



LIQUID AND GRIT

Social Casino Slots Report

Competitive research and data insights for slots designers

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INTRODUCTION



Dear Slots Designers,

Clayton Christensen, author of *The Innovator's Dilemma*, once said, “Innovators need a heavy dose of faith. They need to trust their intuition that they are working on a big idea. That faith need not be blind.”

The Innovations section, which is new this month, highlights the most recent machine mechanics released in the social casino market.

The Market Watch section has been updated. A summary of trends was added specifically targeting games with slot machine content as their core offering, i.e., Product Madness, House of Fun and Quick Hit Slots. Details about every machine released by these featured games is provided. For a broad market view, we also summarize the 30 top grossing social casino slots games.

The Deep Dives thoroughly analyze newly released innovative machines. DoubleU Casino's Zeus' Thunderbolt had a volatility 3x higher than the next closest game when including jackpot wins (there were two jackpots won in 10,000 spins). Because our data includes 10,000 machine spins, outliers are adjusted, providing you the most accurate data on your competitors.

All the best,

Brett Nowak
Editor-in-Chief

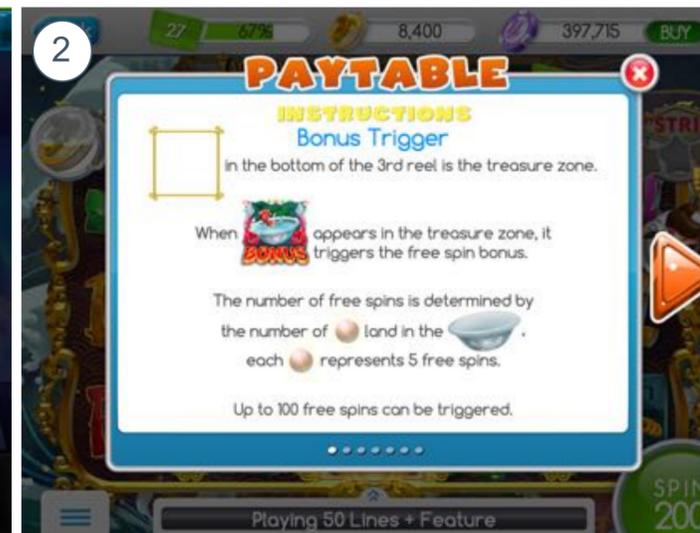
INNOVATIONS

11/1/16 - 11/30/16

NEW MECHANICS

Hit zones trigger free games or jackpots, golden backgrounds for jackpot wins and progression mechanics to unlock bonus games

- **Add hit zones to certain reels:** In Medusa Magic from Slotomania HD, landing in the cash zone pays a prize pool amount (image 1) [see November 2016 Slots Report for details]. In myVegas' new machine Treasure Bowl, any bonus symbol that lands in the treasure zone will trigger a free spin. During free spin, the treasure zone expands to the entire reel (image 2).
- **Use golden background symbols to trigger jackpots:** In Jackpot Party's machine Pirate Queen, when full reels appear with golden backgrounds in different combinations, certain jackpots are awarded (image 3) [see November 2016 Slots Report for details]. In Scatter Slots' new machine Keepers of the Sky, players fill multiple reels with golden backgrounds to win jackpots (image 4).
- **Unlock bonus games with a fill the meter:** In House of Fun's new machine Magnificent Genie, players fill a meter to unlock new bonus games (image 5). The first two times the meter is filled, players receive credit prizes. On the third time, one of the four bonus games unlocks. Once all four bonus games are unlocked, players may then pick the bonus game to play (image 6).



NEW MECHANICS

Try options like deal or no deal during bonus, convert sandwiched symbols and test reveal symbols to the base game

- **Give players deal or no deal options during the bonus:** In Jackpot Party's new machine The Godfather: My Daughter's Wedding, if a jackpot symbol hits on reel 5, the progressive bonus is triggered and players may win credits and a progressive level (image 1). If players win a progressive level, they can choose to take the money, take and pick 1 of 6, or take and pick 1 of 3 (image 2).
- **Convert middle symbols during free spins:** In myKONAMI Slots' new machine Savage Eyes, during free spin, face symbols on reels 1, 3, 4 or 5 may have a white rim (image 3). When two of the same face symbols land on different reels but across from each other, the reels in between are converted to the outside symbols (image 4).
- **Add revealing symbols to the base game:** In House of Fun's new machine Fatal Beauty, certain symbols land as red doors subsequently to open up as symbols (image 5).
- **Pay players for minor symbol combinations:** In House of Fun's new machine Great Lion, combinations of minors—like A/K, Q/J, and 10/9—have higher payouts (image 6).



MARKET WATCH

11/1/16 - 11/30/16

TRENDS: TOP 30 GROSSING SLOTS GAMES

Machines released per game increased by 9% MoM to 2.5 machines. Classic 2 x 3 machines were popular as were Asian-themed machines. Respins and reveal symbols represented new mechanics. Several male-targeted IP content machines were released



REELS		THEMES		MECHANICS*		IP	
3 x 5	25	Classic	8	Respins	7	The Godfather	Jackpot Party
4 x 5	12	Asian	5	Jackpot	6	Playboy	Goldfish Casino
2 x 3	10	Thanksgiving	5	Pick'em bonus	4	Garfield	Hit It Rich!
Other	5	Animal	4	Reveal symbols	4	Ouija	Hot Shot Casino
3, 4, 4, 4, 3	2	Mythical	4	Stacked symbols	4	Battleship	Hot Shot Casino

*There were 17 machines with multipliers and 16 machines with progressive jackpots

TRENDS: FEATURED GAMES

The featured games released 2.75 machines on average in November.* Pay ways and 3, 4, 4, 4, 3 reel formation machines were popular. Animal themes, u-pick bonuses and multiple reel mechanics were trending



REELS**		THEMES		MECHANICS		IP	
3 x 5	8	Animal	4	Stacked symbols	12	The Godfather	Jackpot Party
4 x 5	6	Other	4	U-pick bonus	9	Ouija	Hot Shot Casino
3, 4, 4, 4, 3	2	IP	3	Progressive jackpots	7	Garfield	Hit It Rich!
Other	2	Asian	2	Multiple reels	6	Betty Boop	Quick Hit Slots

*Featured games: DoubleDown Casino, Heart of Vegas, House of Fun, Jackpot Party, Hit It Rich!, Slotomania HD, Quick Hit Slots and Hot Shot Casino

**Four machines were pay way machines of 2,000, 1,024 and two 243 pay ways

DETAILS: FEATURED GAMES

GAME	MACHINE	REELS	LINES	THEME	TYPE	NOTABLE FEATURES
DoubleDown Casino	Pilgrims!	4 x 5	50	Thanksgiving	Core Video	<ul style="list-style-type: none"> During free spins, players may collect five bonus symbols to win more free spins
	Golden Eagle	6 x 5	100	Other	Core Video	<ul style="list-style-type: none"> Nudging wilds and stacked symbols (image 1)
Heart of Vegas	Turtle Treasure	3 x 5	25	Ocean	Core Video	<ul style="list-style-type: none"> During free spins, three low symbols change into the highest symbol
	Wonder 4	Other	40	Other	Premium	<ul style="list-style-type: none"> Choose four machines from four different reel sets (see Deep Dives)
	Mammoth Thunder	4 x 5	50	Animal	Core Video	<ul style="list-style-type: none"> Each free game, additional wilds are added to reels 2, 3 and 4 (image 2)
House of Fun	Gorilla Grand	4, 5, 5, 5, 4	2,000 ways	Animal	Premium	<ul style="list-style-type: none"> Jackpot bonus wheel (see Deep Dives)
	Magnificent Genie	3 x 5	40	Other	Core Video	<ul style="list-style-type: none"> Fill the meter for credits and to unlock four bonus games (see Innovations)
	Fatal Beauty	3, 4, 4, 4, 3	Unknown ways	Asian	Core Video	<ul style="list-style-type: none"> Stacked and reveal symbols (image 3)
	Great Lion	4 x 5, up to 8 x 5	1,024 ways	Animal	Premium	<ul style="list-style-type: none"> One or more reels expands one to five reels high (image 4)
	Fairy Bliss	3 x 5	50	Mythical	Core Video	<ul style="list-style-type: none"> During free spins, reel 3 is spun together as one giant symbol



