



# LIQUID AND GRIT

## Slots Design Report

Competitive research and data insights for slots designers

# TABLE OF CONTENTS

<b>NEW INNOVATIONS</b>	4
Last month’s most innovative slot mechanics	
<b>MARKET WATCH</b>	7
Trends: Featured games	
All machines: Featured games	
<b>DEEP DIVES</b>	14
<i>Spin of Fortune</i> – Slot Bonanza	
<i>Twin Fire</i> – Jackpot Party	
<i>Lightning Wheel</i> – Big Fish Casino	
<i>Captain’s Fortune</i> – DoubleDown Casino	
<i>Fortune Firecracker</i> – Heart of Vegas	
<i>Incredible Pan</i> – Caesars Slots	
<b>APPENDIX</b>	28
Data collection process	

# APRIL

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# 2017

# INTRODUCTION



Dear Slots Designer,

*"Capital isn't so important in business. Experience isn't so important. You can get both these things. What is important is ideas."*

- Harvey Firestone, founder of Firestone Tire

Today, the social casino market is competitive; organic growth is driven by word-of-mouth, iOS release times are short, and even IP is at risk. What we have left is our innovative ideas.

This month, Slot Bonanza continues to invest in skill-based bonus games. Check out New Innovations to see their *Blocks Destroyer* machine; a new take on the 1979 classic Atari game *Breakout*. In a role reversal, Zynga was likely compensated to promote IP—see the *Skecher* machine released by Hit it Rich.

A growing trend is combination video and stepper machines. Caesars Slots initiated this in January with *Power of Christmas*. This month, it's House of Fun's *Hot in Rio* and Viva Slots Las Vegas' *Cashing Fire*. Consider adding a combination machine to your roadmap.

Lastly, don't overlook the Deep Dives. Slot Bonanza's *Spin of Fortune* has a 95% hit frequency. *Twin Fire* was the real money machine that inspired many social features released in the past six months.

Focus on the ideas.

Brett Nowak  
*Editor-in-Chief*

# NEW INNOVATIONS



# NEW INNOVATIONS I

Consider extreme hit frequency machines.  
Test skill-based bonus games. Combine video and stepper mechanics

- **Consider machines that hits on every spin:** Slot Bonanza's *Spin of Fortune* pays something on almost every spin. The wheel also turns every spin (image 1; see Deep Dives section for hit frequency data).
- **Explore skill-based bonus games:** Most of Slot Bonanza's bonus games are skill-based. *Blocks Destroyer* is a version of Atari's classic *Breakout* (image 2).
- **Investigate promotional content in slots machines:** In Hit it Rich's *Skechers*, the *Skechers* shoe is prominently displayed on the loading screen and within the symbols (image 3).
- **Add a ladder mechanic with progressive and stand alone jackpots:** In Jackpot Party's *Twin Fire*, players pick to reveal 'Up 1', 'Up 2 and Collect', and other combinations to climb the ladder (image 4; see Deep Dives section for details).
- **Explore video and stepper machine combinations:** Viva Slots Las Vegas added a video machine bonus game to *Cashing Fish* (image 5). House of Fun's *Hot in Rio* is the second iteration of a stepper machine triggering within a video machine (image 6).
  - Also see *Twin Fire* in the Deep Dives section this month. And, Caesars Slots' machine *Power Shot Christmas* that was showcased in the January 2017 Slots Design Report.





# NEW INNOVATIONS II

Display the free spin combo on the progress bar. Add bonus games with higher bets

- **Show players the number of free spins and sticky wild reel configuration they will earn upon filling a meter:** In House of Fun's *Charming Frog*, the end of the meter shows the free spins and the sticky wild reel configuration (image 1).
- **Slide symbols in from the sides:** In FaFaFa Real Casino's *Temple of Jade*, symbols slide in from the side when a full stack of temple symbols land on a reel (image 2).
- **Increase player bets by adding bonus games with higher bet amounts:** In Caesars Slots' *American Glamour 2*, players are incentivized to increase their bet with multiple bonus games that are only eligible at higher bet amounts (images 3 and 4).
- **Innovate on a *Lightning Link* style mechanic:** Explore ways to expand on this now proven and recognizable real money mechanic. Slotomania released a similar mechanic in *Vegas Cash*. Be mindful that your innovations do not infringe on IP (image 5).
- **Add recent winners to the pay table:** In myVEGAS' *Riches of the Underworld*, recent winners are showcased in the Jackpot How-To page of the pay table (image 6).





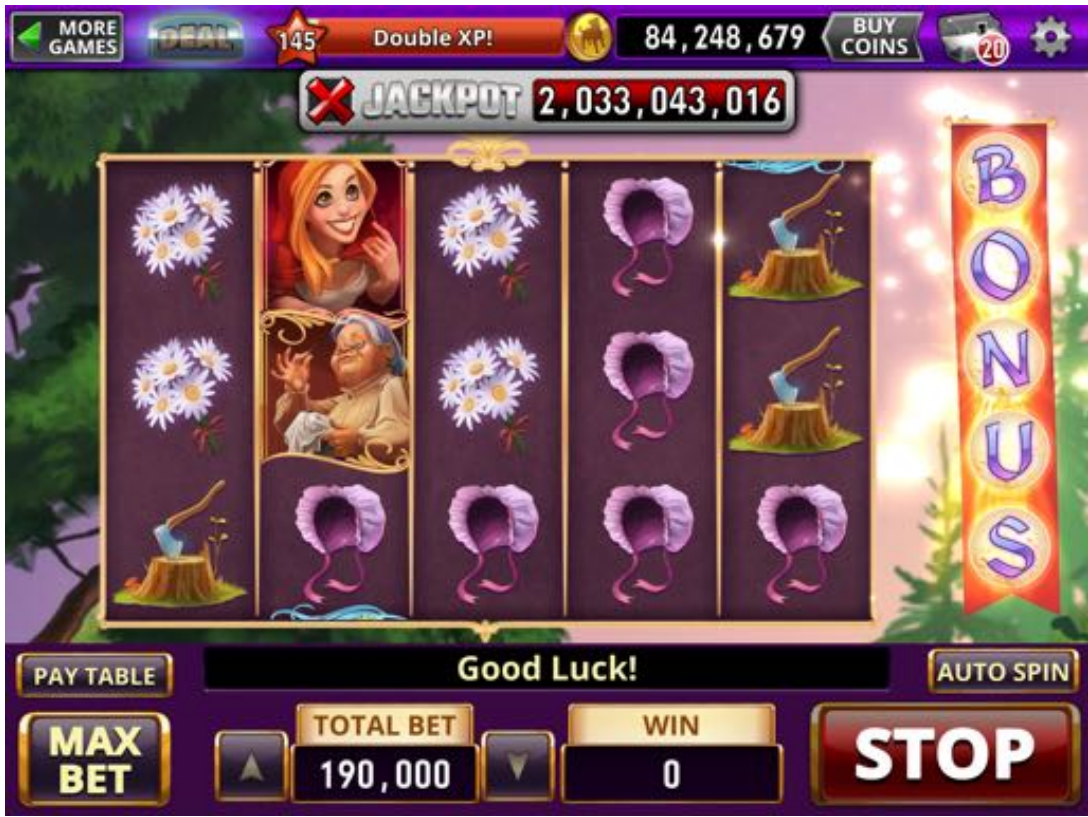
# MARKET WATCH

Covering 3/1/17 - 3/31/17



# TRENDS: FEATURED GAMES

3 x 5 reel configurations (52%) were the most popular in March (February was 4 x 5 at 47%). Progression (24%) and wild mechanics (24%) were the most prevalent mechanics. Product endorsements (*Skecher*) is a new IP implementation



REELS		THEMES		MECHANICS		IP	
3 x 5	52%	Animal	10%	Progression	24%	Gold Fish	Betty Boop
4 x 5	19%	Holiday	10%	Wild mechanics	24%	Gold Fish	CLUE: Confidential
4 x 6	6%	Asian	6%	Multiplier mechanics	13%	Hit it Rich	Wicked
5 x 5	6%	Mystical	6%	Wheels	11%	Hit it Rich	Skechers



# ALL MACHINES: FEATURED GAMES I

GAME	MACHINE	REELS	LINES	THEME	TYPE	NOTABLE FEATURES
Heart of Vegas	Macaw Money	3 x 5	Line	Animal	Video	A 3 x 5 machine that includes an <i>Extra Wild Bonus</i> , <i>Sticky Wild Respin</i> , <i>Multipliers</i> , and up to 20 free games (image 1)
	Wonder 4: Stars	Multi-play	Line	Animal	Video	Multi-play reel set with up to four different machines. Select the machines to appear on the four reel sets (image 2)
DoubleDown Casino	Irish Shamrocks	3 x 5	Line	Holiday	Video	Pick'em feature includes 12 pots of gold that add additional credits to the bonus round total until a leprechaun is revealed (image 3)
	Ocean Magic	4 x 5	Line	Ocean	Video	<i>Wild Bubble Feature</i> adds wild bubbles randomly that may move one position in any direction during a spin (image 4)
	Captain's Fortune	4 x 5	Multi-way	Pirate	Video	Reskin of <i>Mighty Bison</i> that features three in-machine <i>Daily Challenges</i> (see Deep Dives section for details)





