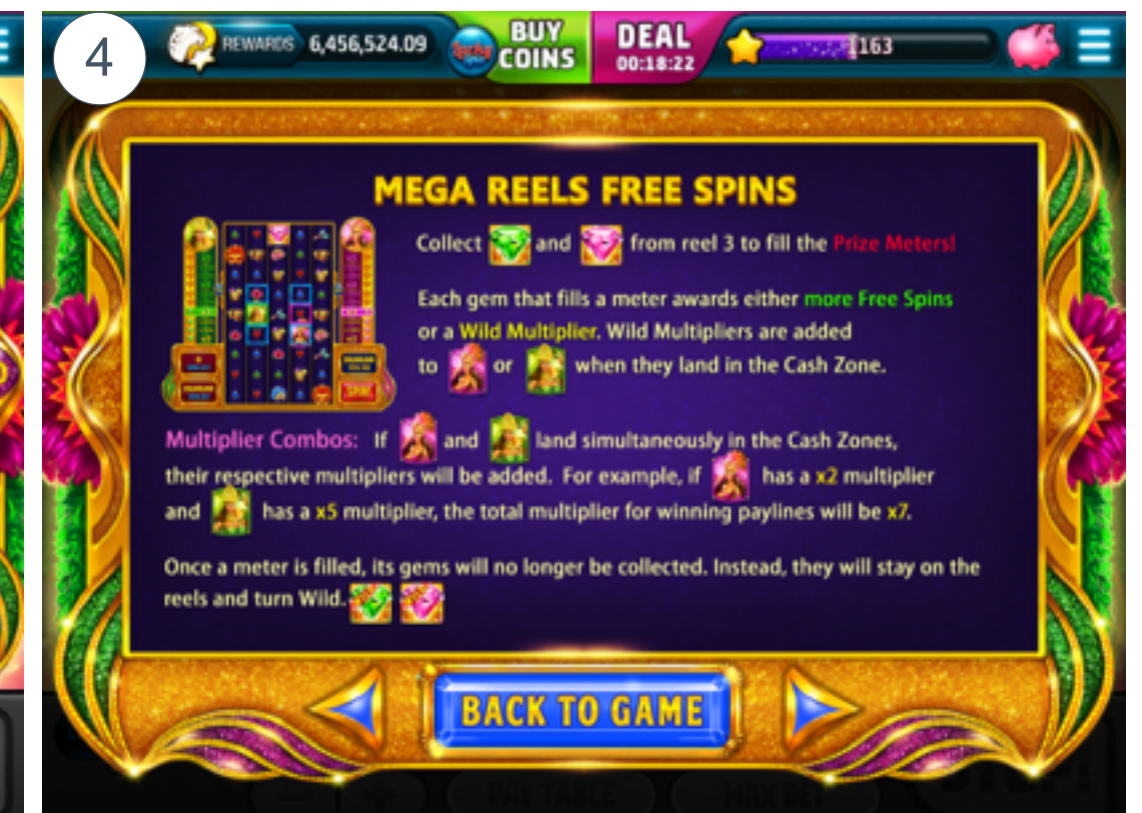
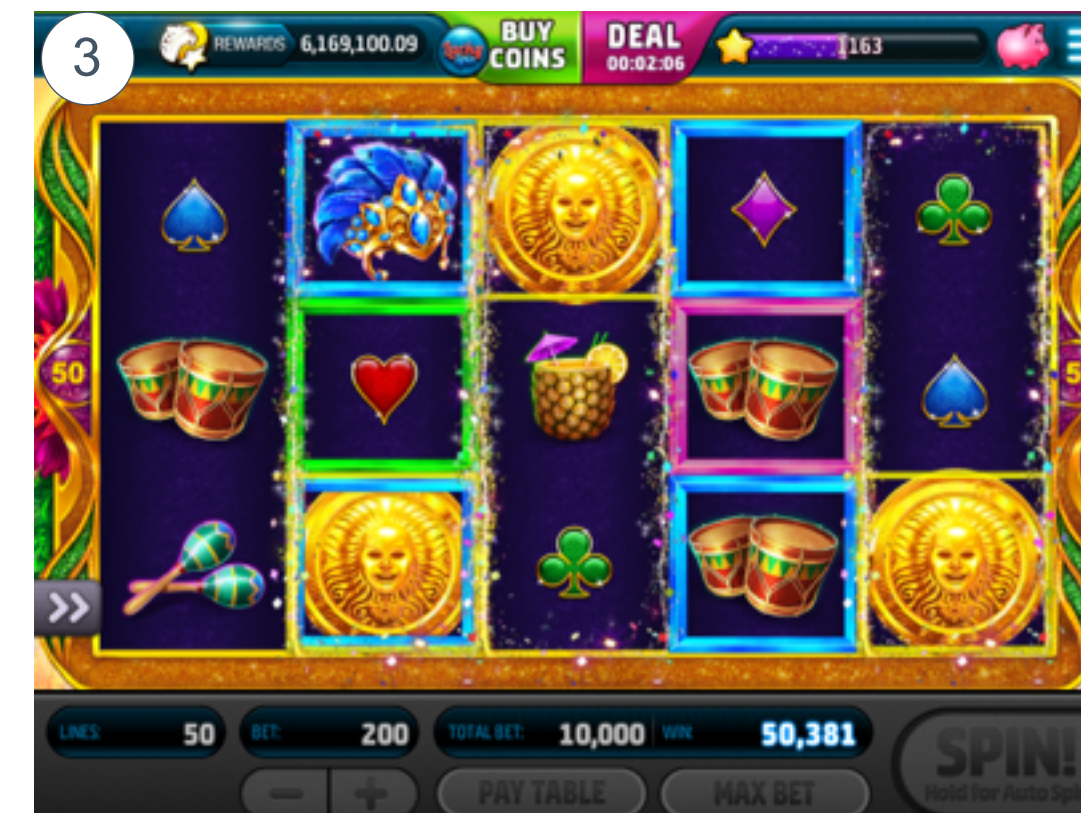
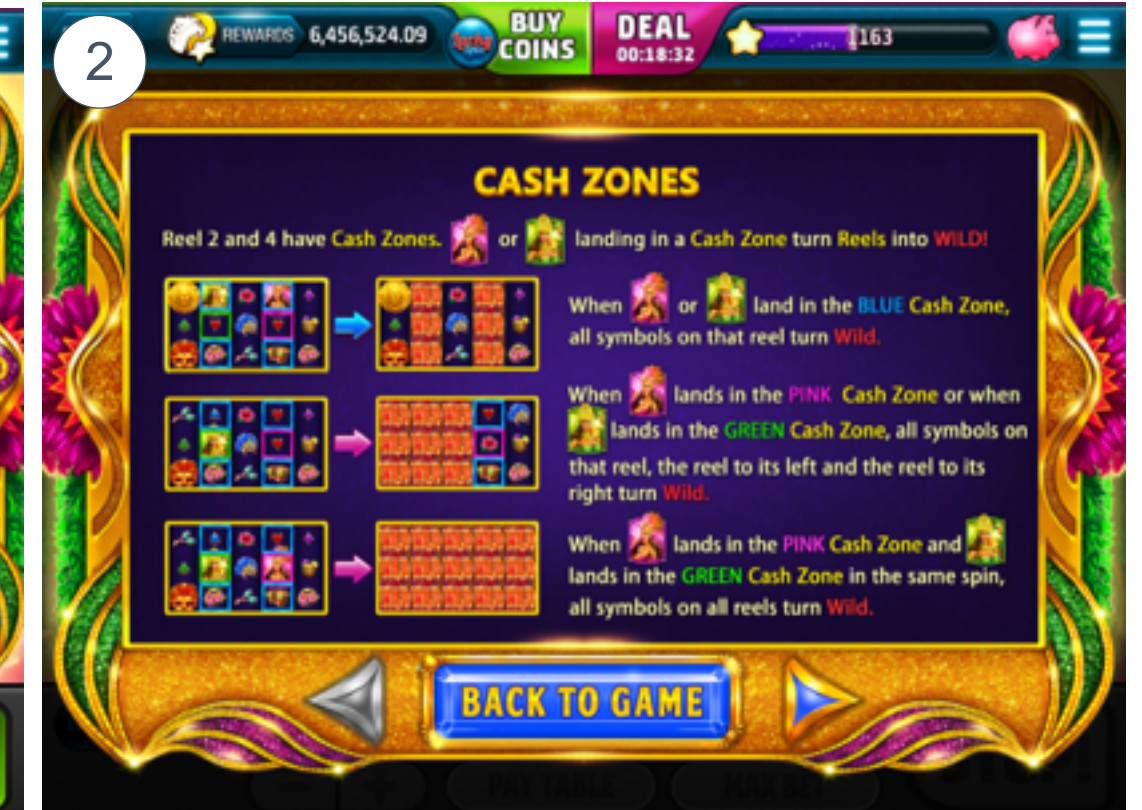


Jackpots are payouts equal to or greater than 1,000x the bet
Dark blue dots in the graph represent other machines examined in past reports

SAMBA FEVER

Slotomania's *Samba Fever* features multiple *Cash Zones* and two fill meters in the *Mega Reels Free Spins*

- Six different *Cash Zones* are visible on reels 2 and 4 of a 3 x 5 reel set upon machine-entry (image 1).
- When certain combinations of dancer symbols land in the *Cash Zone*, different sets of full reels turn wild (image 2).
- Three or more scatters that land on the reels trigger the *Mega Reels Free Spins* (image 3).
- The *Mega Reels Free Spins* is played on a 9 x 5 reel set with similar *Cash Zones* found in the base game (image 4).
- Collecting gems during free spins fills the matching-colored meter, rewarding additional spins and wild multipliers (image 5).
- During free spins, wilds appear as multiplier wilds based on the multiplier displayed in the meter. *Multiplier Combos* may be triggered by both dancers simultaneously landing in their color *Cash Zone*, multiplying the win by both meter multipliers (image 6).

