- We are going to look at data from a bitcoin betting game called bustabit and try to categorise the betting patterns of players.

- It's a very simple game:
    - choose how much you want to stake (in bits, 1 millionth of a bitcoin)
    - watch the multiplier go up
    - at any point you can cash out, and get your stake multiplied by that amount
    - but at any point the game could bust, and you lose your stake
    - to maintain the house edge, in 1/100 games everyone will bust
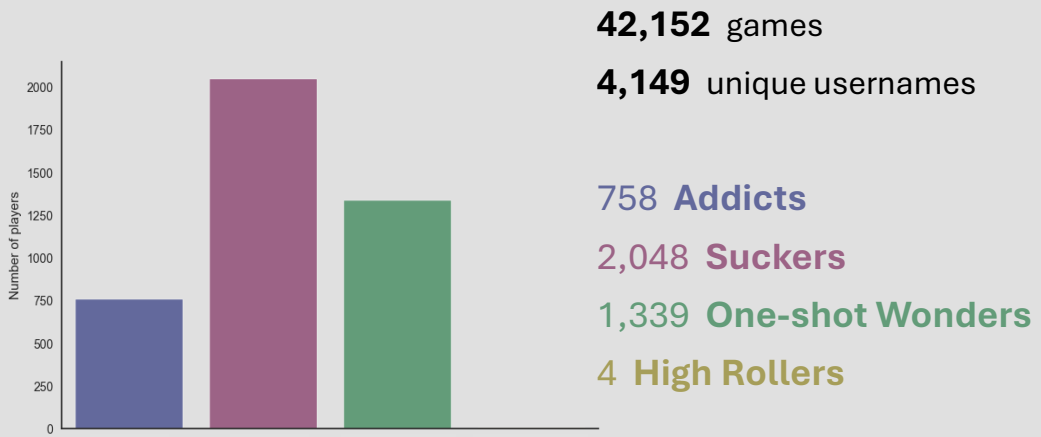
- What data do we have?
    - each row is an individual user's outcome in a particular game
    - 1.5 month period in 2016, end of October to mid December. For those who care, BTC was trading $700-775 back then
- interesting to see if there are any patterns that reveal what type of player you are, for example:
    - do you have a high risk tolerance, the Midas touch, or perhaps a tendency to rage quit?

Player Groups – KMeans clustering

42,152 games

4,149 unique usernames

758 **Addicts**

2,048 **Suckers**

1,339 **One-shot Wonders**

4 **High Rollers**

- In this short time period we have just over 42k unique games, involving 4k unique users
- Using KMeans clustering algorithm, we have put the players into 4 categories
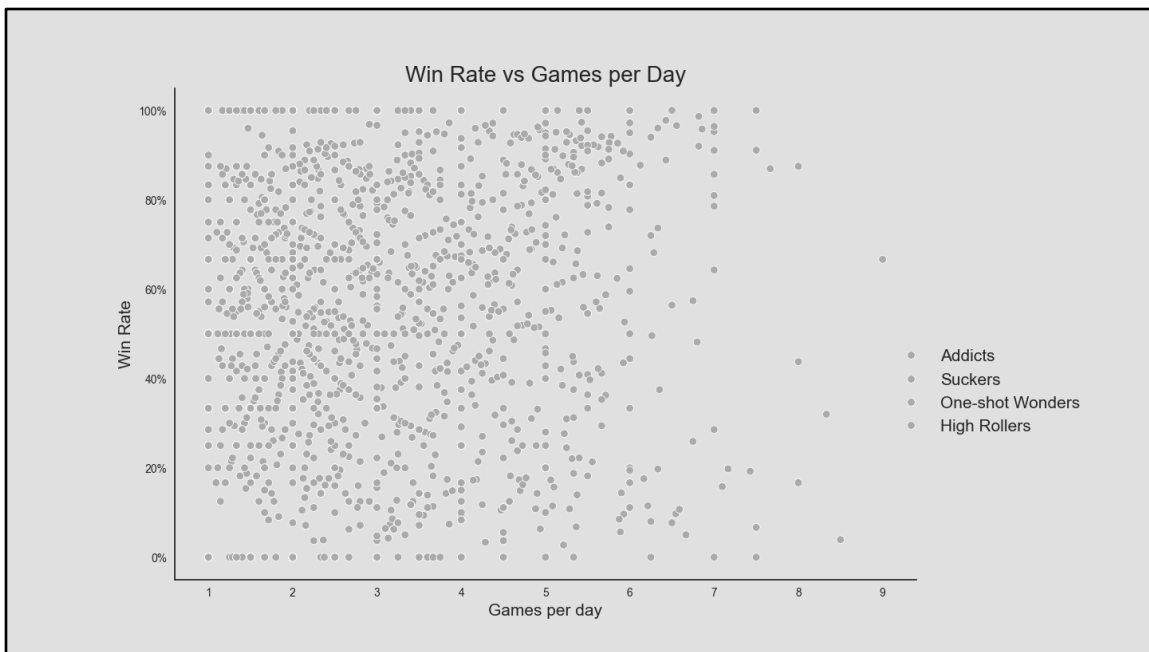
Using the KMeans algorithm was extremely useful, as it's pretty hard to see clear patterns from the data.