DETAILS: FEATURED GAMES

GAME	MACHINE	REELS	LINES	THEME	TYPE	FEATURES
Jackpot Party	Fu Dao Le	3 x 5	243 ways	Asian	Premium	<ul style="list-style-type: none"> Jackpot bonus feature with four play options Expanding, stacked wilds that nudge Reveal symbols (image 1)
	The Godfather: My Daughter's Wedding	3 x 5	243 Ways	IP	Core Video	<ul style="list-style-type: none"> Free spins with challenge feature Bonus game with deal or no-deal mechanic (see Innovations)
	Dragon's Fire	4 x 5	40	Dragon	Core Video	<ul style="list-style-type: none"> Stacked symbols with random multipliers
Hit It Rich!	Silly Safari	Other	Other	Animal	Core Video	<ul style="list-style-type: none"> Expanding reels (see Deep Dives)
	Garfield	4 x 5	400	IP	Core Video	<ul style="list-style-type: none"> U-pick for free spins with collection mechanic to turn symbols into wilds (image 2)
Slotomania HD	Lion Run	4 x 5	50	Animal	Core Video	<ul style="list-style-type: none"> Progressive jackpots are triggered by stacked lion symbols Free spins are triggered by stacked scatter symbols (image 3)
	Despicable Wolf 2	3 x 5	25	Nursery Rhymes	Premium	<ul style="list-style-type: none"> Free spins with sticky wilds and expanding reels Collection feature (image 4)



DETAILS: FEATURED GAMES

GAME	MACHINE	REELS	LINES	THEME	TYPE	FEATURES
Quick Hit Slots	Quick Hit Riches	3 x 5	50	Classic	Premium	<ul style="list-style-type: none"> U-pick free games with rising multiplier tower (image 1)
	Betty Boop's Fortune Teller	4 x 5	40	IP	Core Video	<ul style="list-style-type: none"> Fortune wheel bonus feature with nine different potential awards There are two u-pick awards within the wheel bonus; one u-pick award gives options for free games with advancing multiplier or free games with more free games (image 2)
	Riches of the Kings	3 x 5	50	Egyptian	Core Video	<ul style="list-style-type: none"> U-pick a scatter symbol to uncover one of two free spins (image 3)
Hot Shot Casino	Ouija	3, 4, 4, 4, 3	40	Mystical	Premium	<ul style="list-style-type: none"> Planchette feature choices: 1-18 wilds; three full reel stacks; instant bonus round with five free spins; or light candles (see Deep Dives)
	Battleship: Periscope Pays	3 x 5	40	IP	Core Video	<ul style="list-style-type: none"> Free spins with alternate set of reels (image 4)

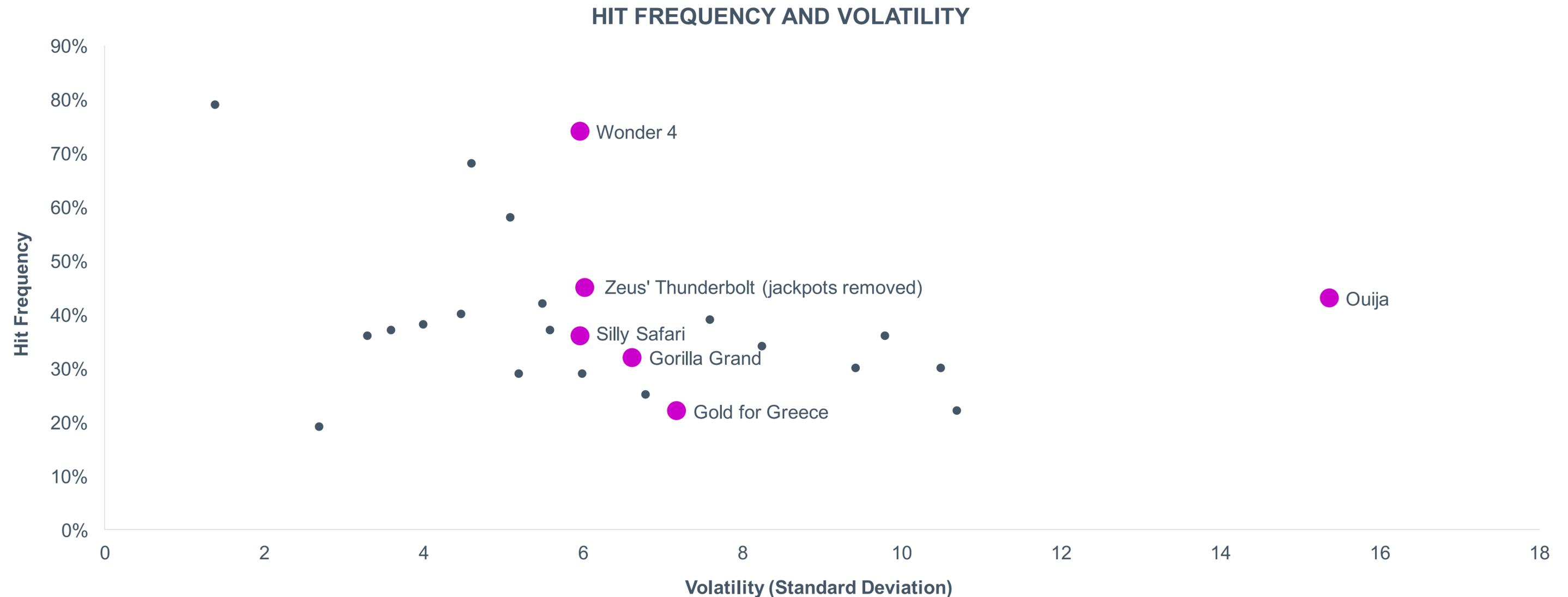


DEEP DIVES

- OUIJA from Hot Shot Casino
- WONDER 4 from Heart of Vegas
- ZEUS' THUNDERBOLT from DoubleU Casino
- GORILLA GRAND from House of Fun
- GOLD FOR GREECE from Caesars Slots
- SILLY SAFARI from Hit It Rich!