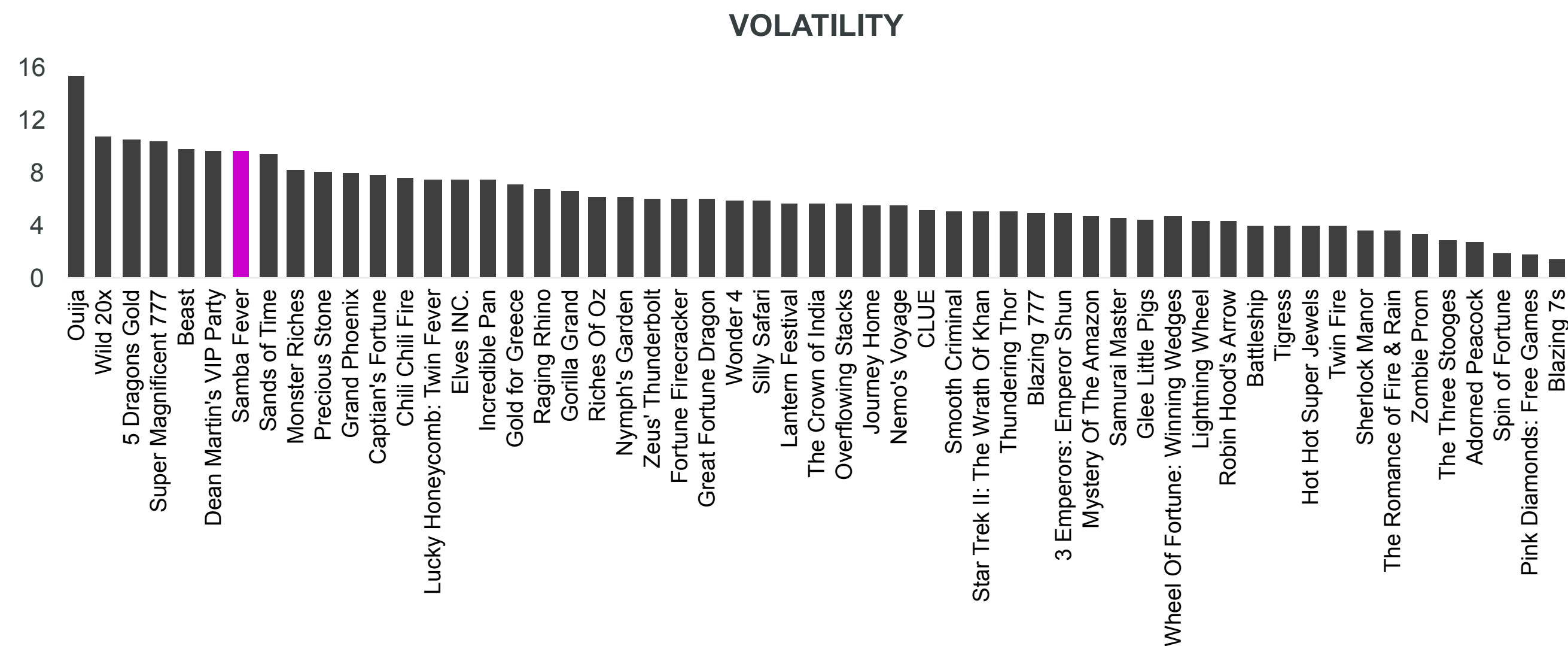
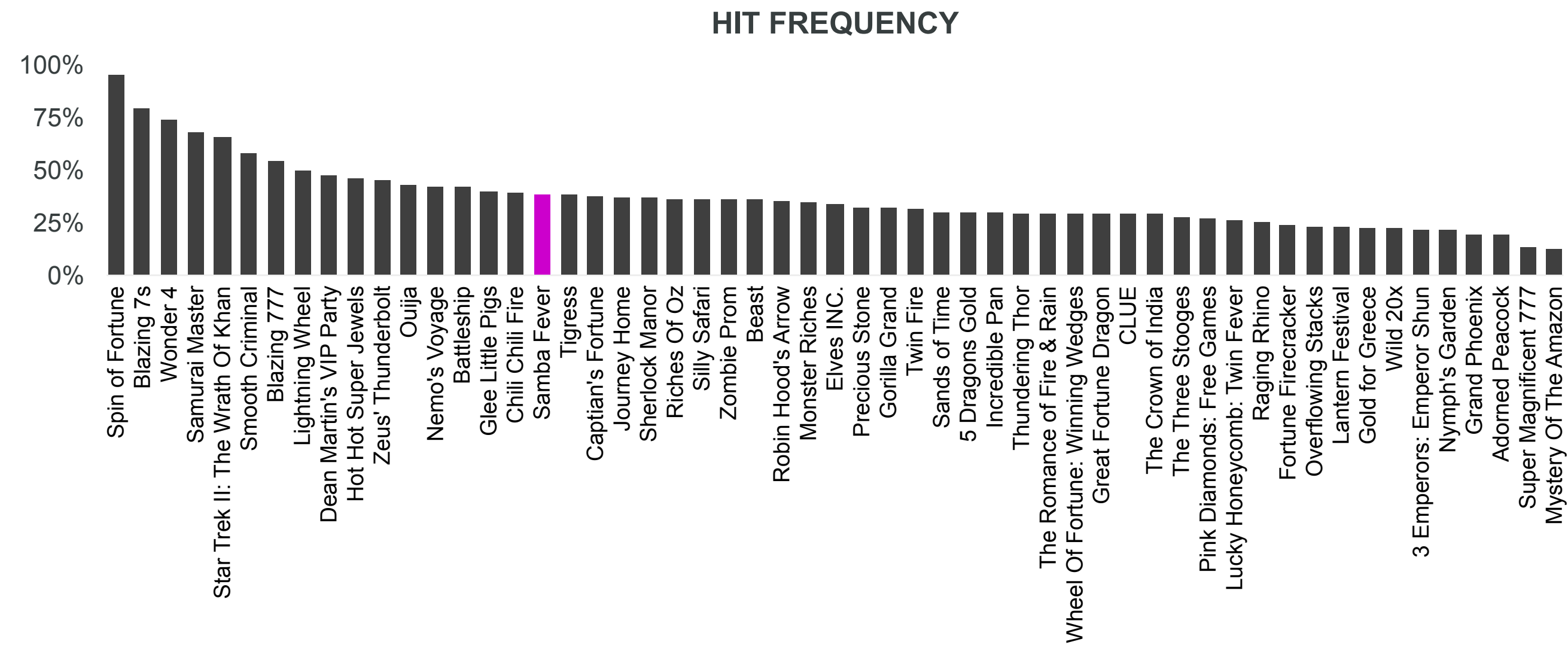


SAMBA FEVER STATS



Game play ^I	
Hit frequency	38%
Volatility	9.6
Spins until a bonus	152
Distribution of RTP as % of total RTP ^{II}	
Base game	52%
Bonus game	48%
RTP range ^{III}	
Minimum range	78%
Median	94%
Maximum range	110%

^I Volatility is the standard deviation of the 10,000 payouts from this machine
^{II} The distribution of RTP equals the RTP of the base or bonus game over the total RTP
^{III} RTP range is 90% confidence with 10K spins. More info in Appendix



HOT SHOT: BLAZING 777

Quick Hit Slots' *Hot Shot: Blazing 777* has a *Game-in-Game Scatter Bonus*, *Credit Wheel Bonus*, and *Free Games Wheel*