This chart is one example of two key features from Principal Component Analysis plotted against each other – we have average games played per day on the bottom, and the overall win rate on the left – but without clustering it is very difficult to see any patterns here.
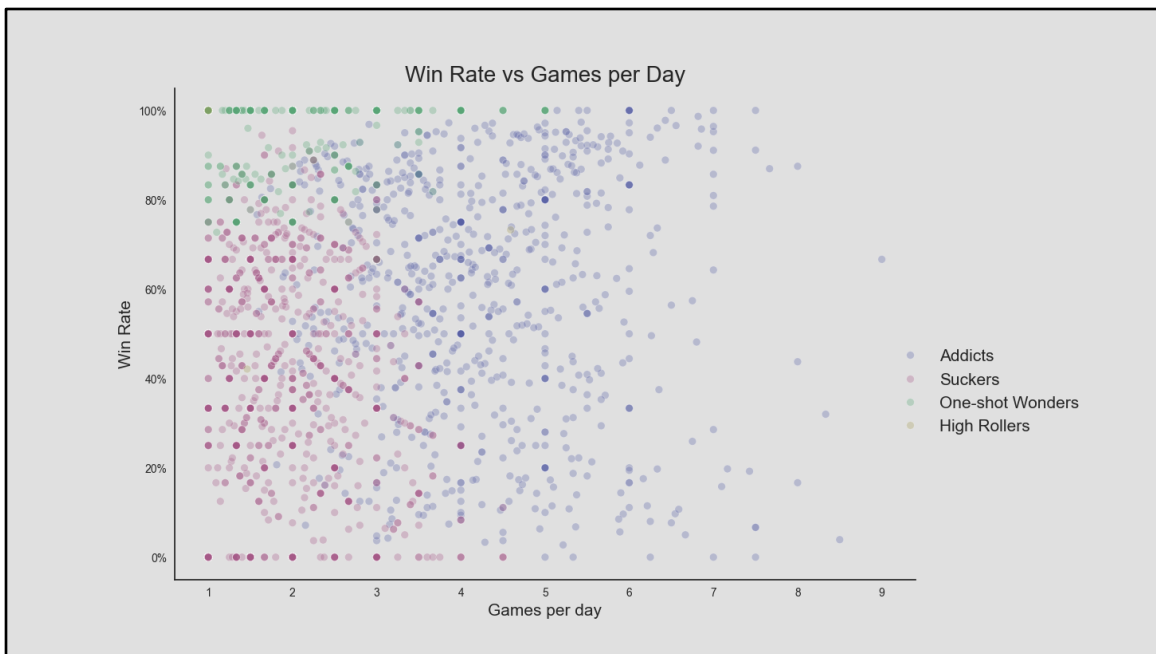
At first, the clustering results may not appear to be much clearer, but we can start to see some patterns emerging even here...