# ALL MACHINES: FEATURED GAMES II

GAME	MACHINE	REELS	LINES	THEME	TYPE	NOTABLE FEATURES
House of Fun	<i>Cascading Critters</i>	5 x 5	Line	Animal	Video	<i>Wild Explosion</i> shoots additional wilds to the reels after the second cascade of wins (image 1)
	<i>Hot in Rio</i>	4 x 5	Line	Cultural	Video	Three or more jackpot symbols trigger <i>Classic Star Jackpots</i> . This mechanic spins on single-line stepper machines (image 2; and New Innovations section for details)
	<i>Charming Frog</i>	3 x 5	Line	Fairy Tale	Video	Fill the meter to win a free spins bonus with the locking wilds pattern that is displayed on the fill meter (see New Innovations section for details)
	<i>Dynamite Gold</i>	3 x 5	Line	Other	Video	Free games that include a collection feature to unlock additional reel sets with full reel wilds
Caesars Slots	<i>Incredible Pan</i>	n x n	Line	Faux IP	Video	<i>Captain's Wheel Bonus</i> is a pick'em feature with a bonus wheel spin attached (see Deep Dives section for details)
	<i>Leprechaun Riches 2</i>	4 x 5	Multi-way	Holiday	Video	Collect gold symbols during free spins to convert major symbols to higher value symbols (image 3)
	<i>American Glamour 2</i>	Multi-play	Line	Retro	Video	Multi-play machine (two reel sets) with five progressive jackpots. Higher qualifying bets unlock bonus games (image 4; and New Innovations section for details)





# ALL MACHINES: FEATURED GAMES III

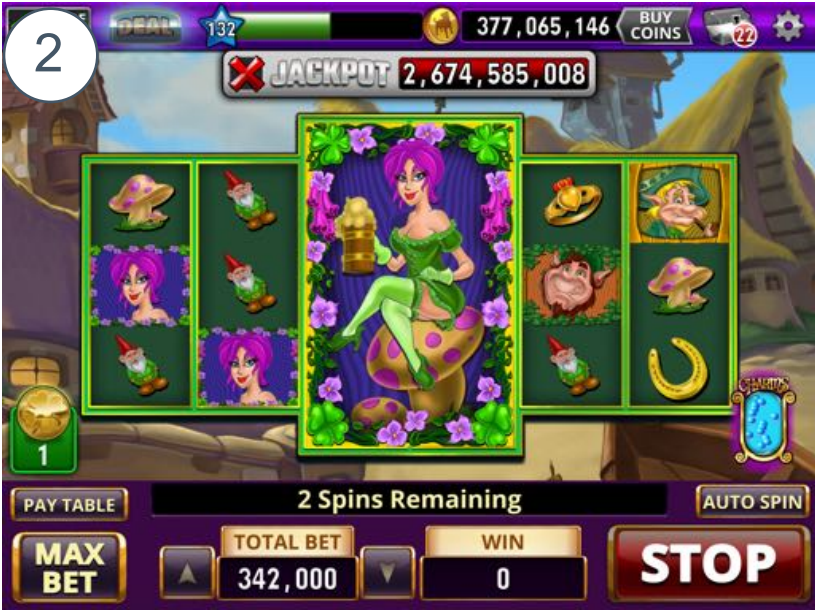
GAME	MACHINE	REELS	LINES	THEME	TYPE	NOTABLE FEATURES
Jackpot Party	<i>Raging Rhino</i>	4 x 6	Multi-way	Animal	Video	Trigger and re-trigger up to 50 free spins with x2 and x3 multiplier wilds
	<i>Twin Fire</i>	3 x 5	Line	Other	Video	Multiple progressive and stand alone jackpots. Single-line stepper machine bonus feature (see Deep Dives section for details)
	<i>VooDoo Queen</i>	Multi-matrix	Line	Mystical	Video	Multi-matrix machine with stacked symbols that transfer from the main reel set to the colossal reel set (image 1)
Slotomania	<i>Aladdin's Wheel of Wishes</i>	3 x 5	Multi-way	Fairy Tale	Video	Trigger <i>Aladdin's Bonus Wheel</i> for coin prizes, <i>Free Spin Adventures</i> , or one of four progressive jackpots (image 2)
	<i>Logan's Luck</i>	3 x 5	Line	Other	Video	Fill the meter by collecting coins to unlock the <i>Secret Room Bonus</i> , a pick'em bonus where each pick reveals a multiplier and possibly another pick (image 3)
	<i>Vegas Cash</i>	3 x 5	Line	Other	Video	<i>Money Case</i> feature has two options; free spins with additional wilds, or a respin with locking symbols that continues until no spins remain or the <i>Grand Jackpot</i> is awarded (image 4; and New Innovations section for details)





# ALL MACHINES: FEATURED GAMES IV

GAME	MACHINE	REELS	LINES	THEME	TYPE	NOTABLE FEATURES
Hit it Rich	Big Bad & Little Red	3 x 5	Line	Faux IP	Video	Collection mechanic spells 'Bonus' to trigger a u-pick for either free spins with a jackpot feature, or a pick'em bonus (image 1)
	Dublin Gold	n x n	Line	Holiday	Video	A mega symbol that fills the center two reels and triggers three respins with the mega symbol locked (image 2)
	Skechers	4 x 5	Multi-way	IP	Video	Shoe company IP machine that features stacked symbols and a free spins bonus with multiplier wilds (image 3)
	Wicked	3 x 5	Line	IP	Video	Musical-themed IP with a 'choose your bonus'; pick'em bonus with an increasing multiplier, or free spins with wild multipliers (image 4)
	Garden Kingdom	Locked	Locked	Locked	Locked	Locked





# ALL MACHINES: FEATURED GAMES V

GAME	MACHINE	REELS	LINES	THEME	TYPE	NOTABLE FEATURES
Gold Fish	China River	3 x 5	Line	Asian	Video	Multiple progressive jackpots and a <i>Free Games Bonus</i>
	Betty Boop	3 x 5	Line	IP	Video	<i>Lucky Round Wheel</i> awards respins with multipliers or one of two pick'em bonuses (image 1)
	CLUE: Confidential	4 x 5	Line	IP	Video	Three <i>Case Files</i> that land on the reels triggers a pick'em for one of three free spins features (image 2)
	Napoleon & Josephine	Locked	Locked	Locked	Locked	Locked
	Lock It Link	3 x 5	Multi-way	Other	Video	If any of the four jackpot symbols land in the same row as the triggered respin, that jackpot is awarded
Quick Hit Slots	Quick Hit: Volcano	3 x 5	Line	Other	Video	Pick'em bonus to match three of any number of free spins bonus rounds that feature 7 - 15 spins (image 3)
Hot Shot Casino	Heavenly Riches	3 x 5	Line	Asian	Video	A <i>Red Envelope Jackpot</i> is awarded when envelopes appear on both reels 1 and 5
	Cash Wizard	3 x 5	Line	Mystical	Video	<i>Magic Potions</i> pick'em bonus with a feature to continue picking or risk current win (image 4)





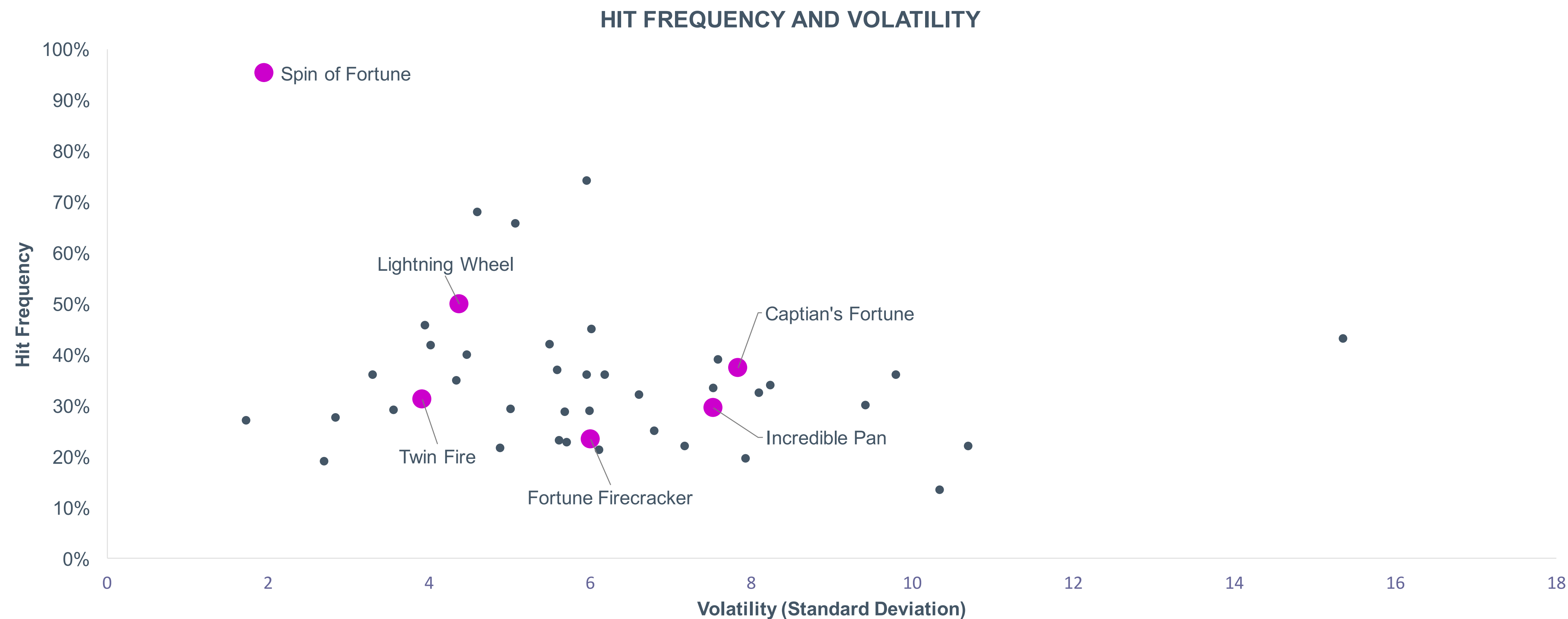
# DEEP DIVES

- *Spin of Fortune* – Slot Bonanza
- *Twin Fire* – Jackpot Party
- *Lightning Wheel* – Big Fish Casino
- *Captain's Fortune* – DoubleDown Casino
- *Fortune Firecracker* – Heart of Vegas
- *Incredible Pan* – Caesars Slots