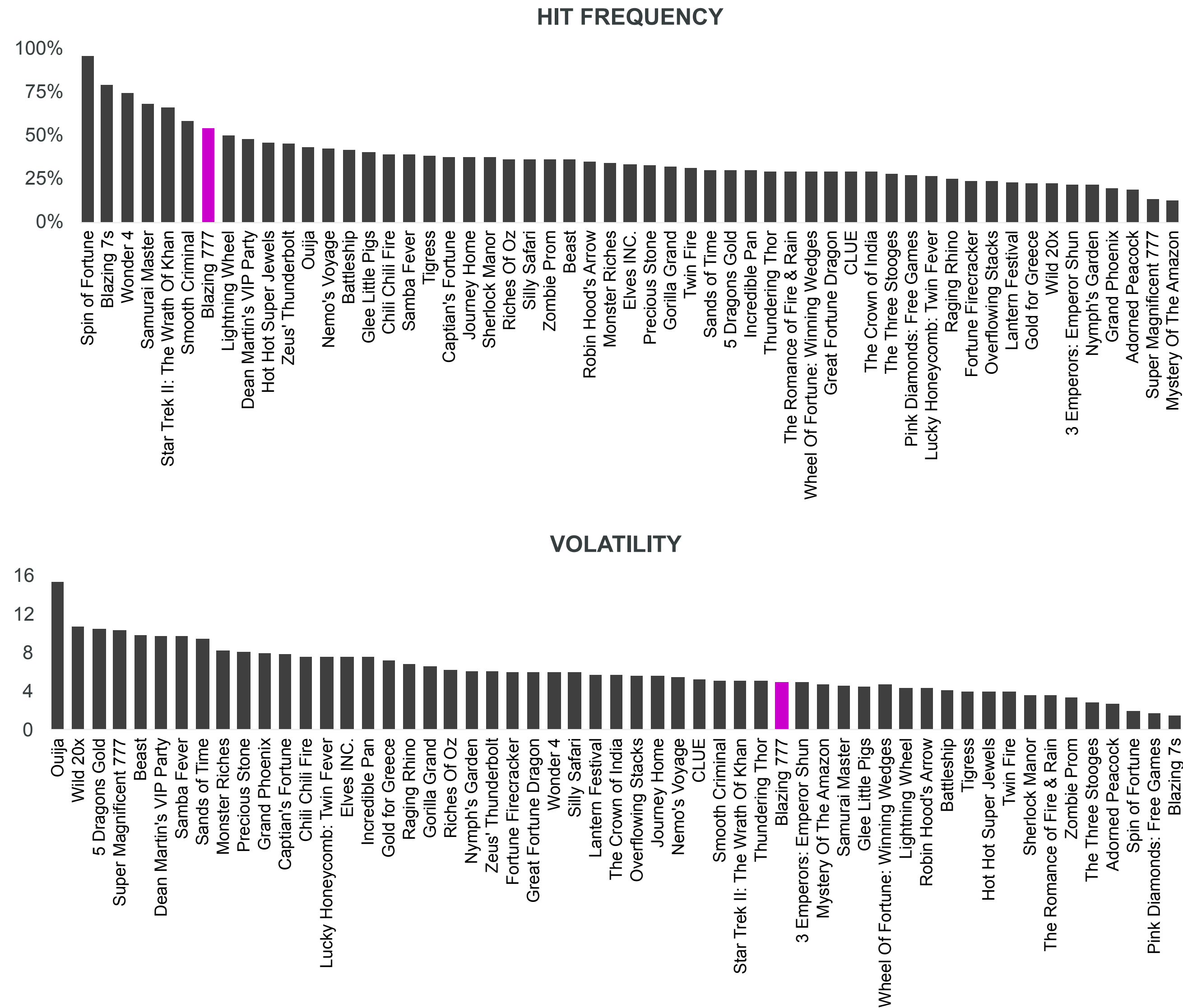
- *Hot Shot: Blazing 777* was initially released with a 'Slot Preview' feature (image 1).
- Upon machine-entry, five jackpots are displayed above a 3 x 5 reel set. Winning combinations are identified by circles (image 2).
- Any three or more mini stepper machines that land on the reels trigger the *Game-in-Game Scatter Bonus* (image 3).
- This bonus awards one spin on each of the triggered mini stepper machines (image 4).
- The *Credit Wheel Bonus* is triggered when 'Bonus' symbols of the same color land on reels 2, 3, and 4 (image 5).
- Once triggered, two wheels appear and the *Credit Wheel* spins, awarding the indicated bet multiplier on the wheel (image 6).
- The *Free Games Wheel* is triggered when 'Bonus' symbols of non-matching colors appear on reels 2, 3, and 4 (image 7).
- Once triggered, the outer ring of the *Free Games Wheel* spins to award a number of free spins. The inner wheel then spins to award a multiplier for the free games (image 8).



HOT SHOT: BLAZING 777 STATS

Game play	
Hit frequency	54%
Volatility	4.9
Spins until a bonus	19
Distribution of RTP as % of total RTP	
Base game	38%
Bonus game	62%
RTP range	
Minimum range	80%
Median	88%
Maximum range	96%
Jackpots ¹	
Number of jackpots	1
Multiple of bet	2.5K

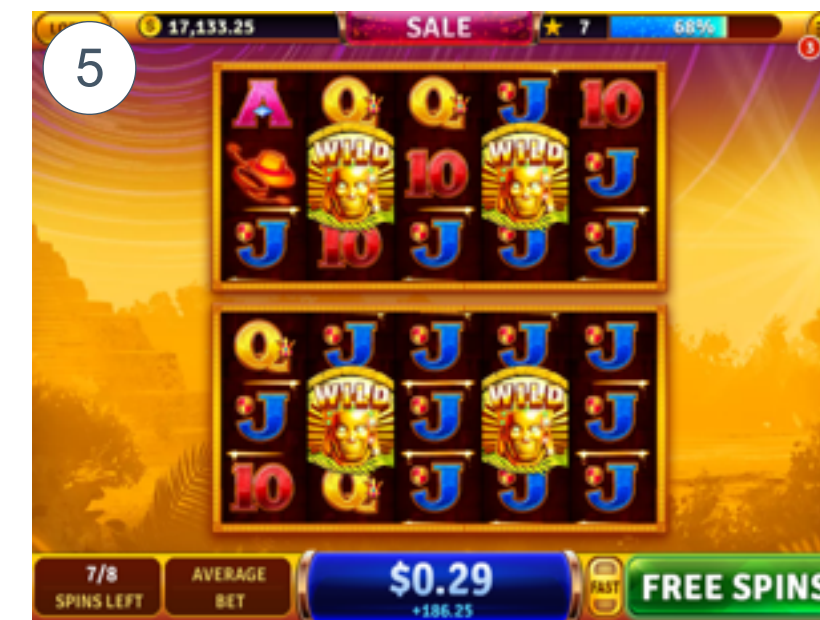
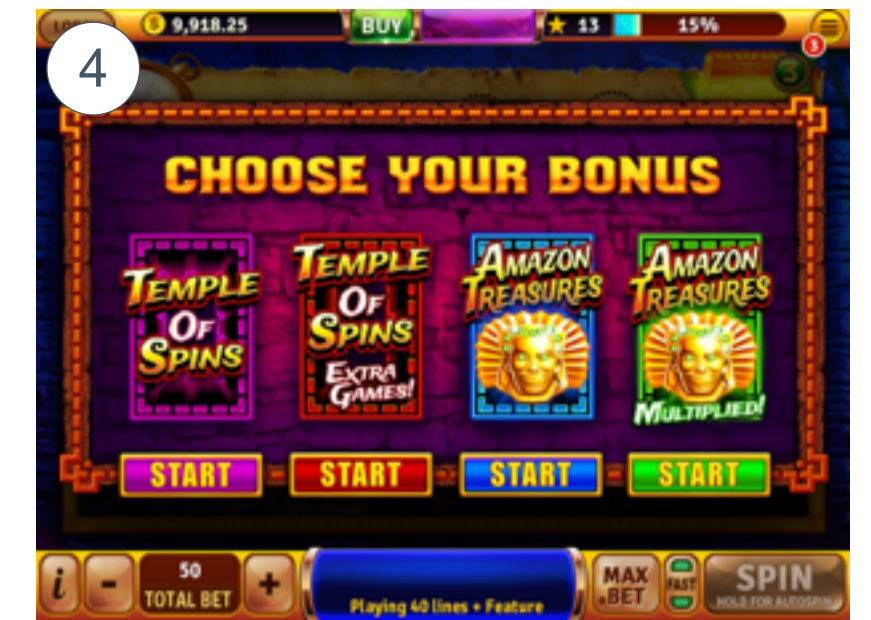
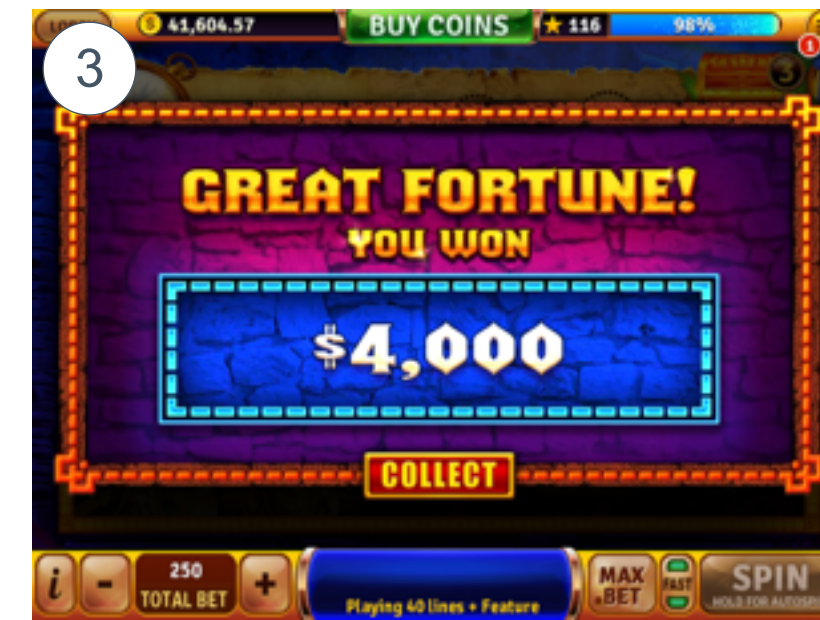
¹ Jackpots are payouts equal to or larger than 1,000x the bet and removed from calculations