Win Rate vs Games per Day
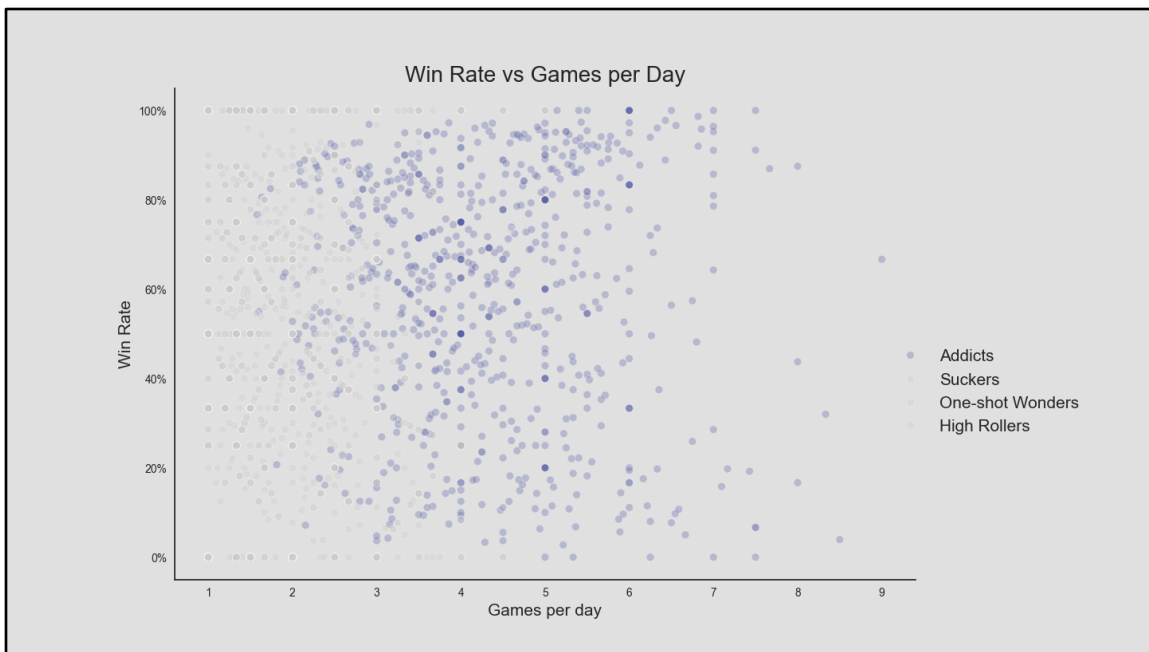
Addicts are on the right of this chart – they play a lot – with a wide range of success rates...