HIT FREQUENCY AND VOLATILITY

Hot Shot Casino's new machine *Ouija* has an extremely high volatility. Zeus' Thunderbolt has an average volatility when removing the two jackpots won (as shown below). Including the jackpots, Zeus' Thunderbolt's volatility would be 44.6, almost 3x *Ouija*



● Gray dots represent other machines examined in past reports

OUIJA

Hot Shot Casino released Ouija, an IP-machine that includes revealing symbols, a planchette feature and two different free spin modes

- A dialogue box appears upon machine entry to notify players about the three jackpots and qualifying bets (image 1).
- The reel set is 3, 4, 4, 4, 3. The machine offers stacked reveal symbols; all reveal symbols are the same symbol (image 2).
- Each reel has a corresponding letter to spell O-U-I-J-A for scatter play (image 3).
- The planchette feature may trigger randomly during any spin. It will then move around various awards until it stops. Award options include: 1-18 wilds; three full reel stacks; instant bonus round with five free spins; or light candles (image 4).
- Anytime the candle symbol appears on the third reel, it will light a “Yes” or a “No” candle (located at the bottom of the reel set). The lit candles represent the number of free spins awarded if the bonus round is triggered (image 5).
- To trigger the free spins bonus round, two bonus symbols on reels two and four must accompany the candle symbol on reel three. Then, the free spins, “Yes” or “No” is chosen and triggered randomly (image 6).
- In the free spins “Yes” bonus round, a multiplier is added after each free spin awarded for each of the lit candles on the “Yes” side (image 7).
- In the free spins “No” bonus round, the four lowest paying symbols are removed from the reels for each spin awarded for the lit candles on the “No” side (image 8).



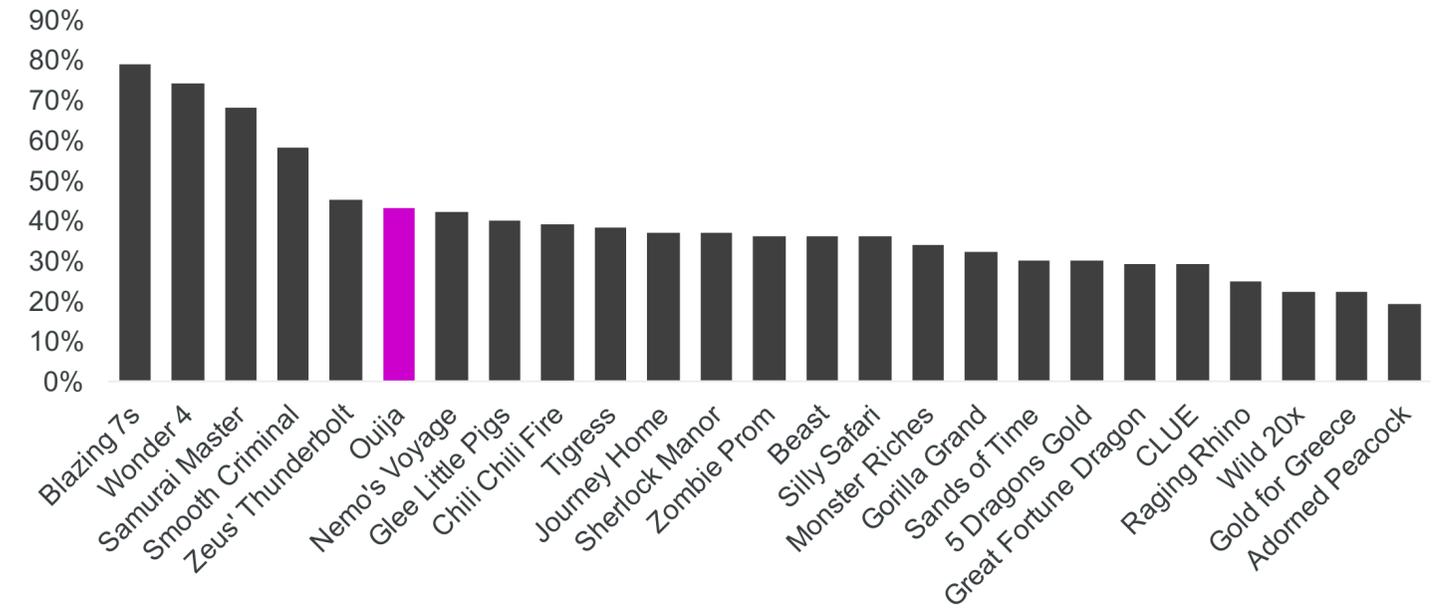
OUIJA STATS

Hot Shot Casino's Ouija has a high hit frequency and extremely high volatility

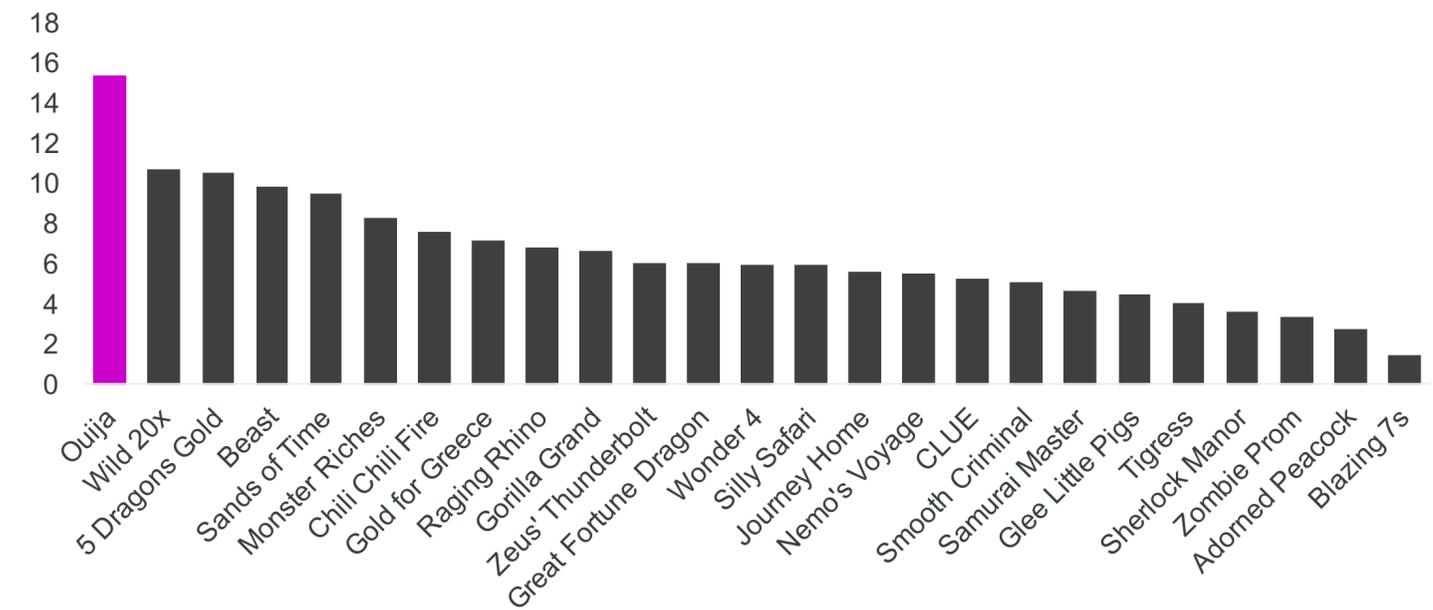
Game play*	
Hit frequency	43%
Volatility	15.4
Spins until a bonus	34
Distribution of RTP as % of total RTP**	
Base game	60%
Bonus game	40%
RTP range***	
Minimum range	97%
Median	122%
Maximum range	148%

*Volatility is based on the standard deviation of the 10,000 payouts from this machine
 **The distribution of RTP equals the RTP of the base or bonus game over the total RTP
 ***90% confidence with 10,000 spins of this machine. More info on this process in the Appendix