MYSTERY OF THE AMAZON

House of Fun's *Mystery of the Amazon* is a reskin of *Magnificent Genie* and *Giant's Treasure*. This machine includes a progress bar, map, and four unlockable bonus games

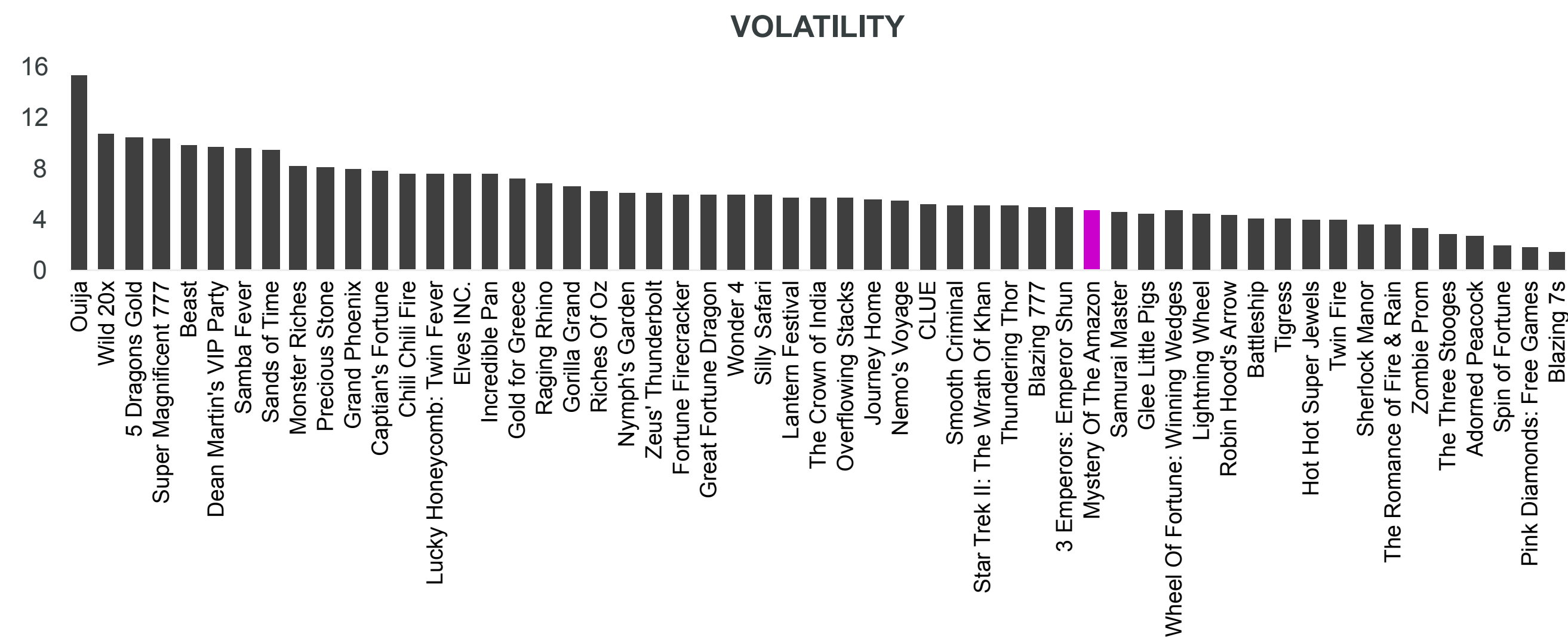
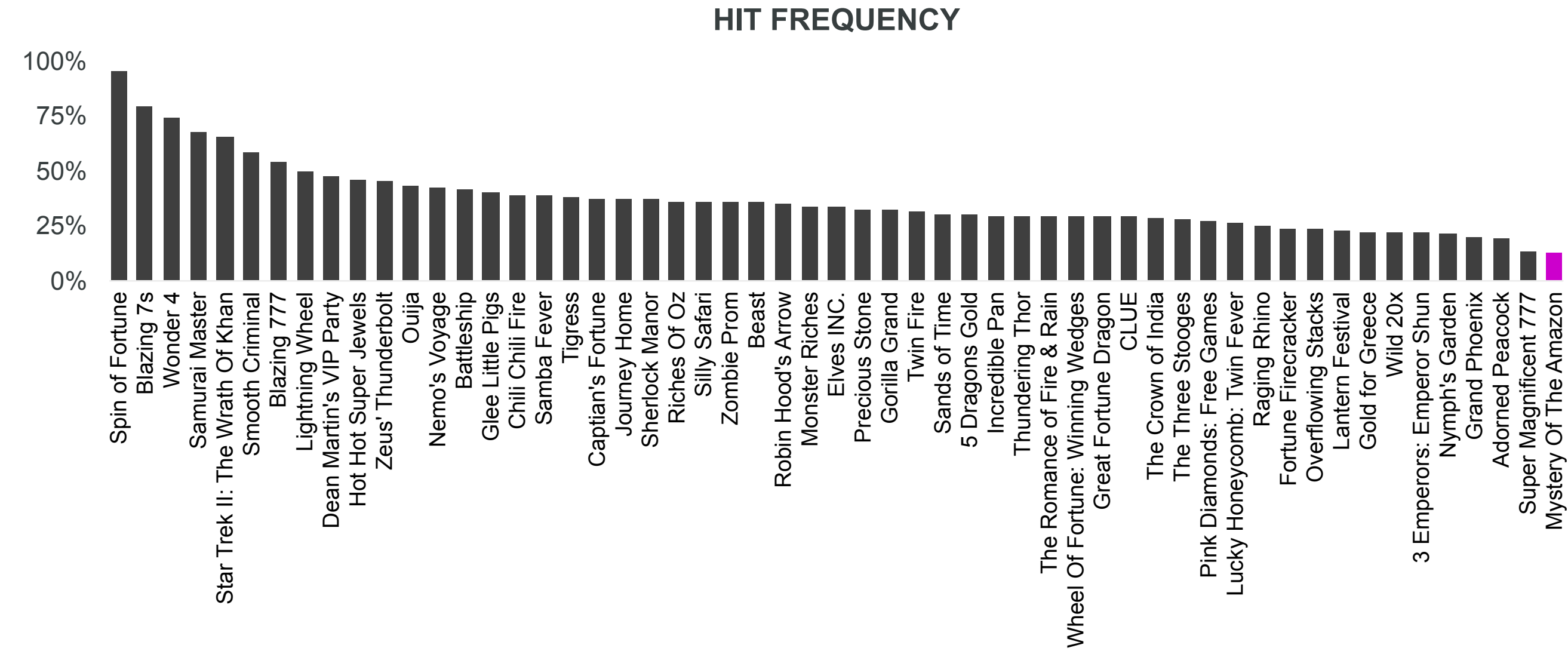
- A dialogue appears upon machine-entry explaining the map and collection mechanic (image 1).
- Players advance along the path to the treasure as compass symbols land during play (image 2).
- The first and second time players reach the treasure they are granted credit awards (image 3).
- Collecting the treasure three times unlocks one of four bonus games. After all the bonus games are unlocked, every third map feature prompts a 'choose your bonus' dialogue (image 4).
- The *Temple of Spins* bonus awards eight free spins. It is played on two reel sets, each with two locked wild symbols (image 5).
- *Amazon Treasures* bonus is a pick'em bonus featuring six rows of symbols. Players pick from the bottom up until 'Collect' is revealed (image 6).
- The *Temple of Spins: Extra Games* awards five free spins played on four reel sets, each containing a locked wild symbol (image 7).
- *Amazon Treasures: Multiplied* is a pick'em bonus featuring six rows of symbols. Players pick credit prizes until the '5x' multiplier is revealed (image 8).