Win Rate vs Games per Day
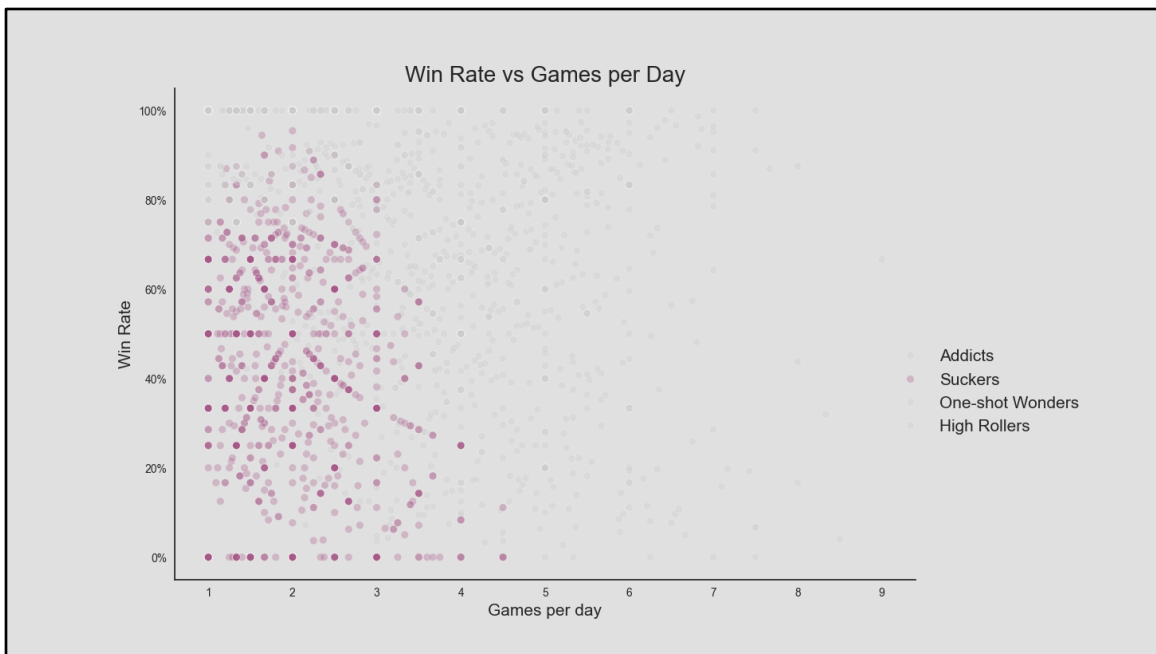
... the Suckers are in the lower left – low down because they don't do very well, and left as they play less than the addicts, unsurprisingly...

Win Rate vs Games per Day
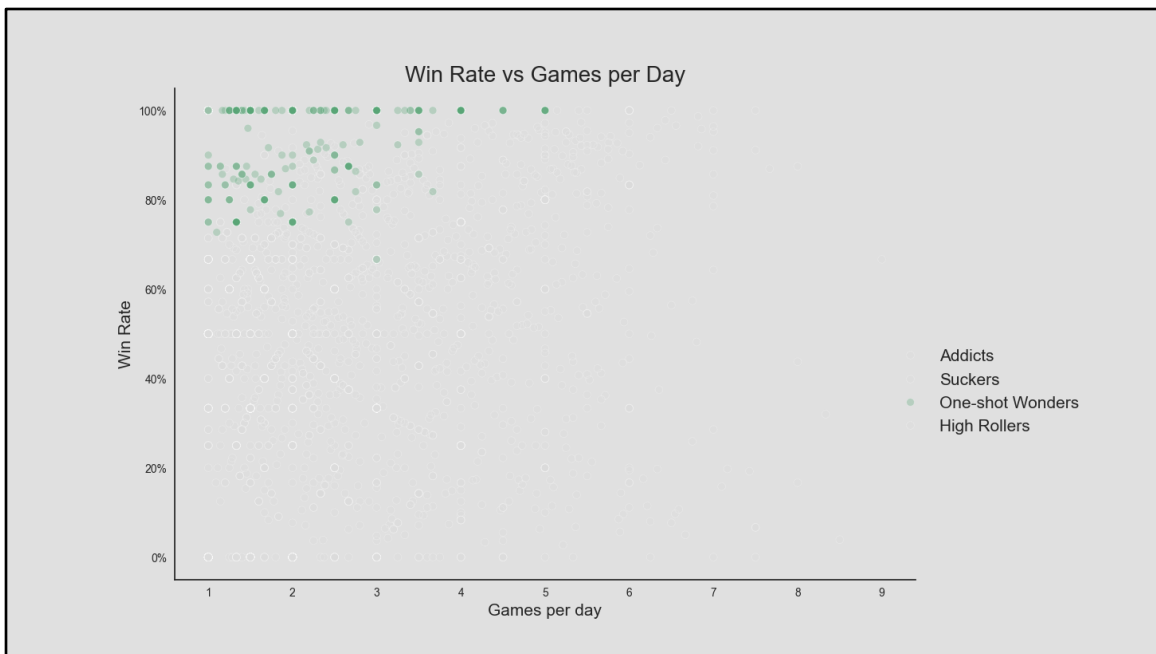
... and the One-shot Wonders are congregated in the top left – they don't play many games, and they don't need to because they usually win.