# HIT FREQUENCY AND VOLATILITY

The outlier is Slot Bonanza's *Spin of Fortune* with a very high hit frequency and low volatility. Big Fish Casino's *Lightning Wheel* had two jackpots hit that were removed from the calculations below (including jackpots, volatility would have been 66)



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



# SPIN OF FORTUNE

Slot Bonanza's *Spin of Fortune* uses secondary currency, a collection mechanic, various bonus games, and the *Giant Wheel of Fortune*

- A notification appears announcing a 'Luxury Experience' to bet and win black diamonds upon machine-entry (image 1).
- A large wheel sits on top of a 3 x 5 reel set with a fill meter on the left side (image 2).
- The wheel above spins with every spin of the reels. The wheel awards additional *Black Diamonds*, free spins, and 'Bonus' symbols to be added to the reels (image 3).
- During play, the 'Spin of Fortune' symbols are collected to fill the meter (image 4).
- Once the meter is filled, the *Giant Wheel of Fortune* drops down and spins (image 5).
- Any time three 'Bonus' symbols appear on the reels, a bonus will trigger. Four symbols multiplies all bonus wins by two and five symbols by three (image 6).
- When the bonus is triggered, players are given the option to pick a 'Quick' or 'Classic' bonus. Once picked, a bonus game in that category is randomly awarded (image 7).
  - Most of Slot Bonanza's machines award the same bonus game options.
  - The bonuses are mostly skill-based.
- Free spins are awarded when three or more 'Scatter' symbols appear on the reels with a x2 multiplier for all wins (image 8).



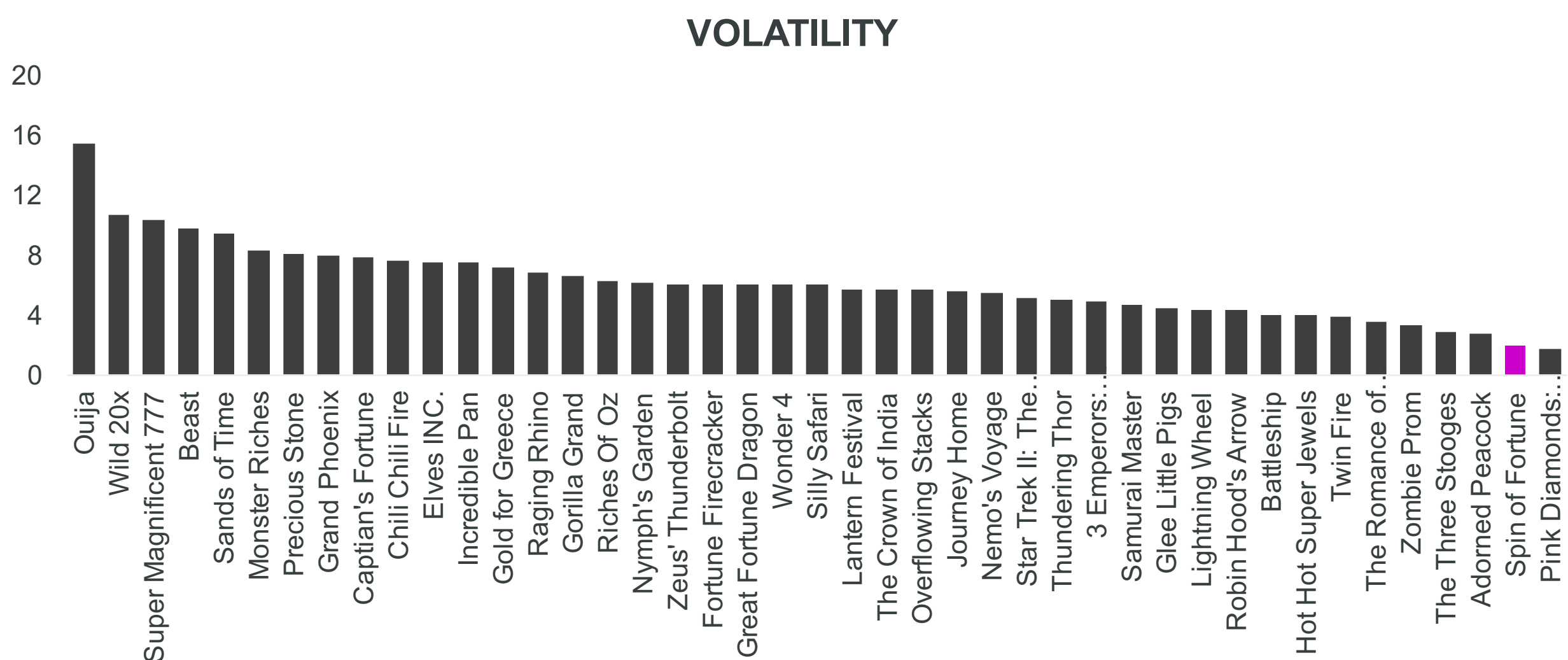
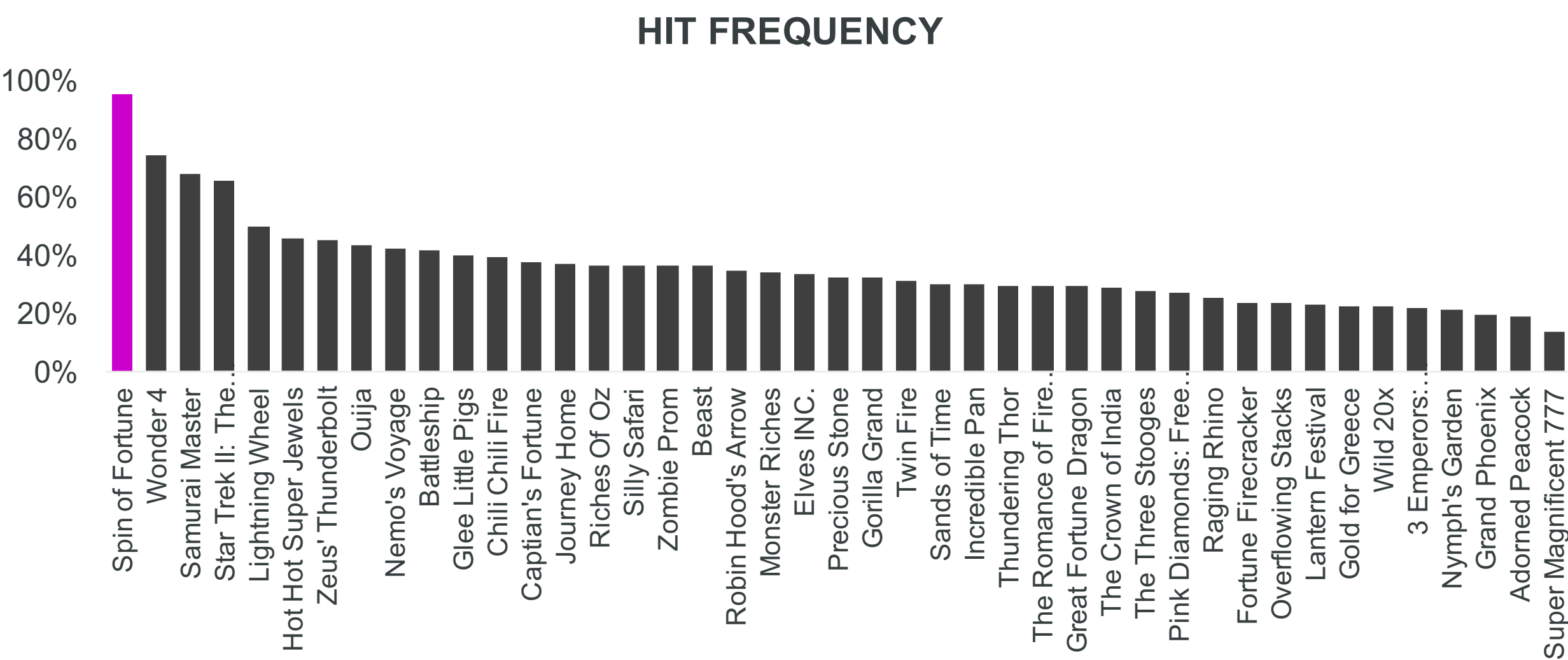


# SPIN OF FORTUNE STATS

Slot Bonanza’s *Spin of Fortune* has the highest hit frequency and second lowest volatility

Game play <sup>I</sup>	
Hit frequency	95%
Volatility	2.0
Spins until a bonus	31
Distribution of RTP as % of total RTP <sup>II</sup>	
Base game	83%
Bonus game	17%
RTP range <sup>III</sup>	
Minimum range	93%
Median	96%
Maximum range	99%