MYSTERY OF THE AMAZON STATS



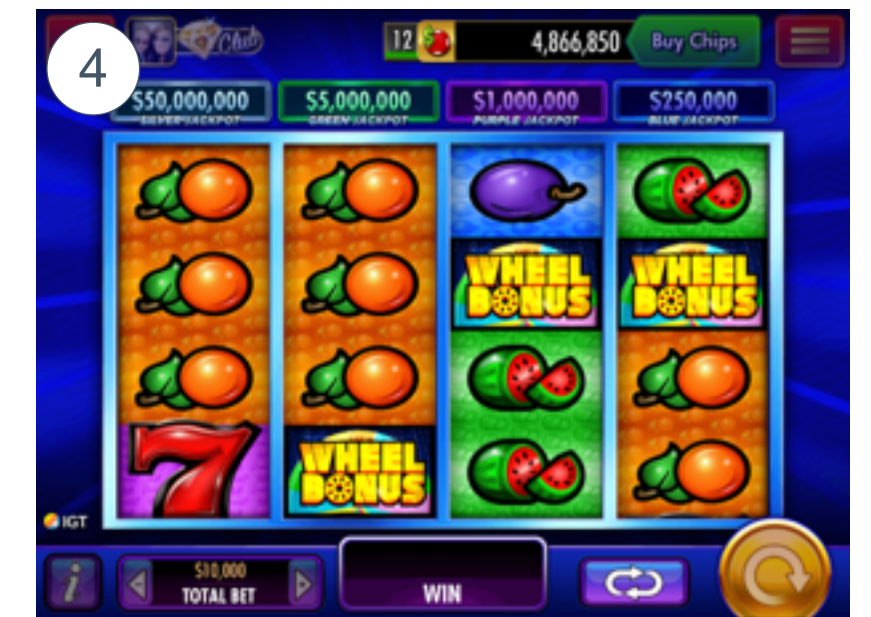
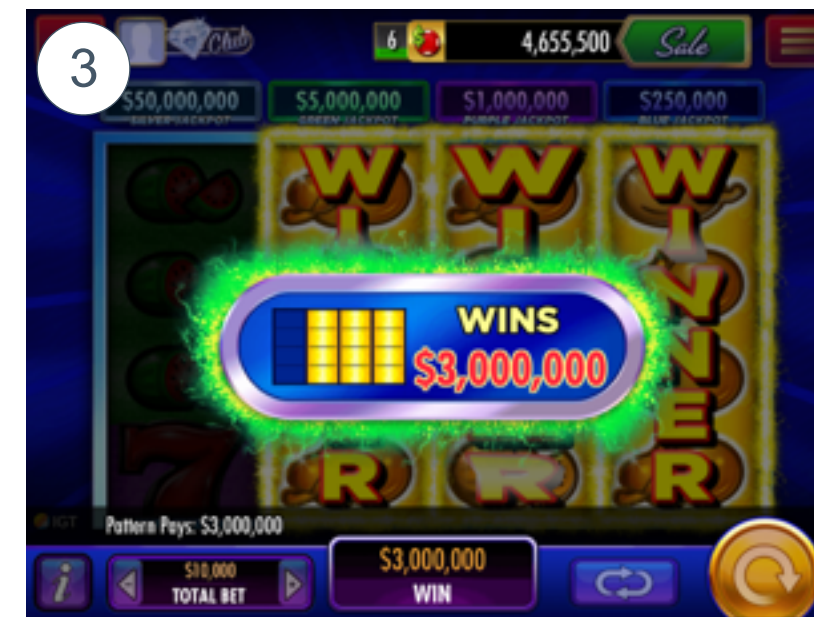
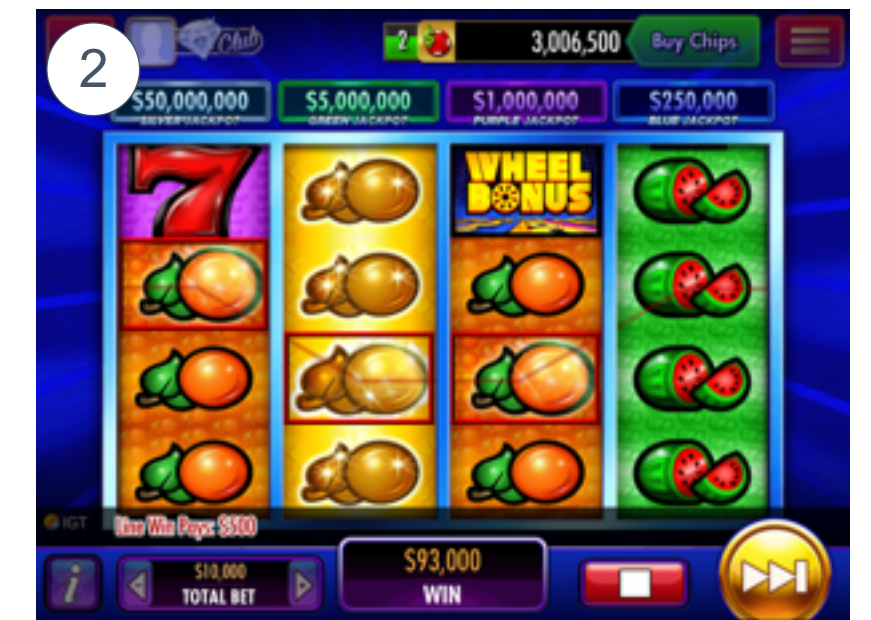
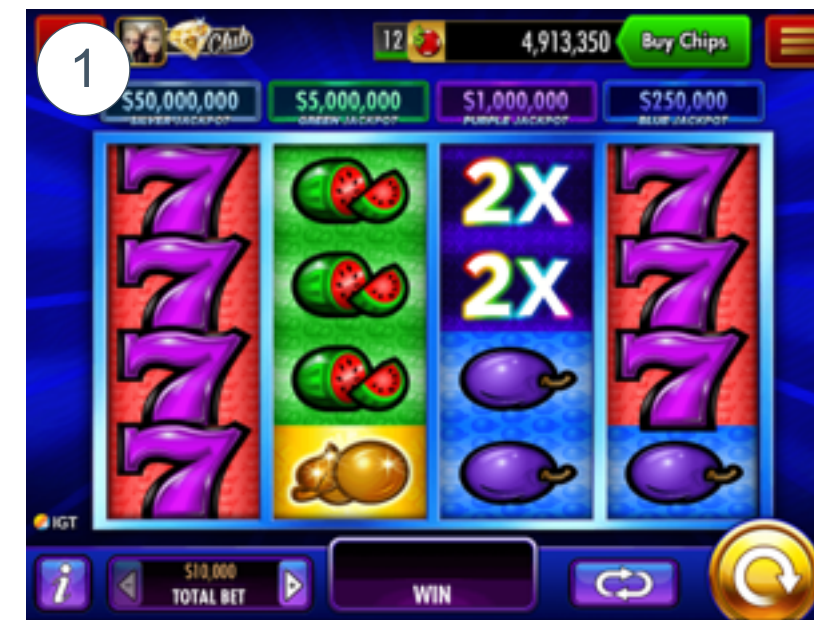
Game play	
Hit frequency	13%
Volatility	4.7
Spins until a bonus	121
Distribution of RTP as % of total RTP	
Base game	73%
Bonus game	27%
RTP range	
Minimum range	83%
Median	91%
Maximum range	99%



WHEEL OF FORTUNE

DoubleDown Casino's *Wheel of Fortune: Winning Wedges* offers stacked symbols, multipliers, gold symbols, and four jackpots

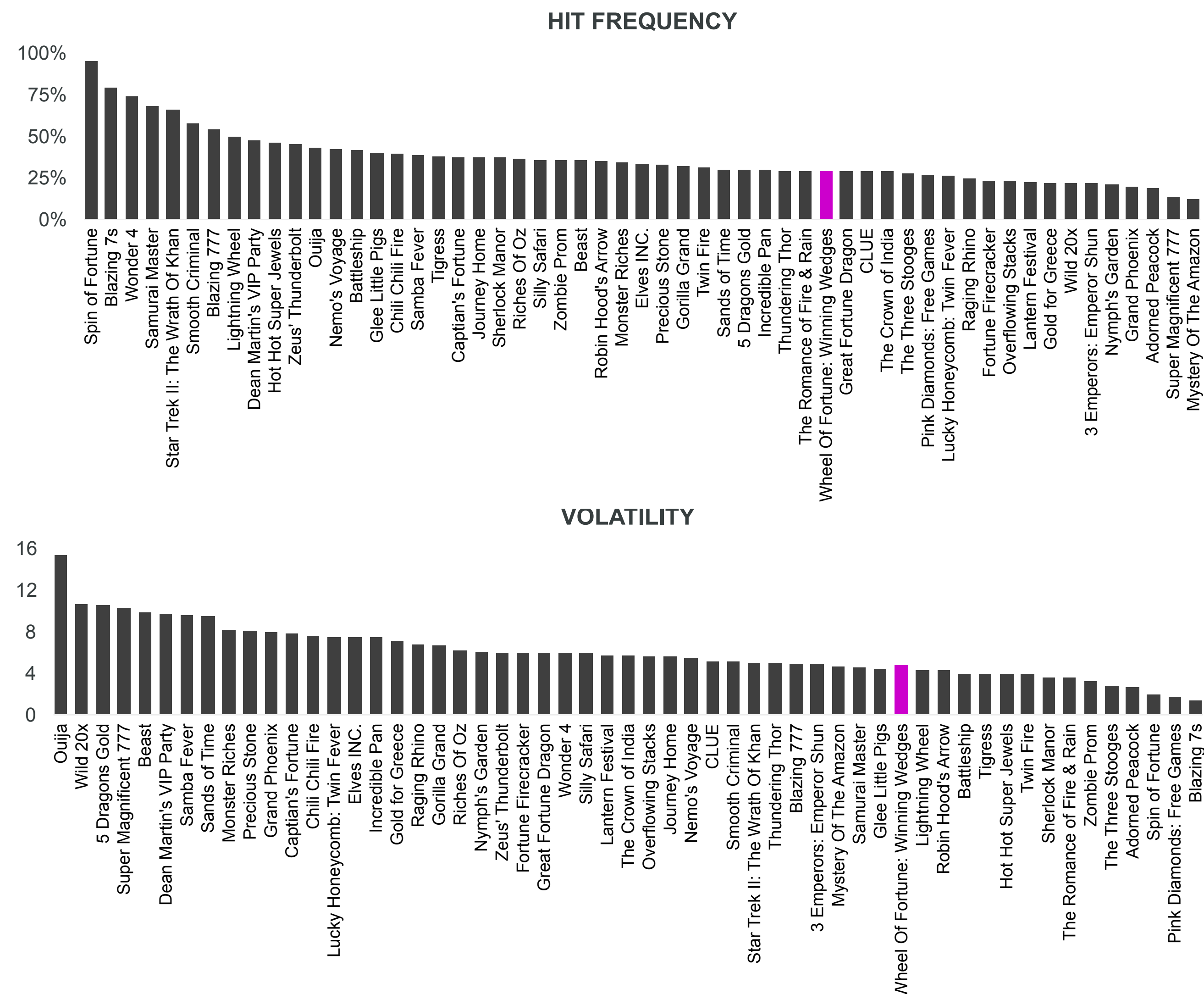
- The machine features a 4 x 4 reel set with stacked symbols (image 1).
- Gold symbols substitute for similar symbols in a winning combination (image 2).
- A *Pattern Pays* feature is triggered by full reel gold symbols on reel 2, reels 2 and 3, or reels 2, 3, and 4 (image 3).
- The *Bonus Wheel* feature is triggered and displayed by three bonus symbols on reels 2, 3, and 4 (images 4 and 5).
- If the active pointer lands on the 'Frenzy' wedge, the *Pointer Frenzy* is triggered. Additional pointers then randomly light up, awarding prizes to all active pointers (image 6).
- If an active pointer lands on the 'Jackpot Bonus' wedge during the *Bonus Wheel*, the *Jackpot Bonus* wheel appears. The *Jackpot Bonus* wheel contains higher coin prizes with wedges for each jackpot (image 7).
- Landing on any of the jackpot wedges awards the prize amount (image 8).