HIT FREQUENCY



VOLATILITY



WONDER 4

Heart of Vegas released Wonder 4, a machine that allows players to choose between four machines with different reel sets, free games and super free games

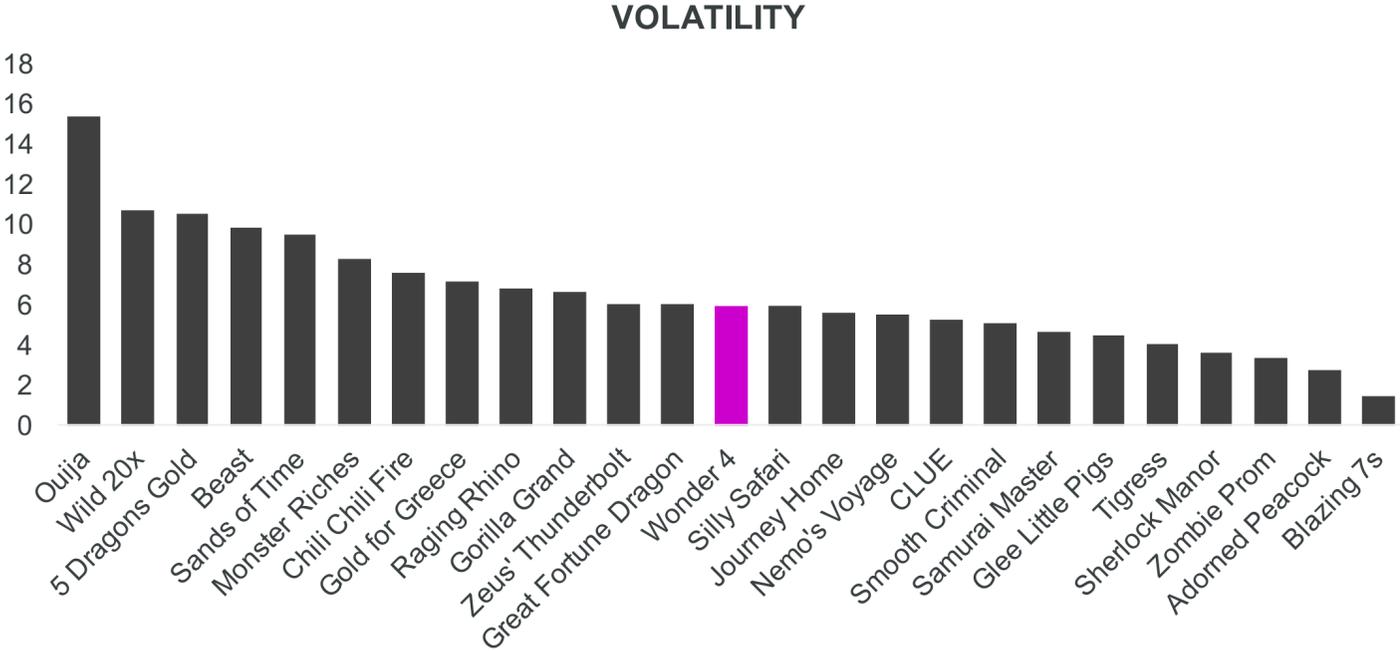
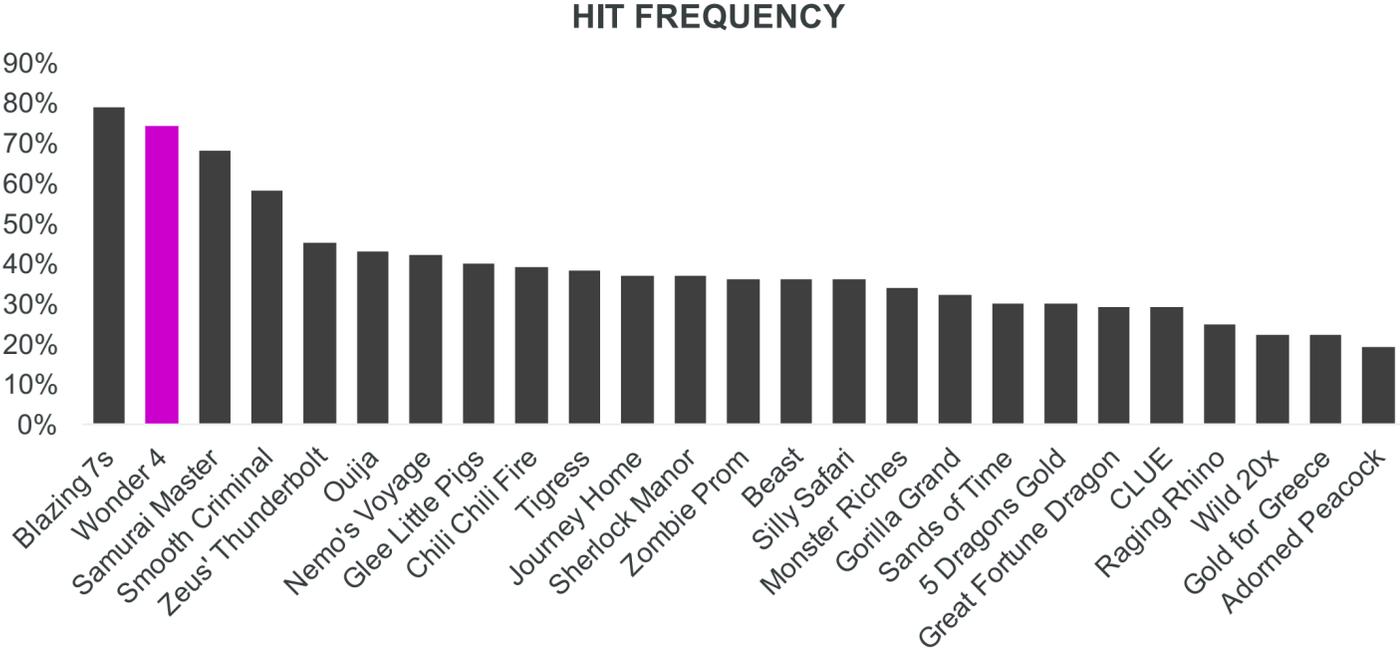
- Wonder 4 was initially released last month as a High Roller Machine only, and now is released in the main lobby with a lower minimum bet (images 1 & 2).
- Upon machine entry, four 3 x 5 reel sets are visible: Pompeii, Buffalo, Wild Splash and Fire Light. Players choose which machines appear in the four spots (image 3).
- To select the machines to play, players press the machine name then select position one through four (image 4).
- All free games are played on a single 4 x 5 reel set of the triggered machine (image 5).
- Free games are triggered when three or more bonus game symbols appear in any of the four reel sets. When free games have been won, players are notified with an information banner across the winning reel set. Super free games are triggered when two or more bonus symbols appear with one or more super free games symbol(s) (image 6).
- Super free games are played on four reel sets of the triggering machine (image 7).
- Free games and super free games may be won on multiple reel sets and are played one at a time (image 8).