<sup>I</sup> Volatility is based on the standard deviation of the 10,000 payouts from this machine  
<sup>II</sup> The distribution of RTP equals the RTP of the base or bonus game over the total RTP  
<sup>III</sup> RTP range is 90% confidence with 10K spins. More info on this process is in the Appendix





# TWIN FIRE

Jackpot Party's *Twin Fire* triggers a one-line stepper machine during bonus, contains both *Quick Hit* and *Hot Shot* features, and a *Jackpot Tower Bonus*

- At machine-entry, three progressive jackpots are displayed above a 3 x 5 reel set (image 1).
- During play, 'Quick Hit' symbols are paid as scatters. Three symbols pay x50 the payline, up to a jackpot amount of x75,000 for nine symbols (image 2).
- Five *Hot Shot* stepper machines may appear on the reels during play. Three or more that land triggers the *Hot Shot Bonus* (image 3).
- Once triggered, players are awarded one spin on each of the one-line stepper machines triggered (image 4).
- Players are awarded 12 free spins when two 'Bonus' and one 'Free Spins' symbol land on reels 2, 3, and 4 (image 5).
- Two 'Bonus' and one 'Jackpot' symbol landing on reels 2, 3, and 4 trigger the *Jackpot Tower Bonus* (image 6).
- In the *Jackpot Tower Bonus*, players are presented with a tower of prize amounts and two flaming balls to choose from (image 7).
- Each selection reveals advancement of one to four levels of the tower with another pick, or 'Collect'. Players are awarded the prize amount displayed in the active tower window when 'Collect' is revealed (image 8).

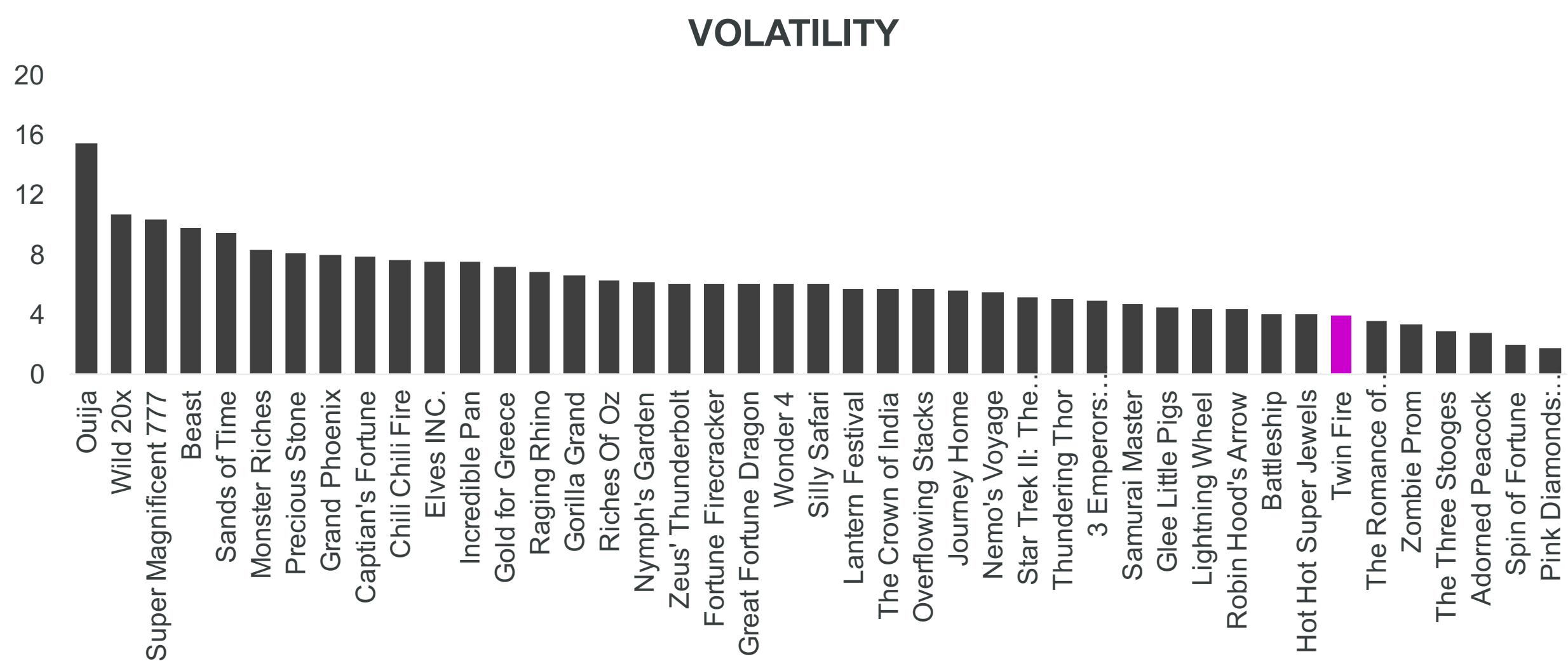
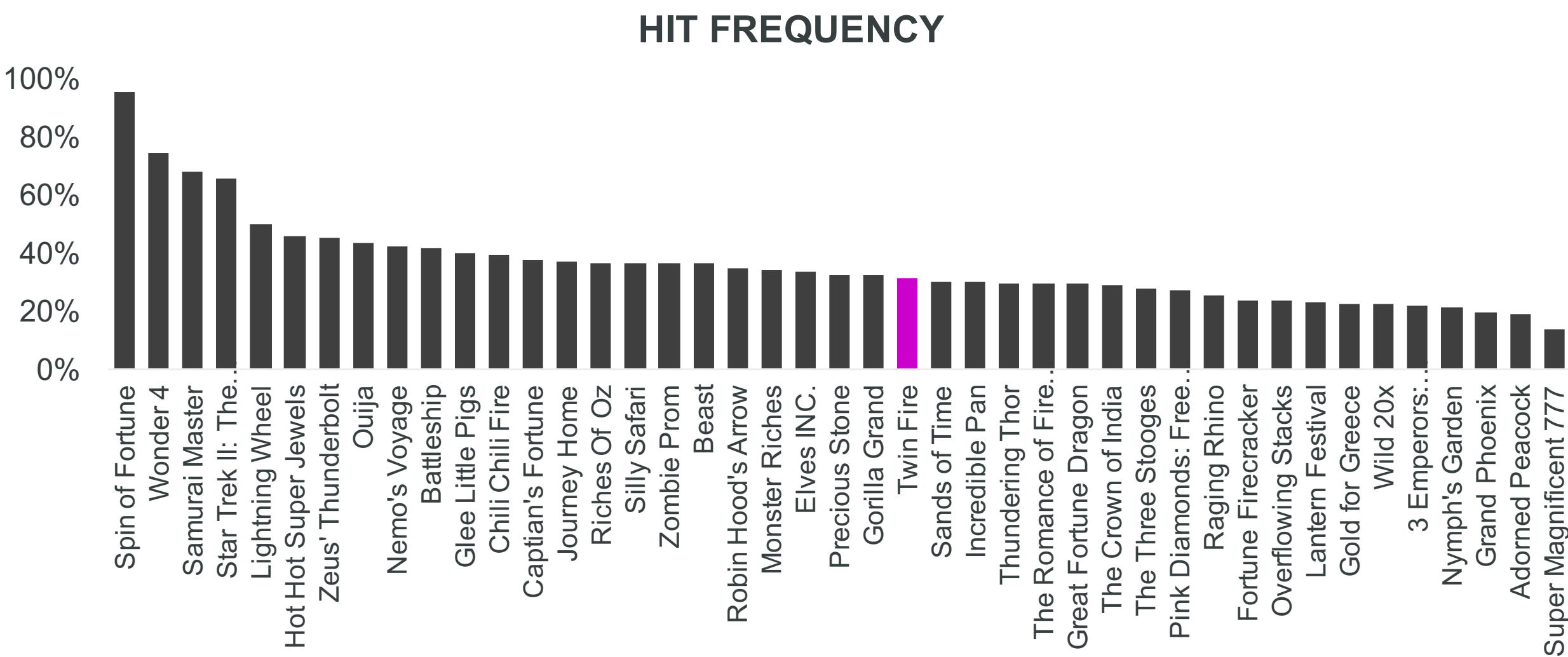




# TWIN FIRE STATS

Jackpot Party’s *Twin Fire* has average hit frequency and low volatility

Game play	
Hit frequency	31%
Volatility	3.9
Spins until a bonus	27
Distribution of RTP as % of total RTP	
Base game	54%
Bonus game	46%
RTP range	
Minimum range	68%
Median	75%
Maximum range	81%