The High Rollers aren't really visible as there are only 4 of them, but we'll come back to them a bit later.

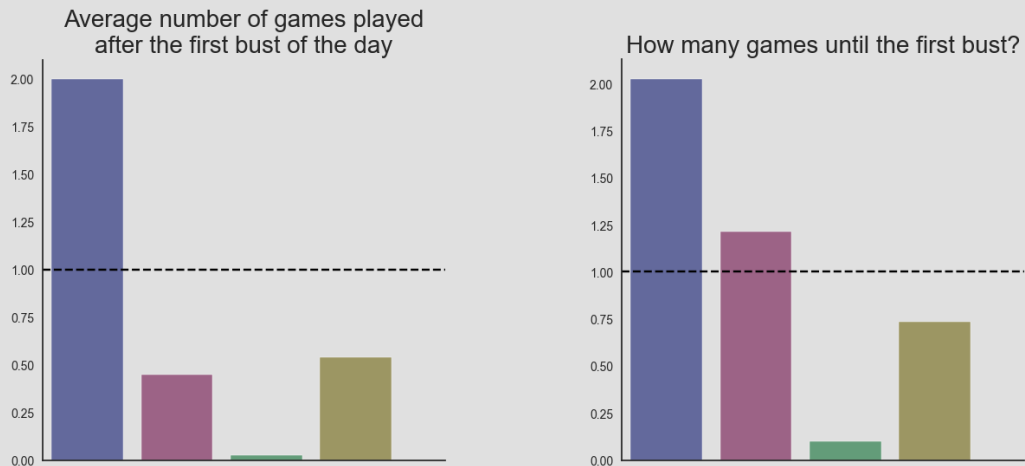For now let's look a bit deeper into these categories...

Addicts – they love to play…

Average number of games played over the period
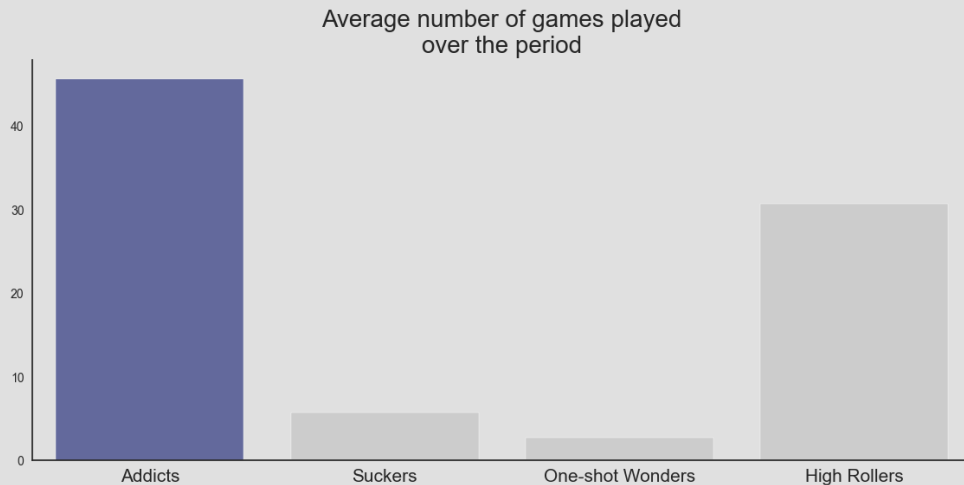
Starting with the Addicts:
- The most obvious sign of an addict, and one the biggest factors from Principal Component Analysis – how many games did they play over the period?
- The High Rollers bar is dragged higher by one of the four players, who played 101 times.
- As we can see, the Addicts category play way more than everyone else.