WHEEL OF FORTUNE STATS



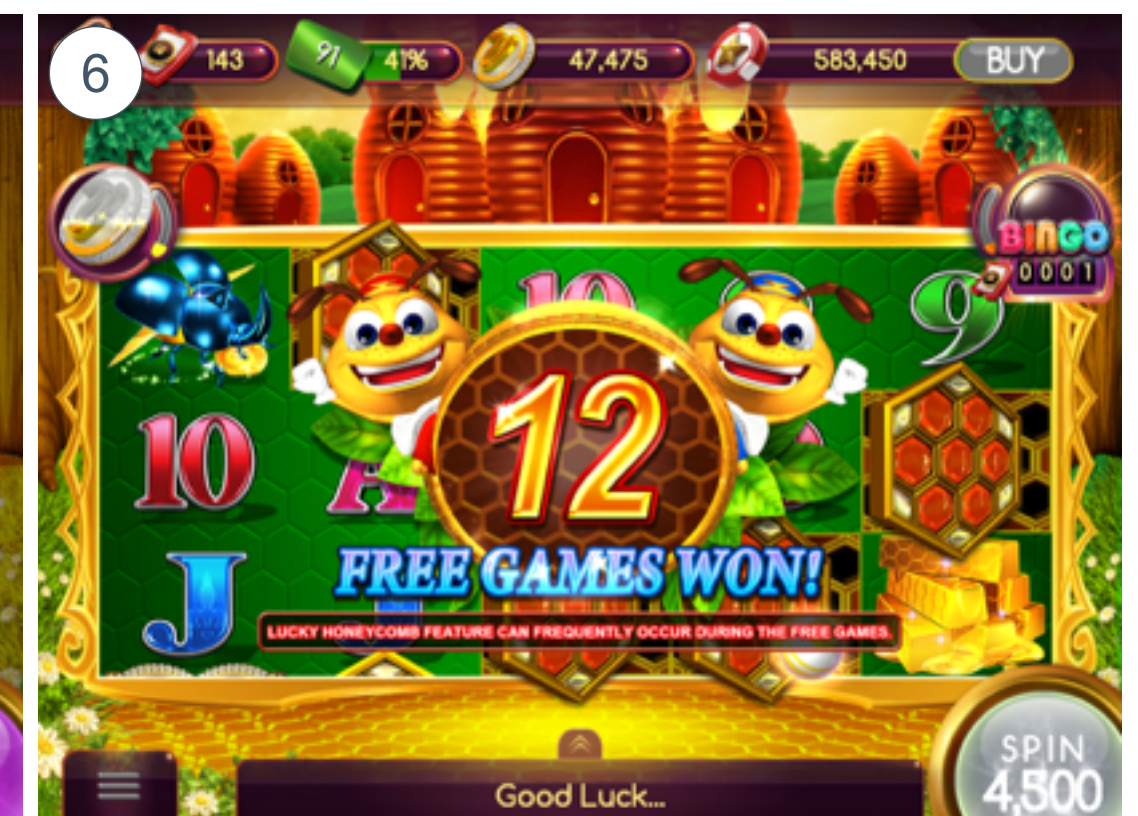
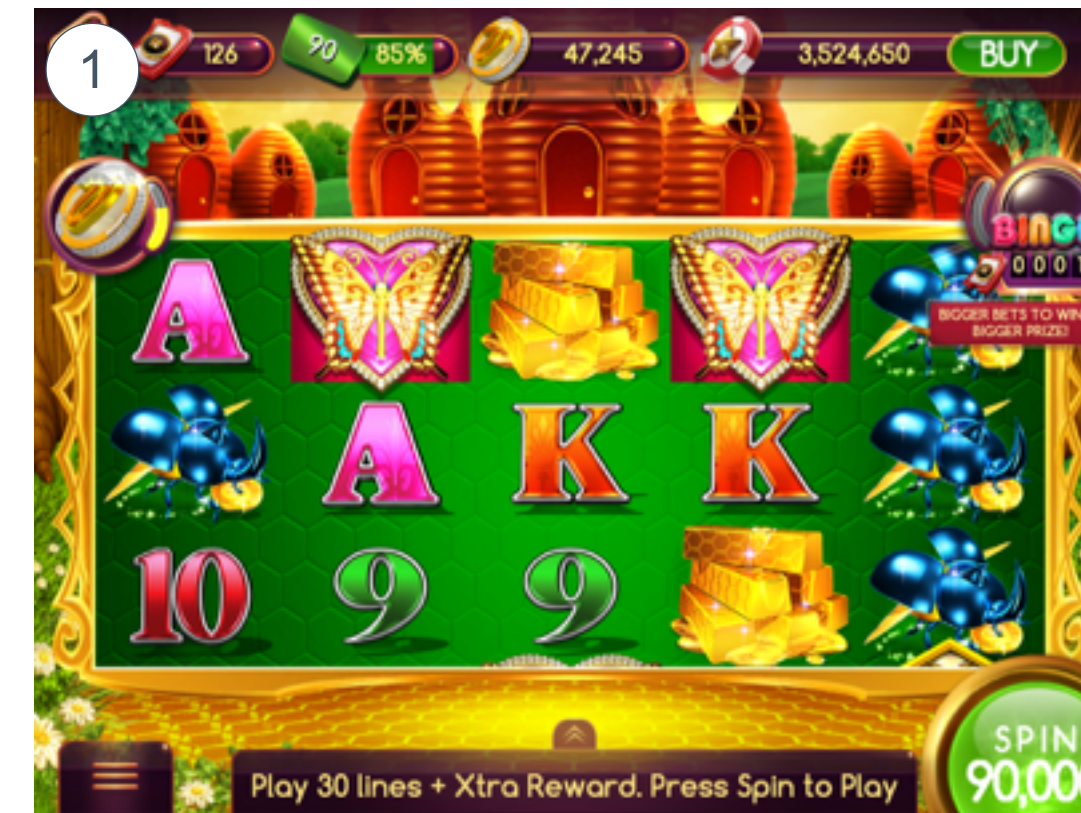
Game play	
Hit frequency	29%
Volatility	4.7
Spins until a bonus	45
Distribution of RTP as % of total RTP	
Base game	72%
Bonus game	28%
RTP range	
Minimum range	89%
Median	97%
Maximum range	104%



LUCKY HONEYCOMB

myKONAMI Slots' *Lucky Honeycomb: Twin Fever* (a reskin of *Dragon's Law*) features the *Lucky Honeycomb* mechanic and free games