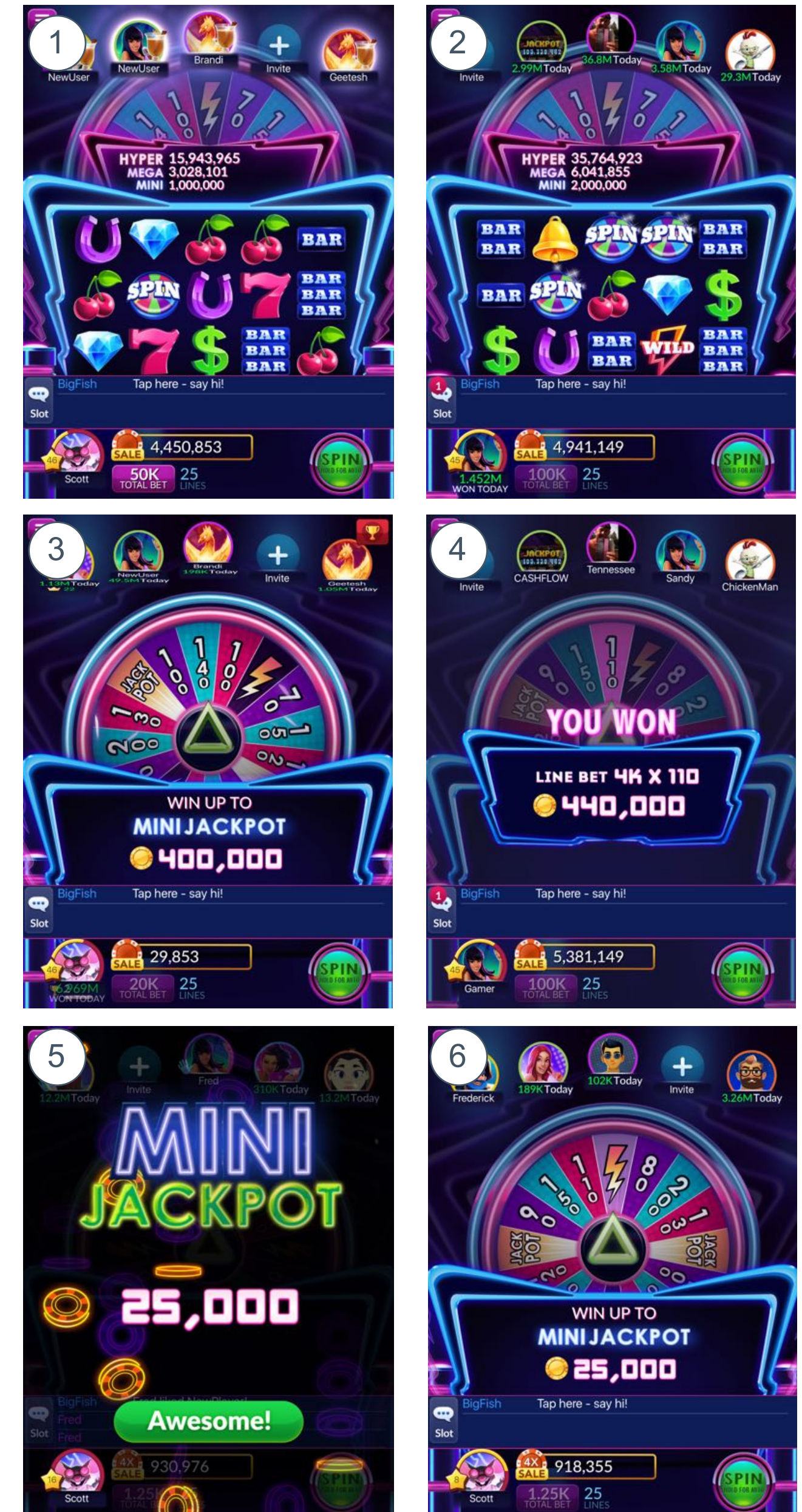




# LIGHTNING WHEEL

Big Fish Casino's *Lightning Wheel* features an upgradable *Lightning Wheel* with two progressive jackpots and one stand alone jackpot

- In this machine, a large wheel with two progressive jackpots and one stand alone jackpot is initially displayed above a 3 x 5 reel set (image 1).
  - Progressive jackpot: this type of jackpot increases based on contributions from a combined pool of players' bets
  - Stand alone jackpot: this type of jackpot does not increase and is based on the bet of a single player
- Three wheel symbols that land on reels 2, 3, or 4 trigger a spin on the *Lightning Wheel* (image 2).
- When the *Lightning Wheel* is triggered, the wheel drops down and displays the jackpot amount that may be won in that spin (image 3).
- When the wheel stops on a prize amount, that amount is multiplied by the bet-per-line and paid to the player (image 4).
- If the wheel stops on one of two 'Jackpot' wedges, the jackpot amount available is awarded (image 5).
- To upgrade the wheel for a bigger prize and jackpot amounts, the wheel must land on one of two 'Lightning Bolt' wedges (image 6).
- Once the wheel amounts and jackpots are upgraded, the wheel spins again. Landing on a 'Jackpot' space after one upgrade awards the *Mega Jackpot*, and the *Hyper Jackpot* is awarded after two upgrades.



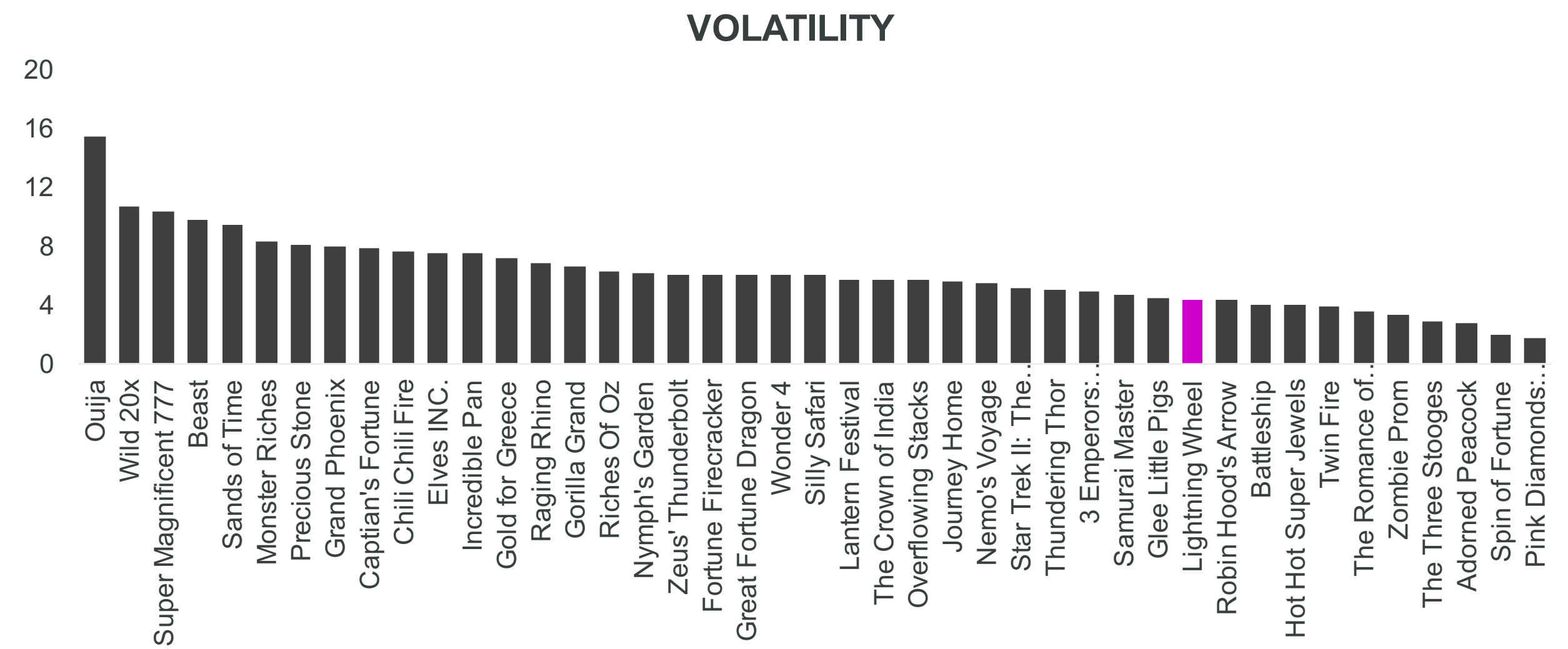
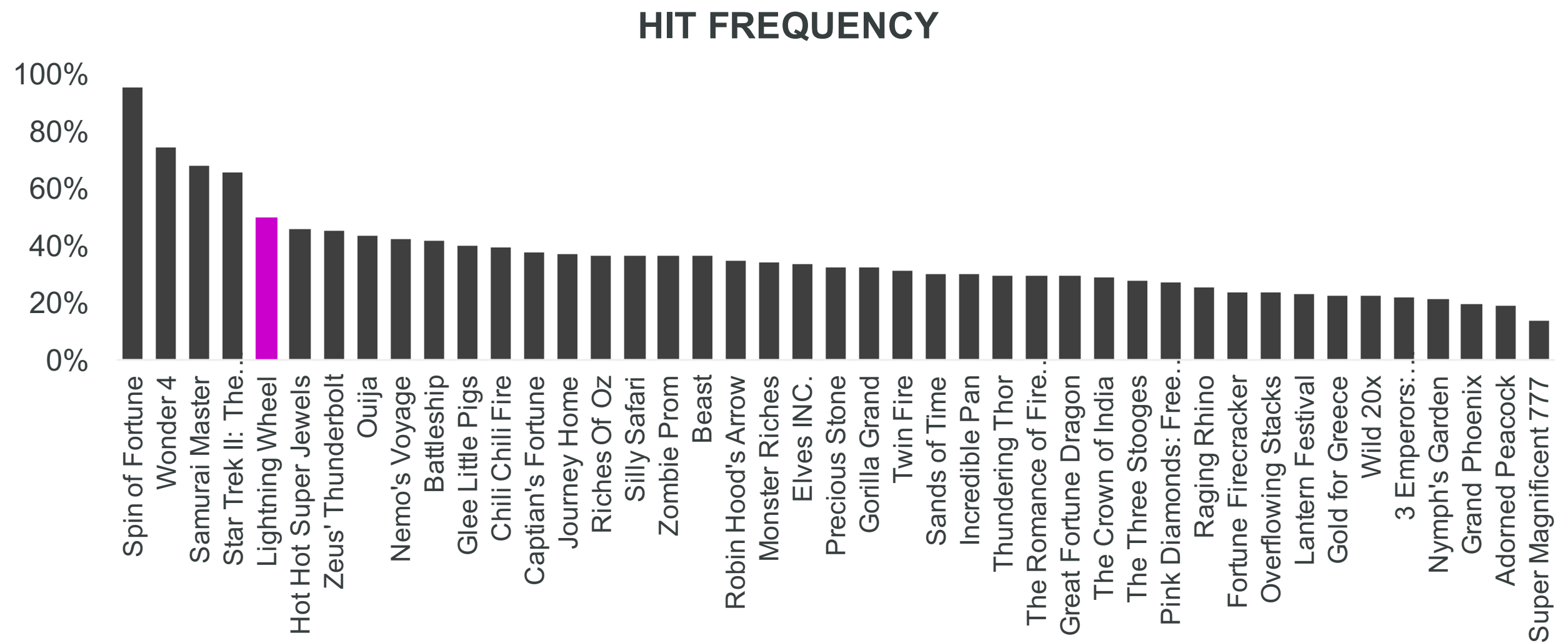