WONDER 4 STATS

The four machines in Wonder 4 produce a high hit frequency but average volatility

Game play	
Hit frequency	74%
Volatility	6.0
Spins until a bonus	35
Distribution of RTP as % of total RTP	
Base game	63%
Bonus game	37%
RTP range	
Minimum range	91%
Median	101%
Maximum range	111%



ZEUS' THUNDERBOLT

DoubleU Casino released Zeus' Thunderbolt with a progressive jackpot, respins and a free spin bonus wheel with additional reel sets and copying wilds

- At machine launch, a “Select the Machine” dialogue opens with a variety of progressive jackpots (image 1).
- The machine is a 4 x 5 reel set with 40 lines (image 2).
- Zeus' Thunderbolt bonus is triggered when four Zeus symbols cover the entire first reel. When this happens, players are awarded two respins (image 3).
- Any wild or Zeus symbols from the triggering spin or on the reels during the two respins lock into place until the bonus is complete (image 4).
- When three scatter wheel symbols appear on reels 1, 3 and 5, the Zeus bonus wheel is triggered (image 5).
- When the bonus wheel appears, the outside ring of additional reels spin around first, followed by the inside ring. The number of reels and spins the wheel lands on is the award for the bonus (image 6).
- Players may win up to four reel sets and up to 10 free spins on the bonus wheel. During free spins, any wild that lands in a reel set will “copy” over to all other reel sets for that spin (image 7).
- Anytime during free spins, the Zeus' Thunderbolt Bonus can be triggered and players are awarded two respins for all reel sets in play (image 8).



ZEUS' THUNDERBOLT STATS

The two jackpot wins were removed from data below. Including jackpot wins, volatility was 3x higher than the nearest machine

Game play

Hit frequency	45%
Volatility (less jackpot wins)	6.0
Spins until a bonus	26

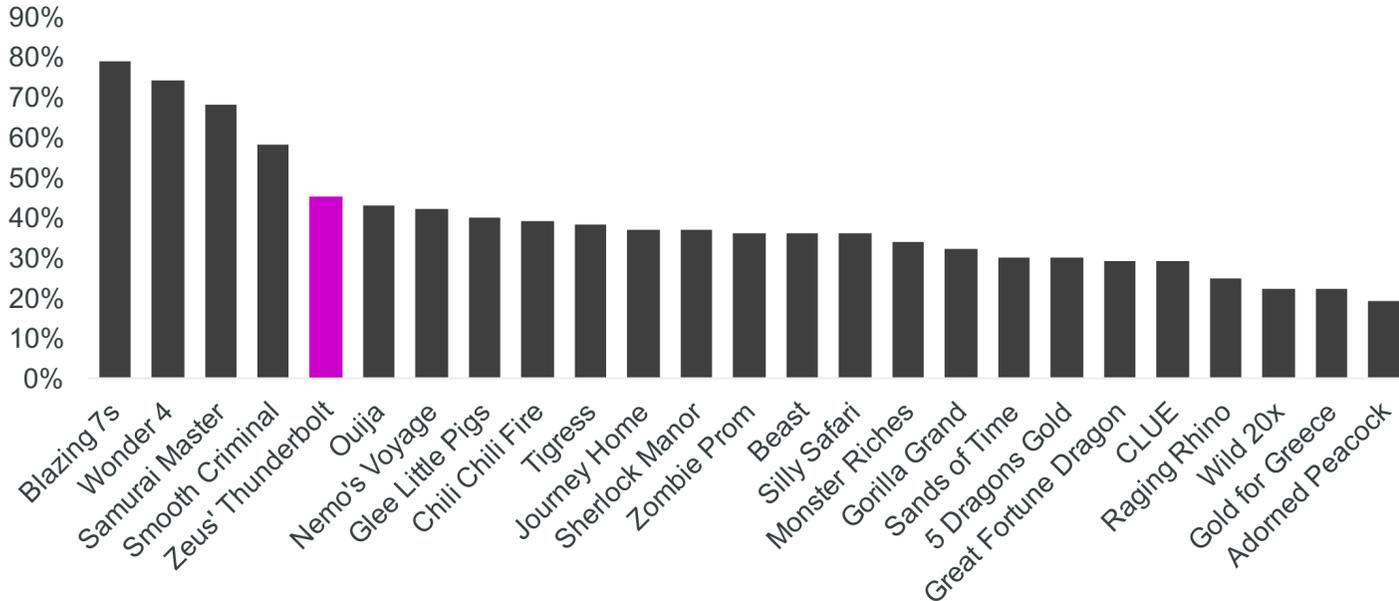
Distribution of RTP as % of total RTP

Base game	48%
Bonus game	52%

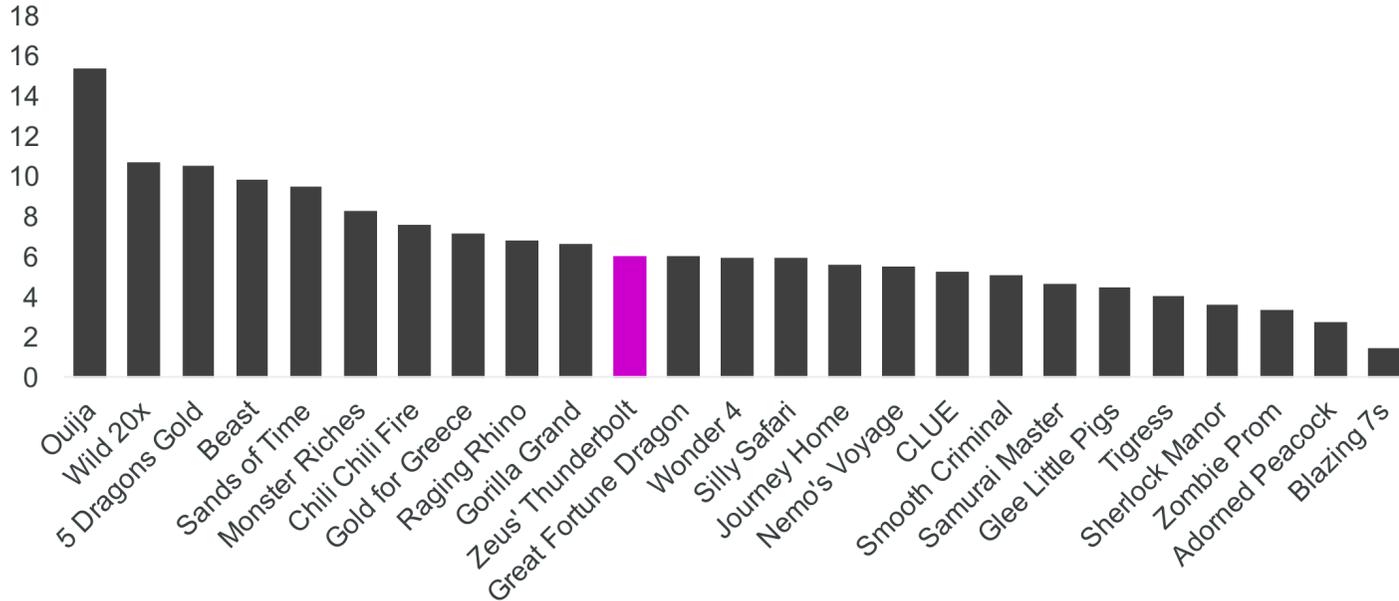
RTP range

Minimum range	87%
Median	97%
Maximum range	106%

HIT FREQUENCY



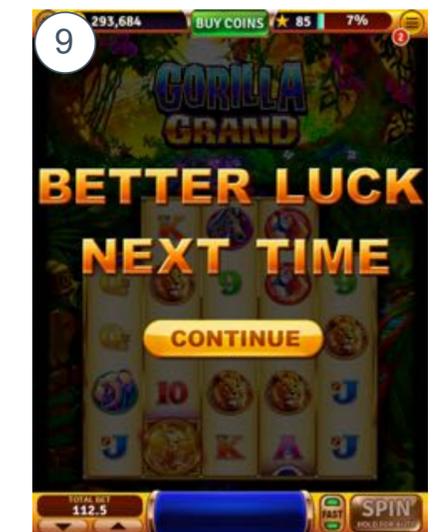
VOLATILITY



GORILLA GRAND

House of Fun released a vertical machine with five levels of jackpots, free games and a win win Jackpot Wheel with multipliers