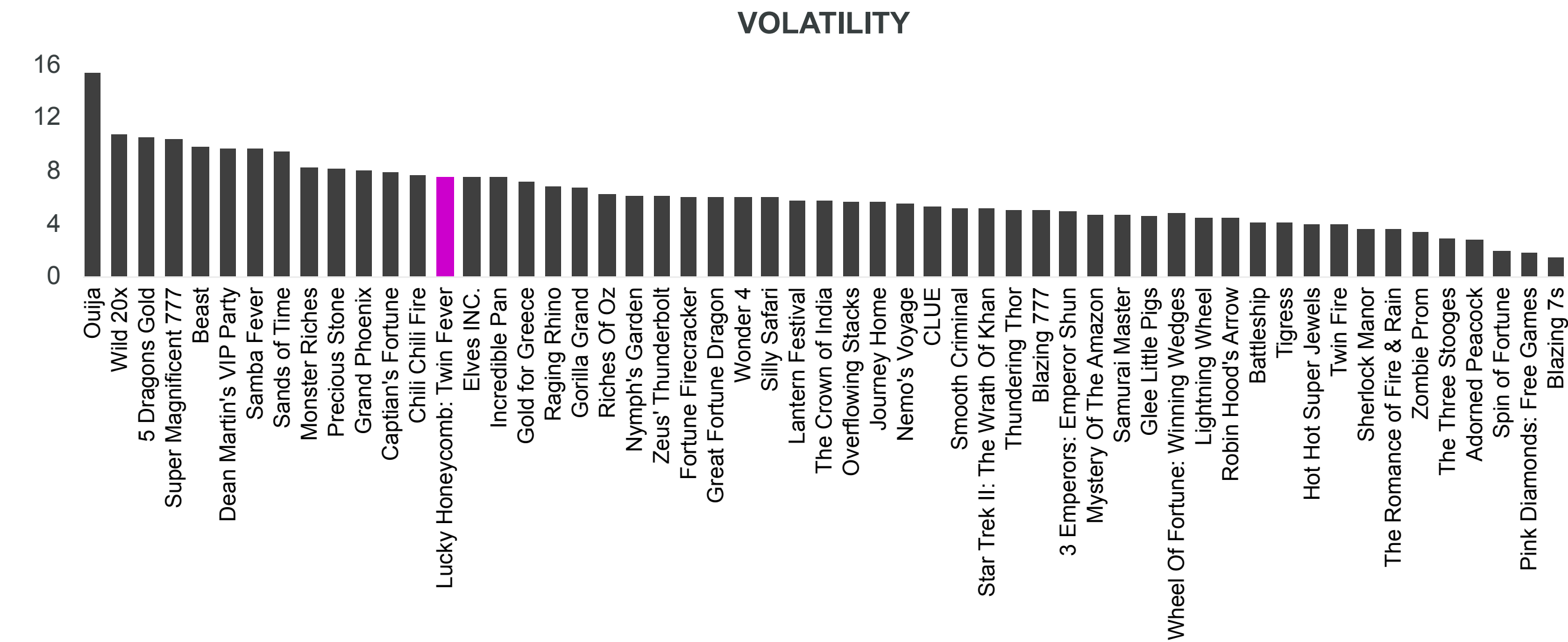
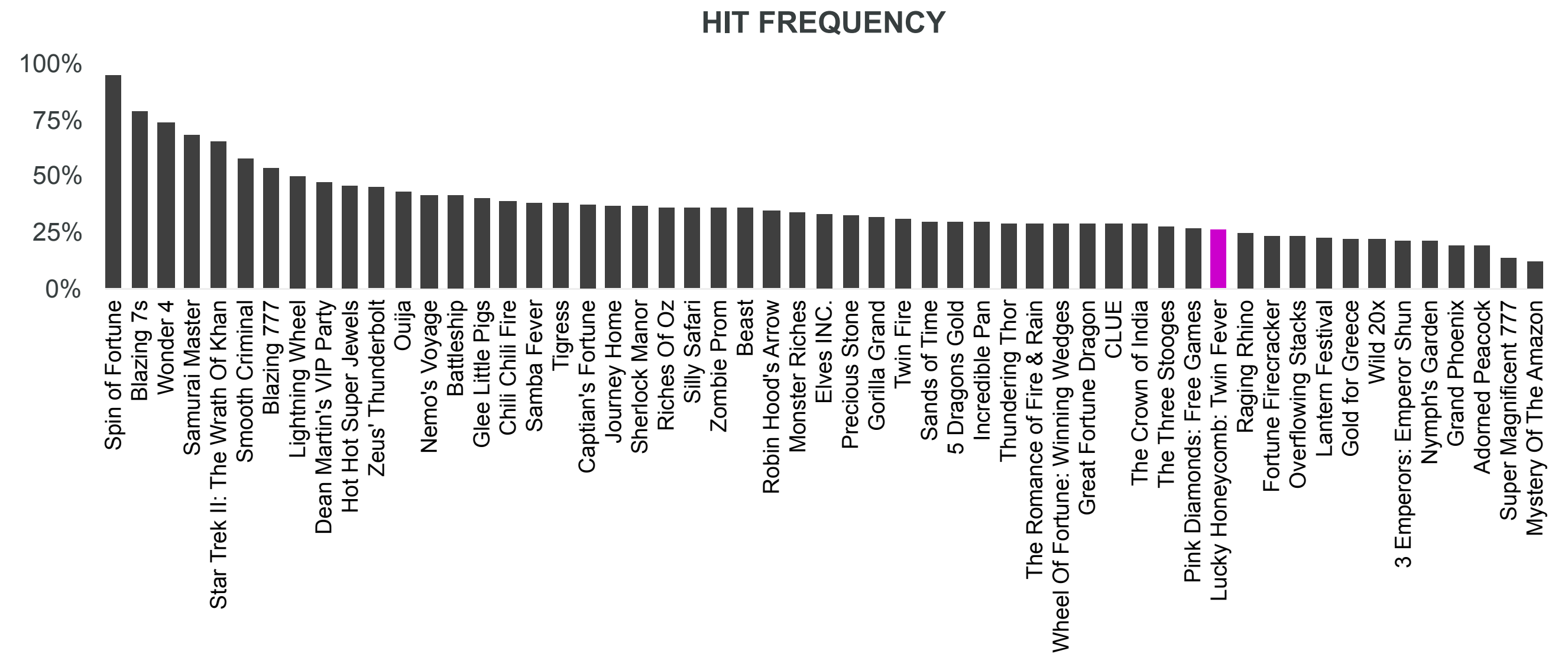
- *Lucky Honeycomb: Twin Fever* is a 3 x 5 reel set machine with 30 pay lines (image 1).
- The *Lucky Honeycomb* feature triggers bees that fly over the reels anytime during play (image 2).
- The *Lucky Honeycomb* feature concludes with wilds showing in place of the bees (image 3).
- If no winning combinations hit with the additional wilds, the *Lucky Honeycomb* feature retriggers (image 4).
- Once retriggered, additional wilds are again added to the reels (image 5).
- The *Lucky Honeycomb* feature occurs more often during free games (image 6).



LUCKY HONEYCOMB STATS



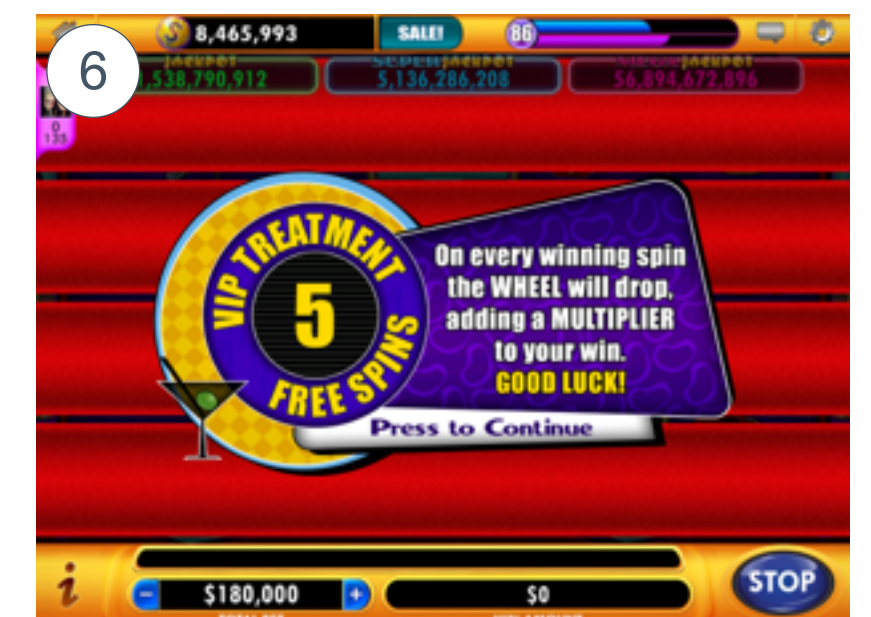
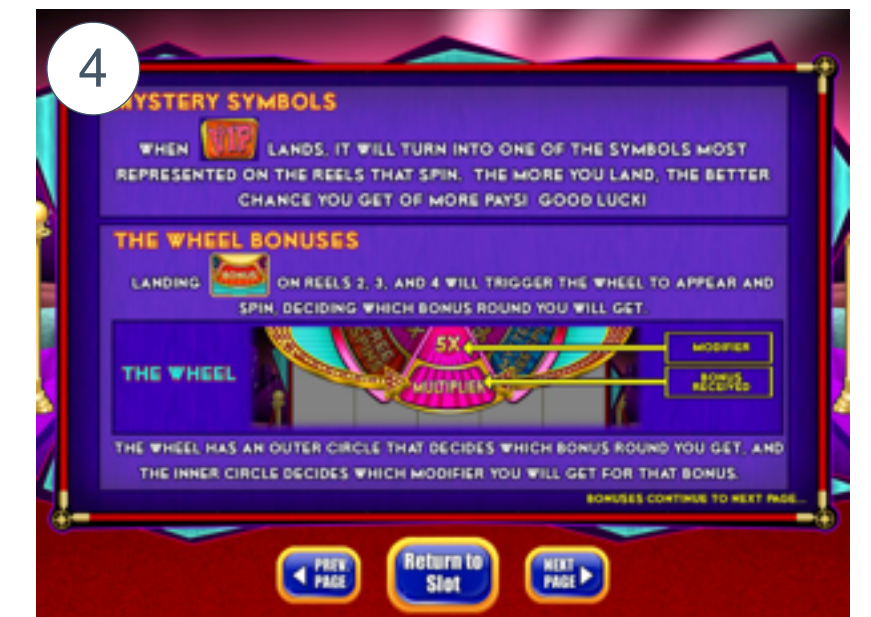
Game play	
Hit frequency	26%
Volatility	7.5
Spins until a bonus	47
Distribution of RTP as % of total RTP	
Base game	35%
Bonus game	65%
RTP range	
Minimum range	69%
Median	81%
Maximum range	93%