# LIGHTNING WHEEL STATS

Big Fish Casino's *Lightning Wheel* has high hit frequency and below average volatility (66 volatility including jackpots)

Game play	
Hit frequency	50%
Volatility	4.4
Spins until a bonus	41
Distribution of RTP as % of total RTP	
Base game	75%
Bonus game	25%
RTP range	
Minimum range	96%
Median	103%
Maximum range	110%
Jackpots <sup>1</sup>	
Number of jackpots	2
Multiple of bet	3.6K, 1.6K

<sup>1</sup> Jackpots are payouts equal to or larger than 1,000x the bet





# CAPTAIN'S FORTUNE

DoubleDown Casino's *Captain's Fortune* is a reskin of *Mighty Bison*. The machine includes *Daily Challenges* and a *Multiplier Wilds* feature

- The *Daily Challenges* dialogue appears upon machine-entry (image 1).
- The *Daily Challenges* icon and fill meter are visible below a 4 x 5 reel set (image 2).
- Each day, three collection challenges are available for coin prizes. Completing one challenge unlocks the next (image 3).
- Once all *Daily Challenges* are complete for the bet level, players must either change their bet or wait a day to receive another challenge (image 4).
- Wilds may convert into x2 or x3 multipliers on any spin with additional x4 and x5 wilds available in the free games (image 5).
- Two or more wilds landing on the reels may trigger the *Multiplier Wilds* feature in the base game or free game play. When triggered, all wins are multiplied by all multiplier wilds that appear on the screen (image 6).
- *Free Games* are triggered when three or more bonus symbols land (image 7).
- Additional *Free Games* are awarded when two or more bonus symbols hit (image 8).

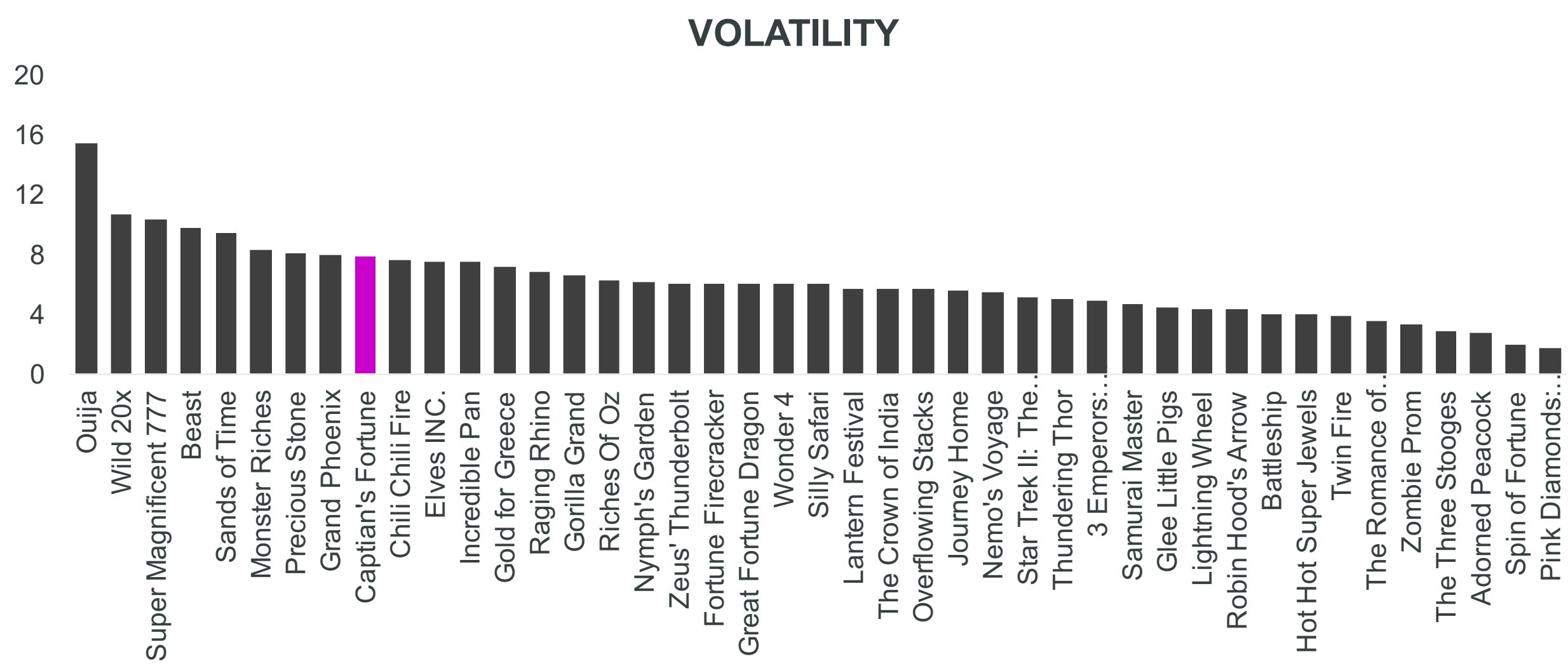
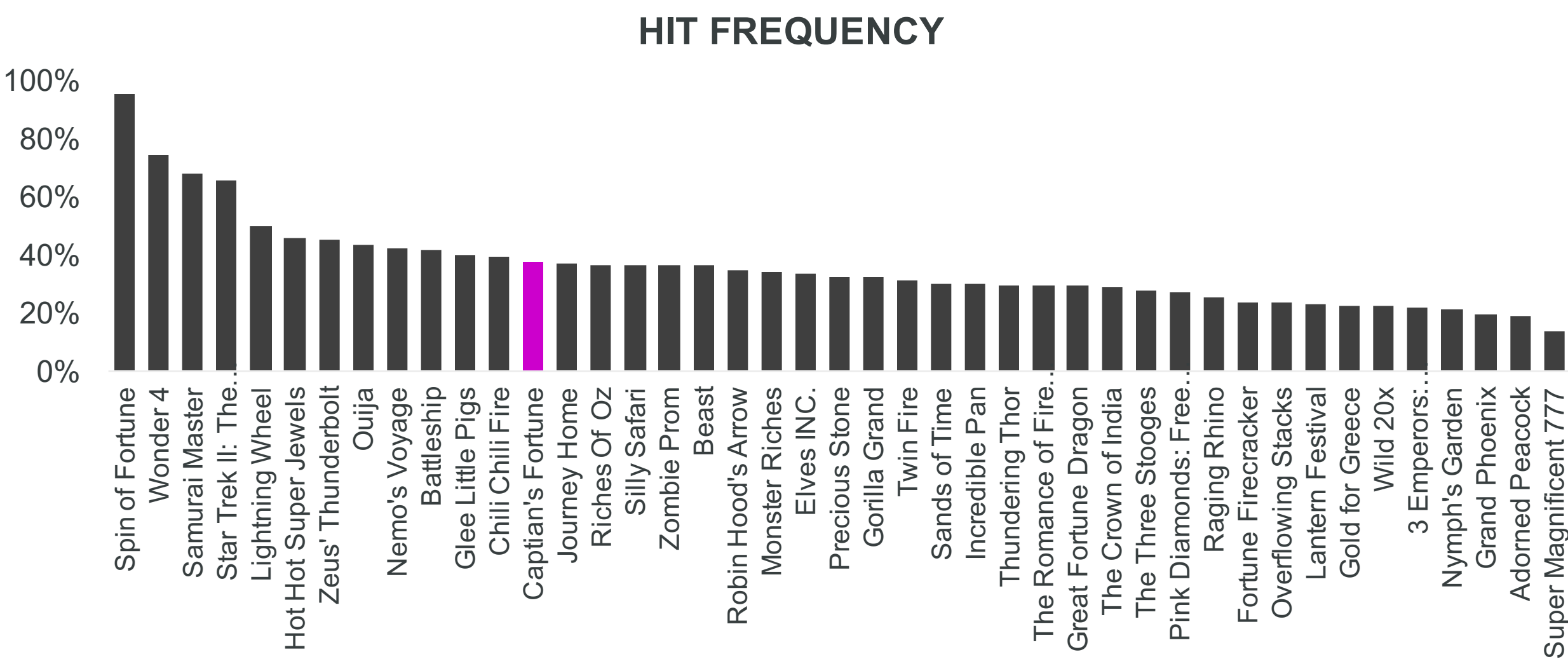