- The machine has a 4, 5, 5, 5, 4 reel set (image 1).
- During play, a Jackpot Bonus Wheel feature is triggered by three or more bonus wheel symbols (image 2).
- The Jackpot Bonus Wheel is comprised of two wheels—a large wheel with various jackpots and free game prizes—and a smaller wheel with multipliers (image 3).
- If the bonus wheel lands on any jackpot, the bottom multiplier wheel spins and awards players the multiplied jackpot (image 4).
- Winning the Mini, Minor, Major or Super Jackpots award players another spin of the bonus wheel. The feature ends when the Grand Jackpot or free games are won (image 5).
- Eight to 50 free games may be won in the bonus wheel feature, depending on the number of triggering bonus symbols (image 6).
- All wilds during free spins become multipliers of 2x, 3x, 4x, 5x and 10x (image 7).
- During free spins, the bonus wheel symbol is replaced with gold coins. Additional free games may be won when two or more coins land anywhere within the reel set (image 8).
- If a player does not win, then a, “Better luck next time” message appears over the reels (image 9).



GORILLA GRAND STATS

Gorilla Grand has slightly below average hit frequency and slightly above average volatility

Game play

Hit frequency	32%
Volatility	6.6
Spins until a bonus	108

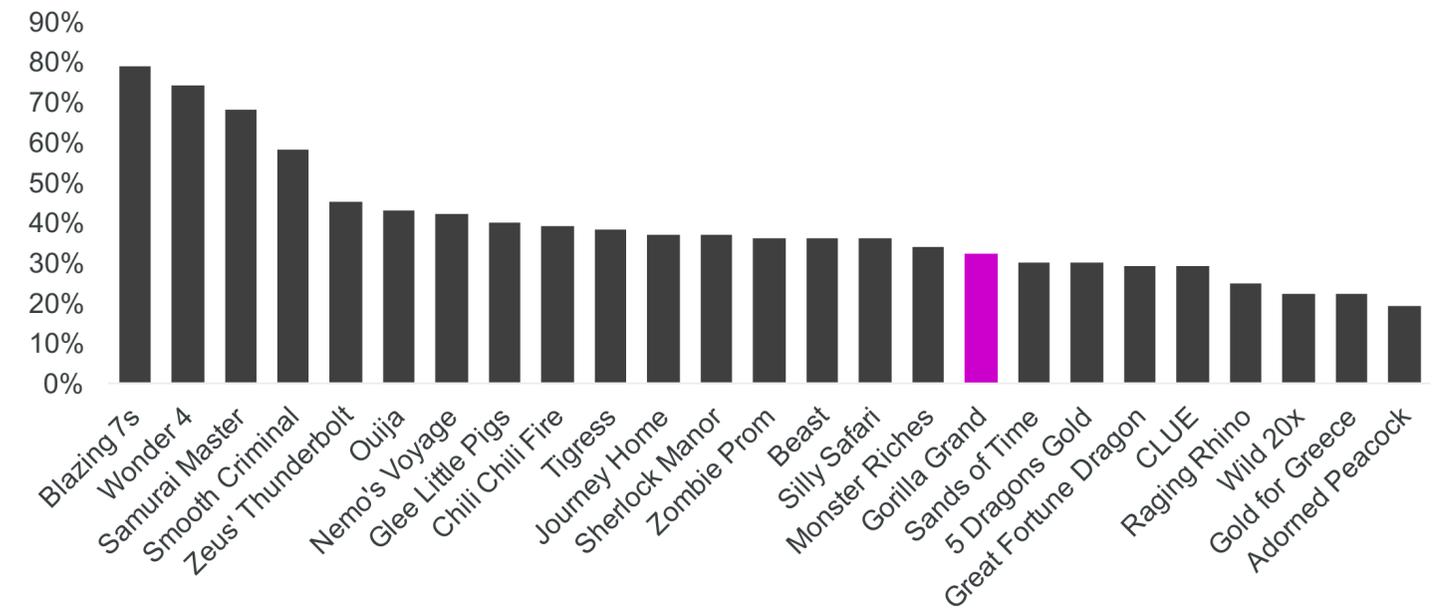
Distribution of RTP as % of total RTP

Base game	70%
Bonus game	30%

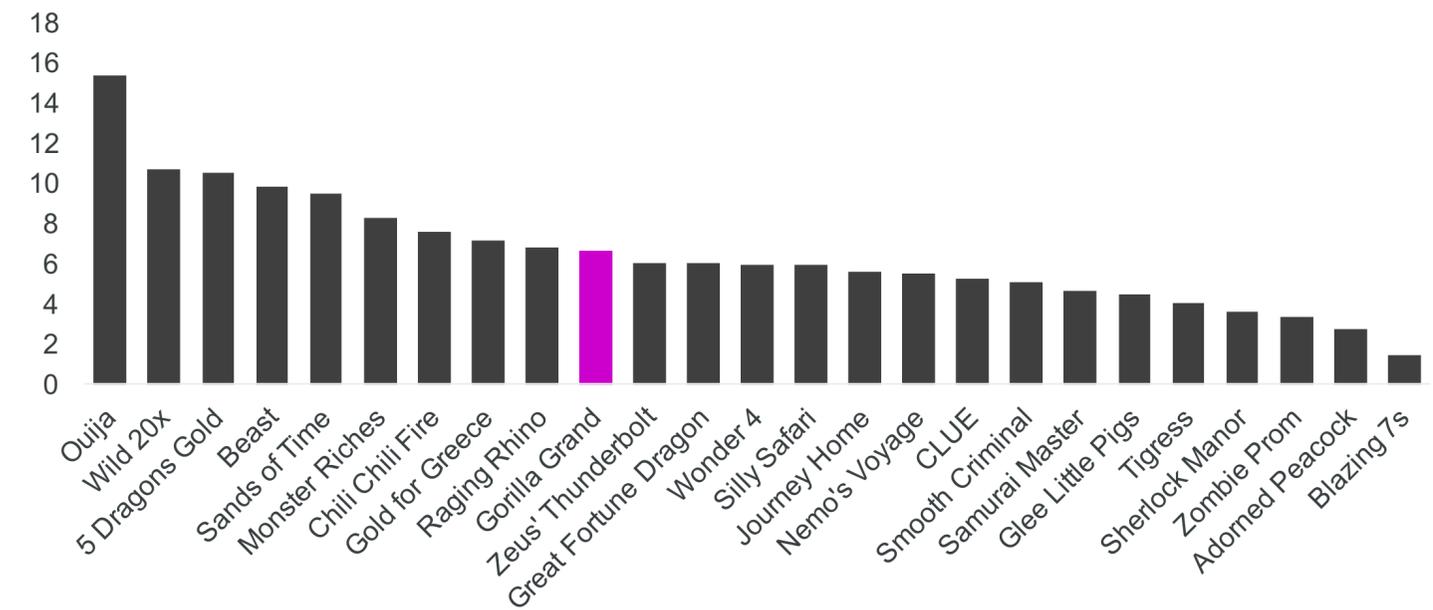
RTP range

Minimum range	86%
Median	97%
Maximum range	108%

HIT FREQUENCY



VOLATILITY



GOLD FOR GREECE

Caesars Slots released a machine with progressive jackpots, pick'em bonuses, high paying gold symbols and free spins. The base game has 243 ways to win and the free spins have 3,125 ways to win