DEAN MARTIN'S VIP PARTY

Jackpot Party's *Dean Martin's VIP Party* includes an on-reel wheel, mystery reveal symbols, and three different bonus rounds

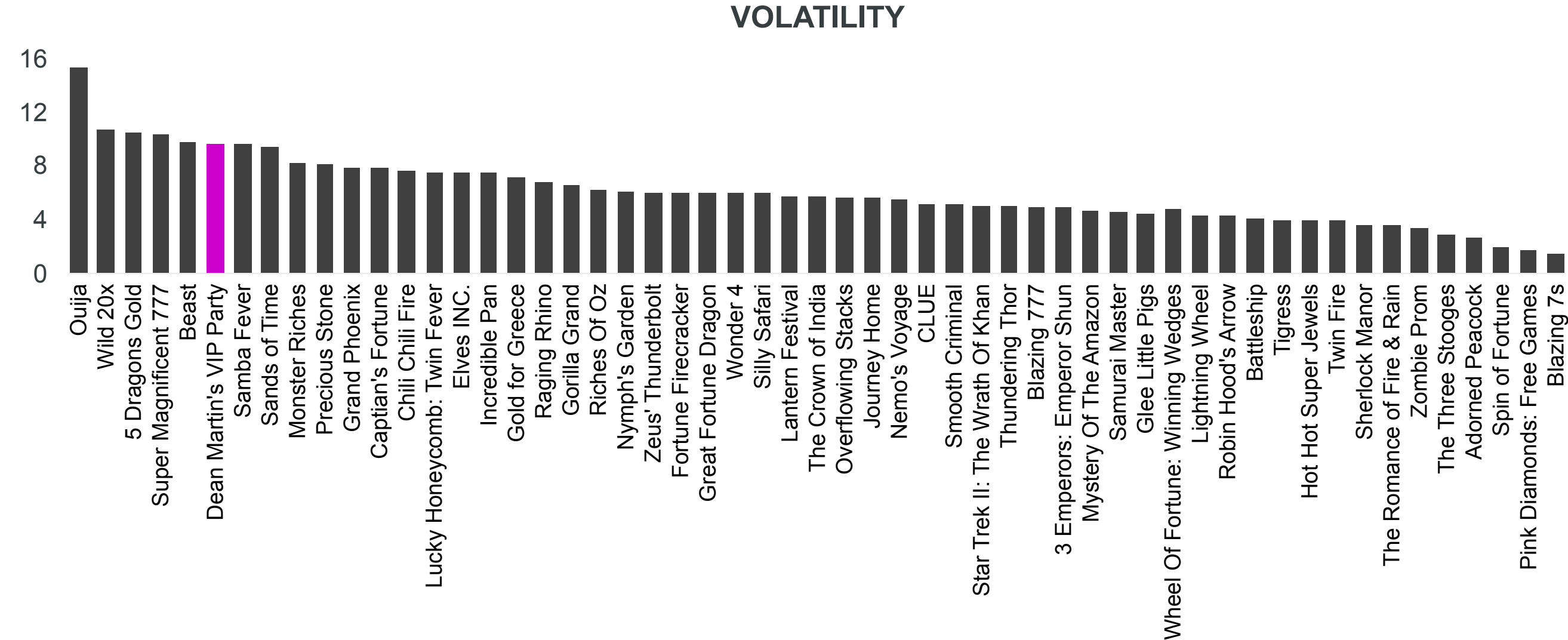
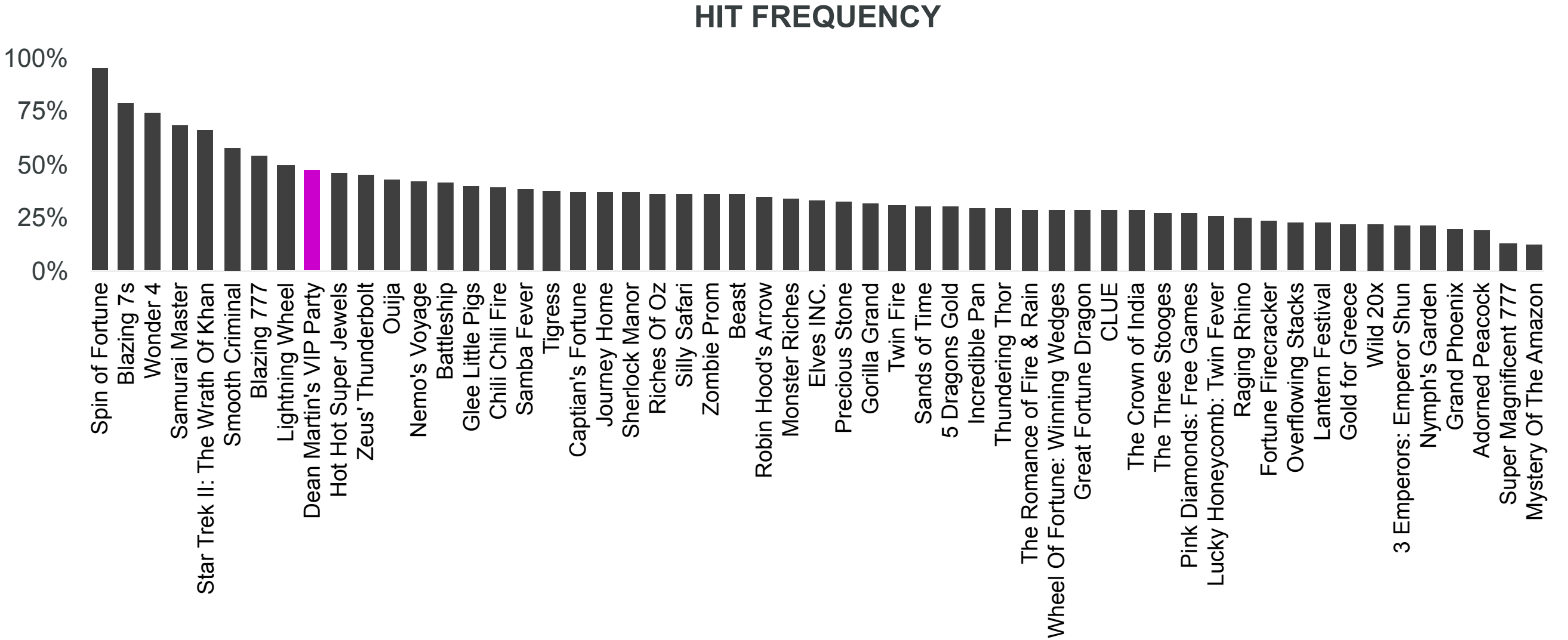
- A progressive qualifying bet is indicated with a dialogue upon machine-entry (image 1).
- The machine is 4 x 5 with mystery reveal symbols and on-reel wheel symbols that spin after landing. Wheel symbols may display 'Wild' or 'Bonus' (image 2).
- Bonus symbols that land on reels 2, 3, and 4 trigger the bonus round (image 3).
- Once triggered, a wheel appears with an outer ring that determines which of three bonus features will be played. The inner ring determines the modifier (image 4).
- If the *Multiplier Bonus* symbol appears in the outer ring of the large wheel, the inner ring will spin for a multiplier. Each of the bonus symbols change to wilds and any winning combinations are multiplied (image 5).
- In the *Free Spins Bonus*, the inner wheel spins. Winning combinations cause the wheel to drop, spinning for a multiplier (image 6).
- *Mystery Free Spins* awards five free spins and the inner wheel determines the number of additional mystery reveal symbols added to the reels (image 7).
- The bonus wheel continues to drop before each spin and mystery reveal symbols remain in play until the bonus is over (image 8).



DEAN MARTIN'S VIP PARTY STATS



Game play	
Hit frequency	47%
Volatility	9.7
Spins until a bonus	39%
Distribution of RTP as % of total RTP	
Base game	25%
Bonus game	75%
RTP range	
Minimum range	76%
Median	92%
Maximum range	108%



APPENDIX

DATA COLLECTION PROCESS

Machine observations are from 10,000 spins and an RMG 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	Market research
• 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 the standard deviation / SQRT(sample size) and the z-score for 90% confidence is 1.65. • For example, the median payout for <i>Zombie Prom</i> 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 <i>Zombie Prom</i> is then 103% +/- (1.65 x 3.3%). • Based on this sample, the result is a 90% confidence that the real RTP of <i>Zombie Prom</i> falls between 97% and 109%.	• 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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