# CAPTAIN'S FORTUNE STATS

DoubleDown Casino's *Captain Fortune* has above average hit frequency and volatility

Game play	
Hit frequency	37%
Volatility	7.8
Spins until a bonus	90
Distribution of RTP as % of total RTP	
Base game	66%
Bonus game	34%
RTP range	
Minimum range	73%
Median	86%
Maximum range	99%





# FORTUNE FIRECRACKER

Hearts of Vegas' *Fortune Firecracker* is a reskin of *More Chili*. The machine features *Mega Pay* free games with a collection feature for multiple reel sets and full reel wilds

- This machine was originally released as *More Chili*, reskinned as *More Hearts*, and then released as *Fortune Firecracker*.
- *Fortune Firecracker* is a 3 x 5 reel set with 25 lines (image 1).
- Three or more 'Firecracker' symbols trigger the *Mega Pay* free games feature (image 2).
- Players select the 'Spin' button to start the feature (image 3).
- The *Mega Pay* feature awards 15 free games and begins with two 3 x 5 reel sets. There is also a collection mechanic for additional reel sets (image 4).
- Collecting 9 to 13 symbols adds a third reel set with one wild reel. Collecting 14 to 29 symbols adds a fourth reel set with two wild reels (image 5).
- Once all four reels are active, players may collect 30 or more symbols to add a third full reel wild to all reel sets (image 6).
- *Mega Pay* cannot be retrigged (image 7).
- Anytime during base game play, the free games feature may trigger randomly and a 'You Are Lucky' dialogue appears (image 8).

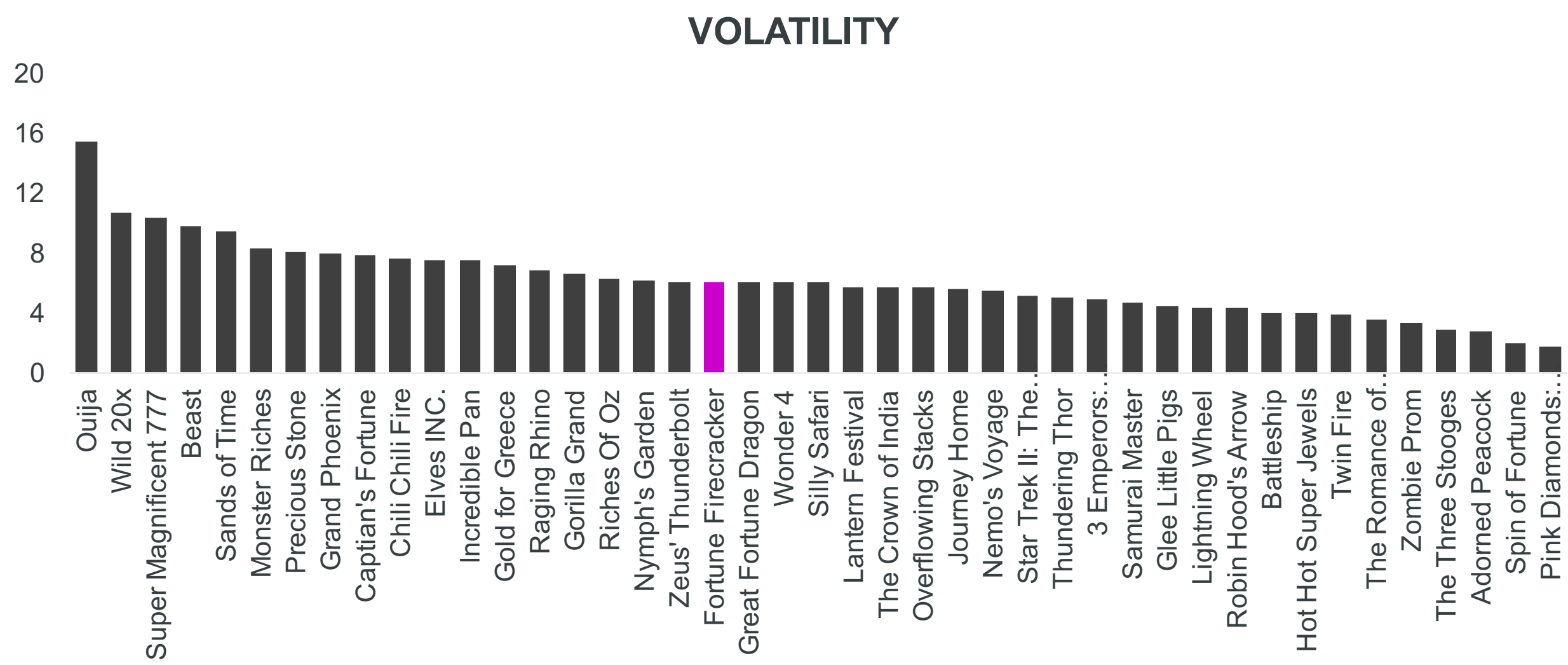
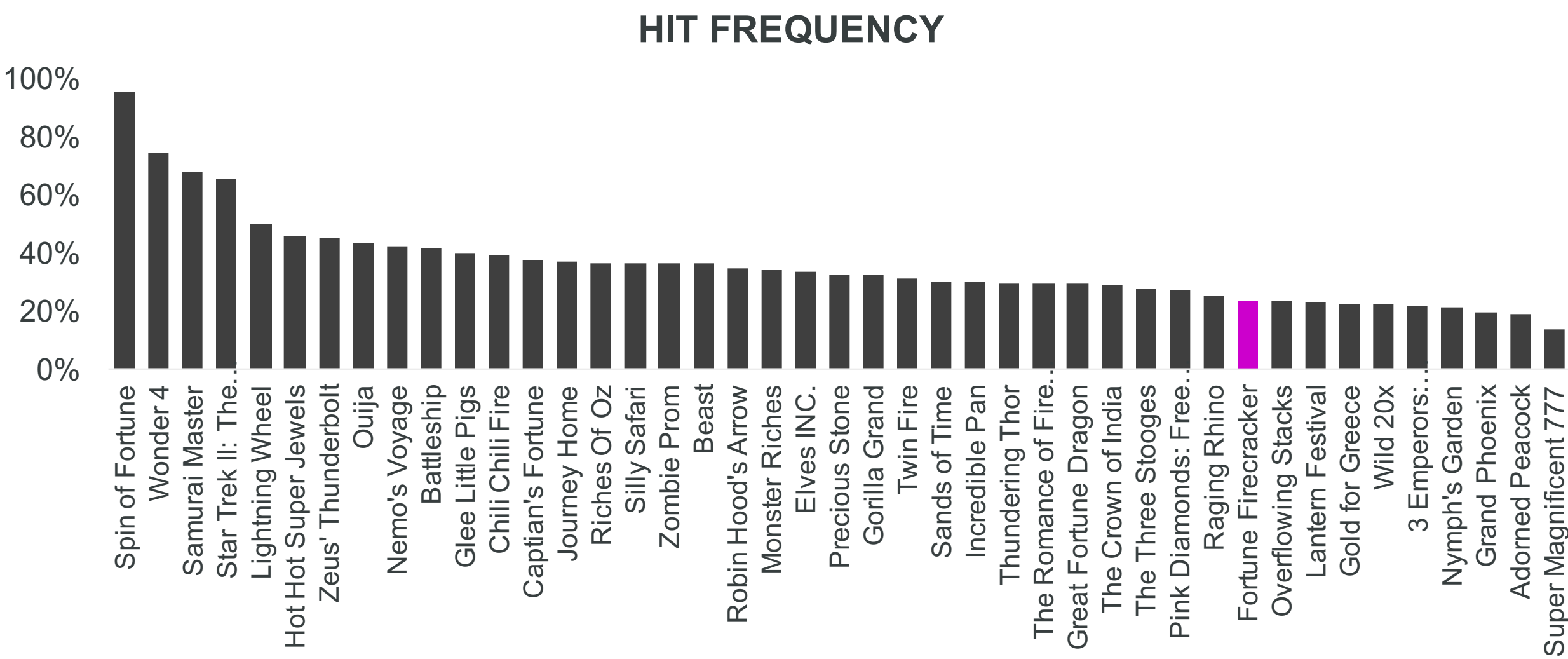




# FORTUNE FIRECRACKER STATS

Heart of Vegas’ *Fortune Firecracker* has below average hit frequency and average volatility

Game play	
Hit frequency	23%
Volatility	6.0
Spins until a bonus	132
Distribution of RTP as % of total RTP	
Base game	54%
Bonus game	46%
RTP range	
Minimum range	59%
Median	69%
Maximum range	79%