- At app-entry, a short video announces Gold for Greece and briefly explains its features (image 1).
- Upon machine-entry, a “Choose Your Bet” dialogue box appears within a pay table displaying available bet levels with corresponding gold symbols (image 2).
- Five progressive jackpots are visible at the top of the 3 x 5 reel set with active gold symbols appearing along the bottom (image 3).
- The golden apple bonus triggers randomly during play when any wild golden cherubs land anywhere on the reel set (image 4).
- To play the golden apple bonus, a box of gold coins appear with all five jackpot amounts across the top. Non-qualified jackpots and corresponding coins are grayed out (image 5).
- Players pick coins until three matching jackpot coins have been revealed. Players are shown the jackpot and amount won during the bonus game (image 6).
- In the base game, free spins are triggered by three or more golden apple scatters appearing anywhere on the reel set (image 7).
- During free spins, the reel set changes to 5 x 5 with 3,125 ways to win and additional free spins may be won (image 8).

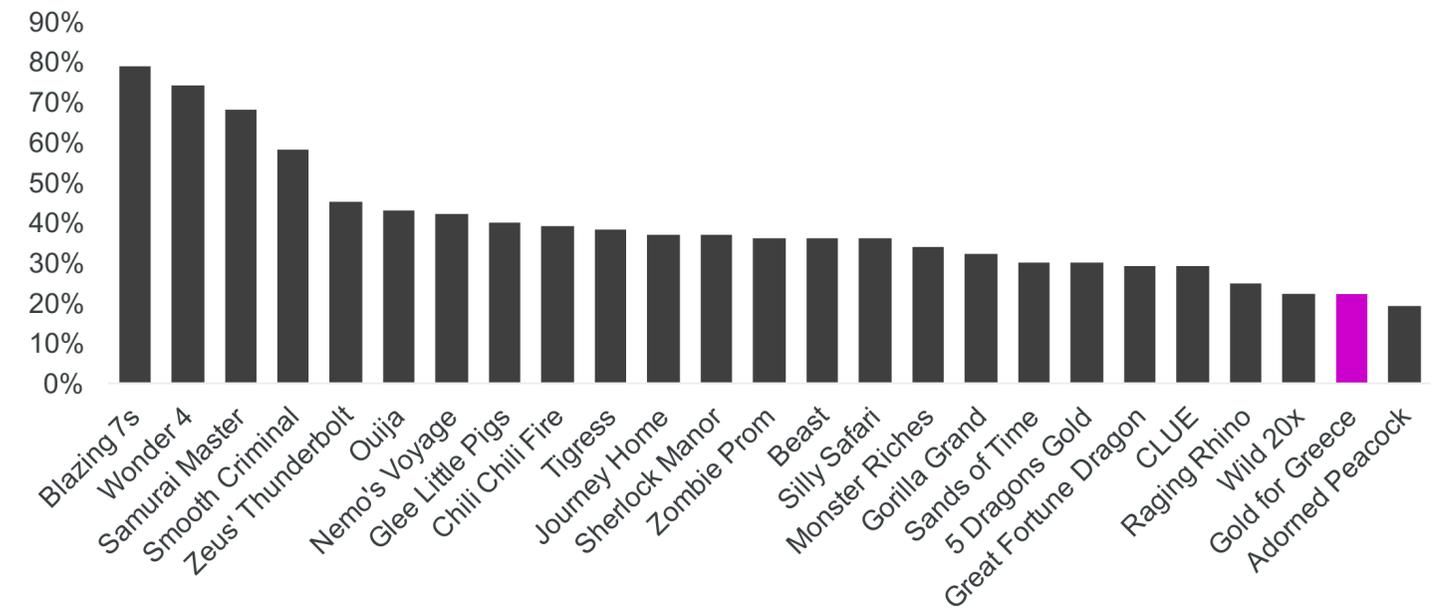


GOLD FOR GREECE STATS

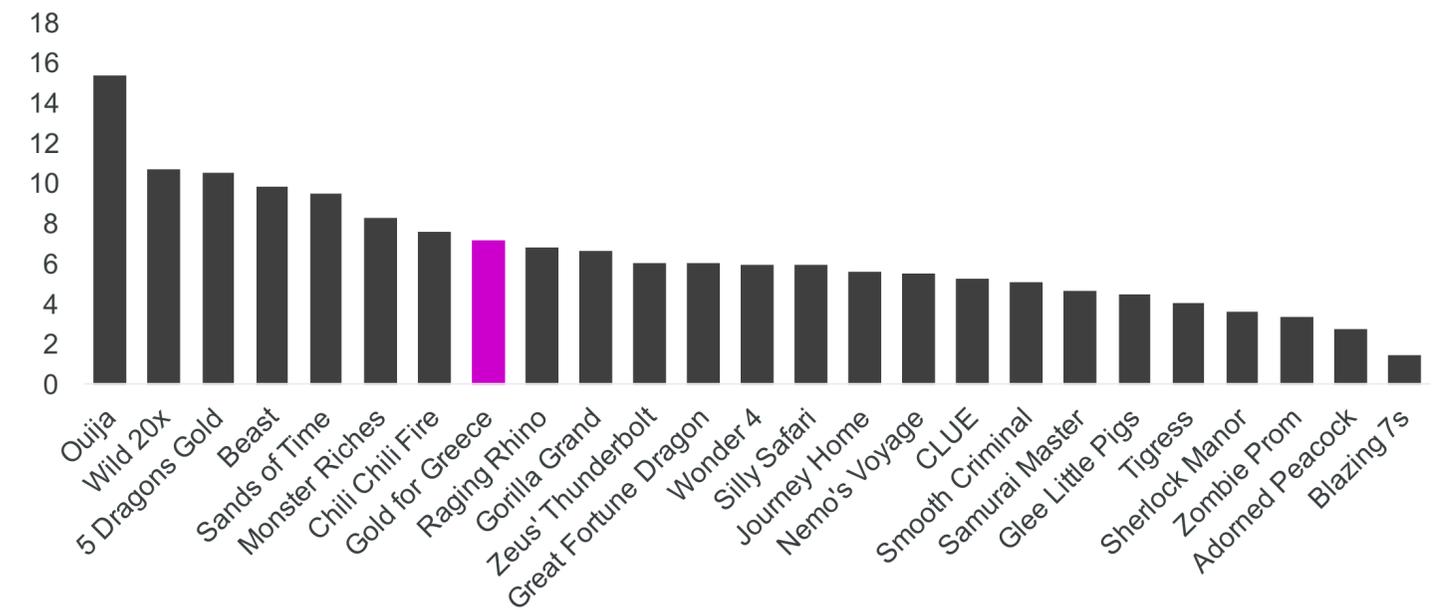
Gold for Greece has very infrequent wins with above average volatility

Game play	
Hit frequency	22%
Volatility	7.2
Spins until a bonus	67
Distribution of RTP as % of total RTP	
Base game	56%
Bonus game	44%
RTP range	
Minimum range	84%
Median	96%
Maximum range	108%