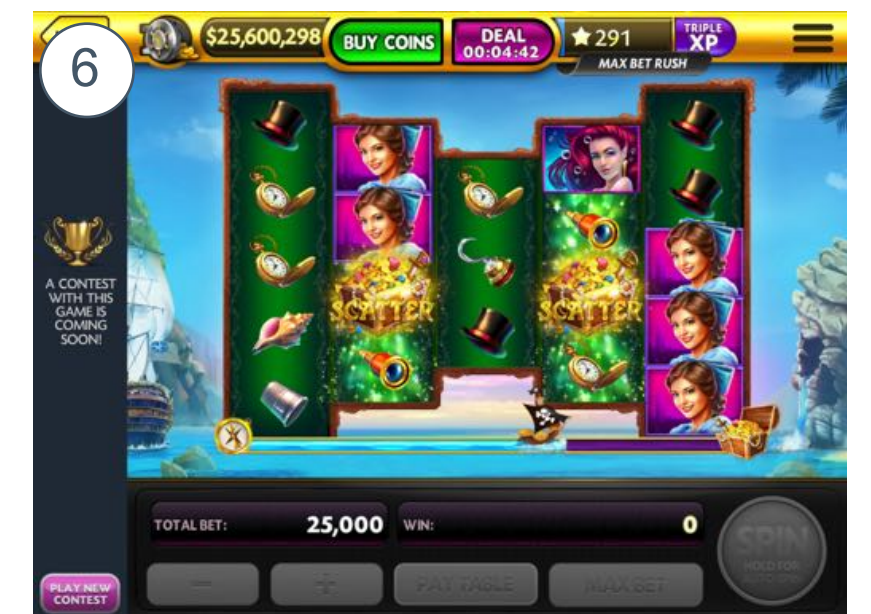




# INCREDIBLE PAN

Caesars Slots' *Incredible Pan* features a collection mechanic to open a map, a *Captain's Wheel Bonus*, and surprise features

- At machine-entry, a 5, 4, 3, 4, 5 reel set is displayed above a fill meter (image 1).
- Players must collect 100 compasses to open the map (image 2).
- Every step along the map awards credit prizes or the *Captain's Wheel Bonus* (image 3).
- The *Captain's Wheel Bonus* displays a large wheel with eight coins to choose from. Each pick may reveal a 'Boost' of credits, another prize pointer, or a spin (image 4).
- Players continue picking until 'Spin' is revealed, triggering the wheel to spin (image 5).
- Eight free spins are awarded when scatter symbols appear on reels 2 or 4 (images 6 and 7).
- Any time during play, the center reel may fill with a tall 'Pan' symbol. This triggers a *Pan's Surprise* and either 'Tinker' adds additional wilds or a respin is triggered (image 8).

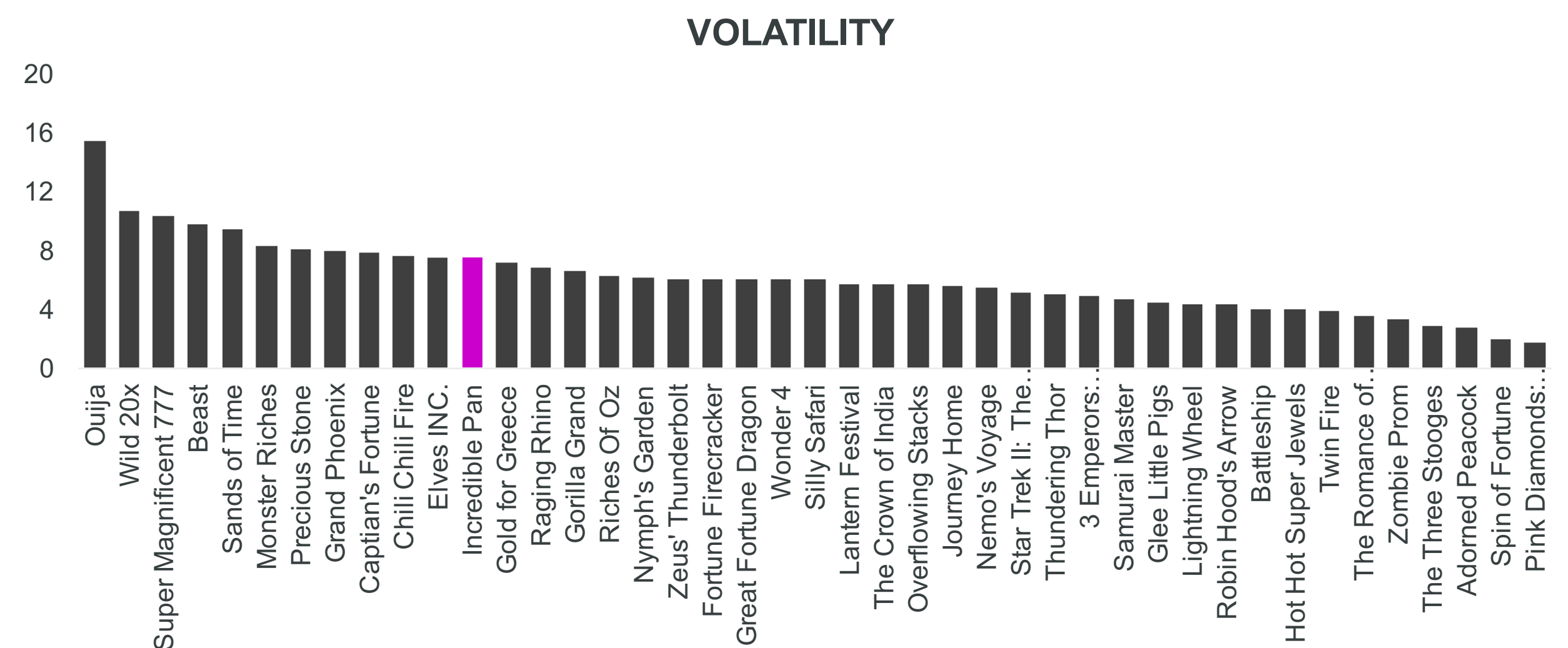
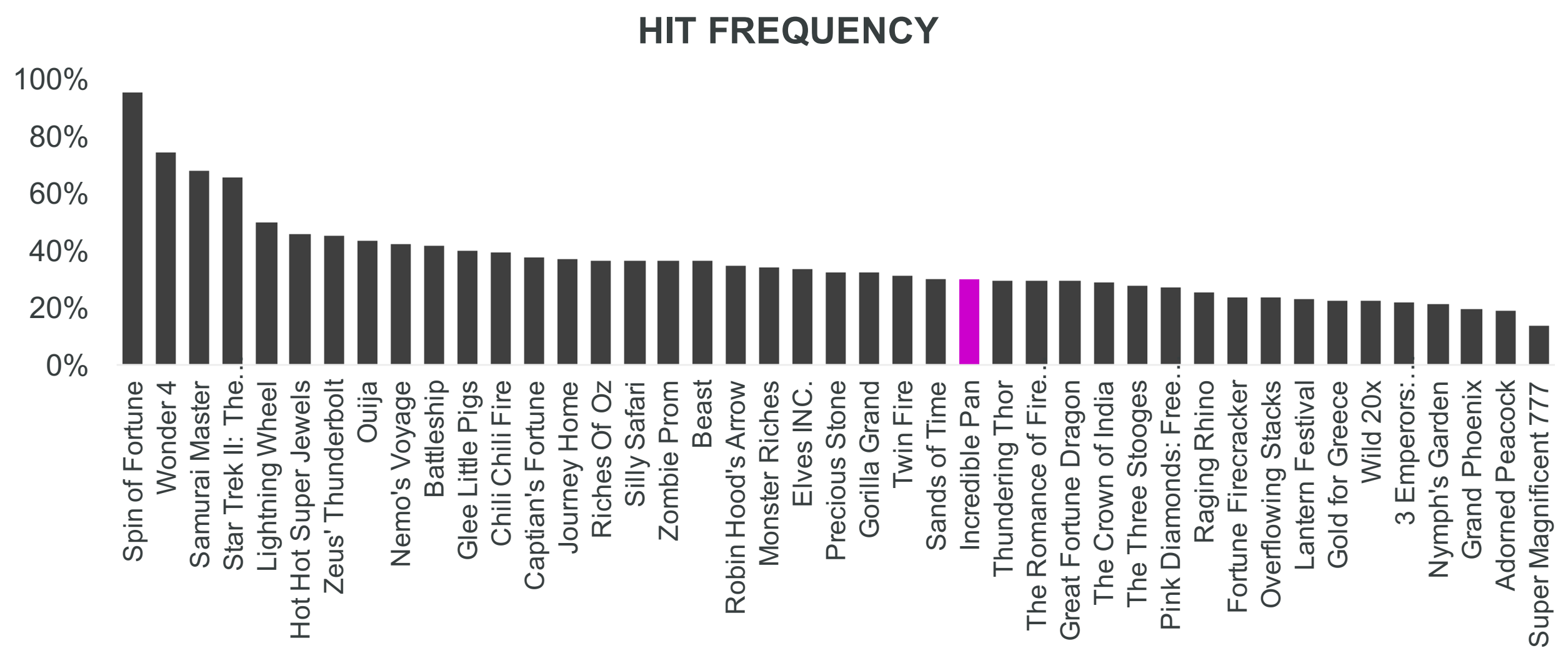




# INCREDIBLE PAN STATS

Caesars Slots’ *Incredible Pan* has average hit frequency and above average volatility

Game play	
Hit frequency	30%
Volatility	7.5
Spins until a bonus	78
Distribution of RTP as % of total RTP	
Base game	58%
Bonus game	42%
RTP range	
Minimum range	80%
Median	92%
Maximum range	105%





# 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  $\pm$  (standard error)  $\times$  (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%  $\pm$  (1.65  $\times$  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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