HIT FREQUENCY



VOLATILITY



SILLY SAFARI

Hit It Rich! released Silly Safari, a game with mega-sized symbols, expanding reel sets, a u-pick bonus with free spins and a pick'em bonus

- Silly Safari was initially released as a VIP early access machine prior to a full release in the main lobby (image 1).
- Upon machine-entry, a dialogue box notifies players of jackpot-eligible bets (image 2).
- Anytime during a spin, the 4 x 5 reels expand to a 6 x 6 reel. After the completion of this feature, the reels reset to the original 4 x 5 reel formation (image 3).
- Bonus symbols only appear on reel 5 and must appear to trigger the u-pick bonus. When the bonus feature is triggered, players are presented with two barrels to choose from: one barrel is free spins and the other is a pick'em bonus (image 4).
- When free spins are revealed in the u-pick bonus, players must pick a coconut drink (image 5).
- The chosen coconut will display the mega-sized symbol that covers 2 x 6 reels and will appear for eight free spins on the 6 x 6 reel set (image 6).
- In the pick'em bonus, players are given three picks and asked to pick a tree (image 7).
- Every tree contains a coin reward with some trees having an additional pick award (image 8).

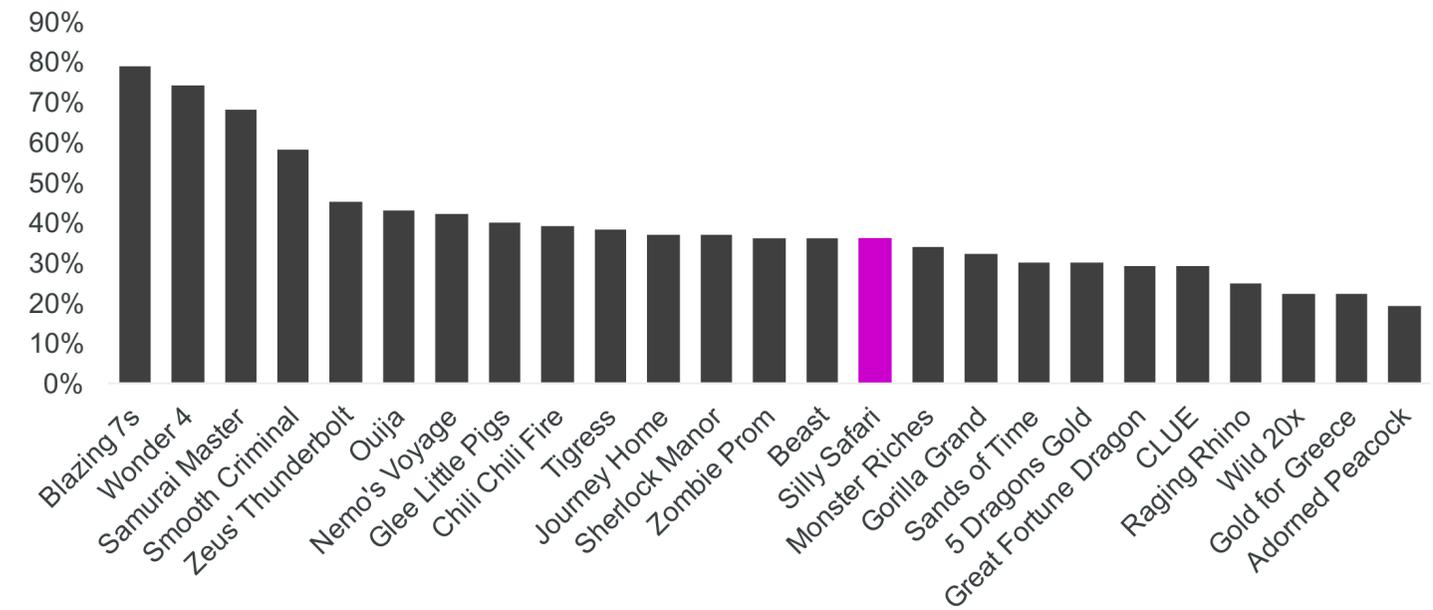


SILLY SAFARI STATS

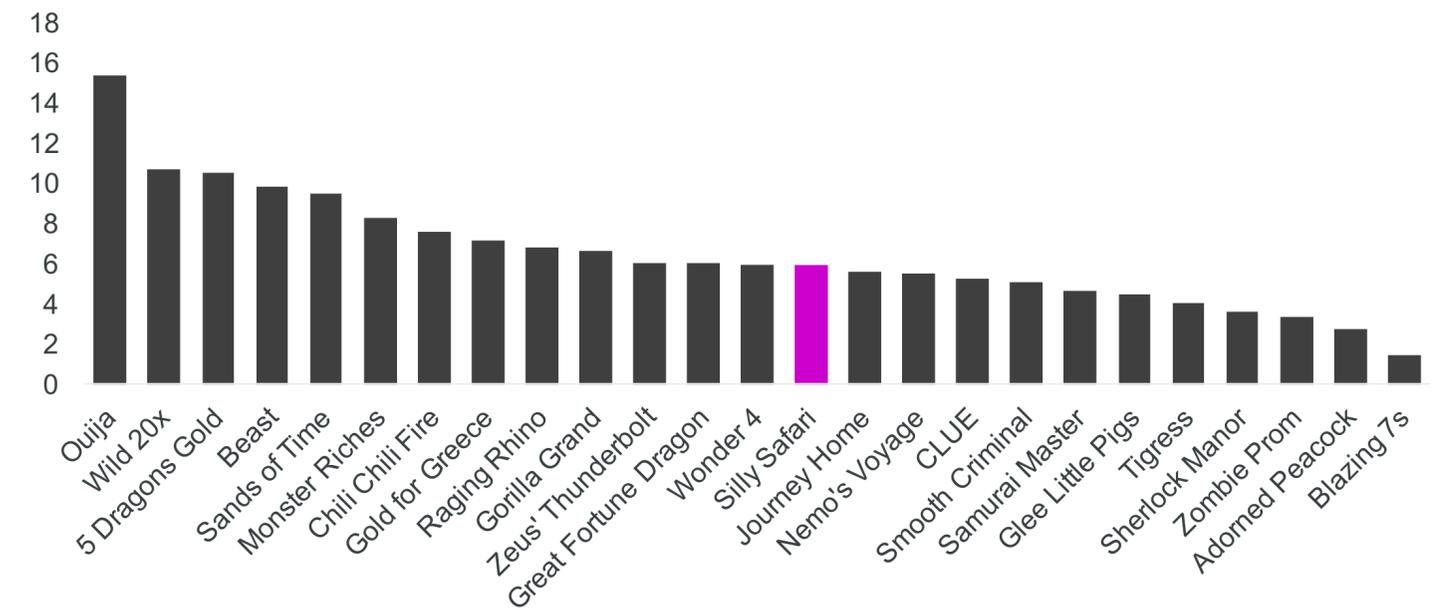
Hit It Rich!'s Silly Safari has an average hit frequency and volatility

Game play	
Hit frequency	36%
Volatility	6.0
Spins until a bonus	59
Distribution of RTP as % of total RTP	
Base game	57%
Bonus game	43%
RTP range	
Minimum range	94%
Median	104%
Maximum range	114%

HIT FREQUENCY



VOLATILITY



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

- 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 (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%.

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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