... and they keep coming back for more

Average number of games played after the first bust of the day

How many games until the first bust?

Not only that, but another classic sign of addiction – when they bust, they keep playing:
- On the left we can see how many games they play after the first bust of a playing session – addicts will keep going back to the well, while in the other categories the majority of players don't even play 1 more game, they give up straight away.
- And this is despite the fact that on average it takes longer for the addicts to bust (on the right).

Suckers – a chart says a 1000 words

Win Rate
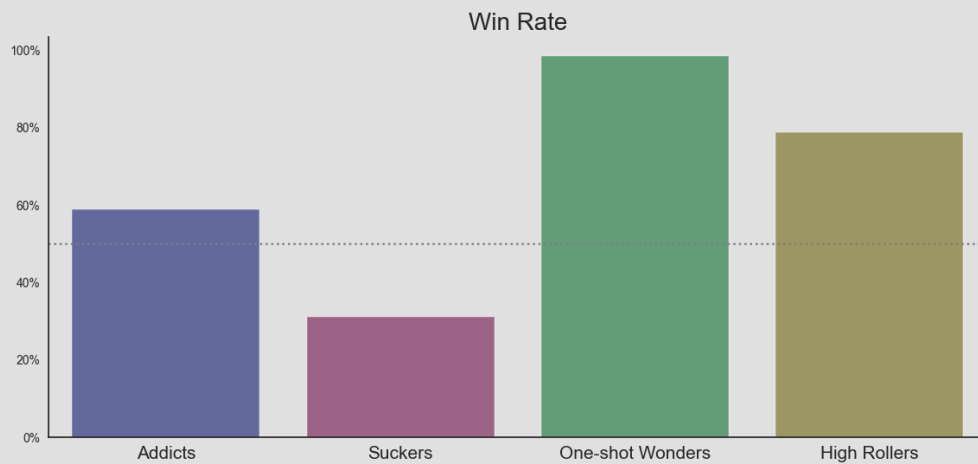
- The Suckers are the only group below the magic 50% success rate, meaning a key characteristic is that they lose more than they win...

Best at something?

Average bust multiplier
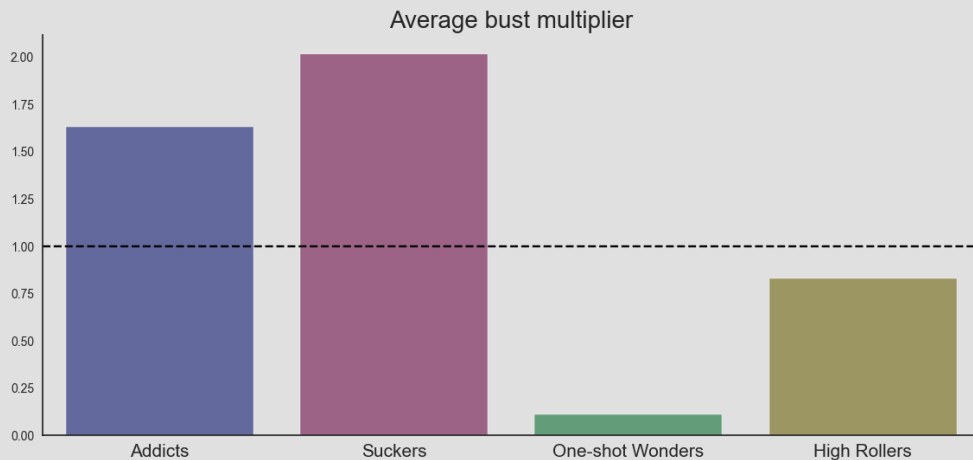
... and here were see the Average Bust Multiplier – what the end multiplier was ONLY for the cases where the users lost:
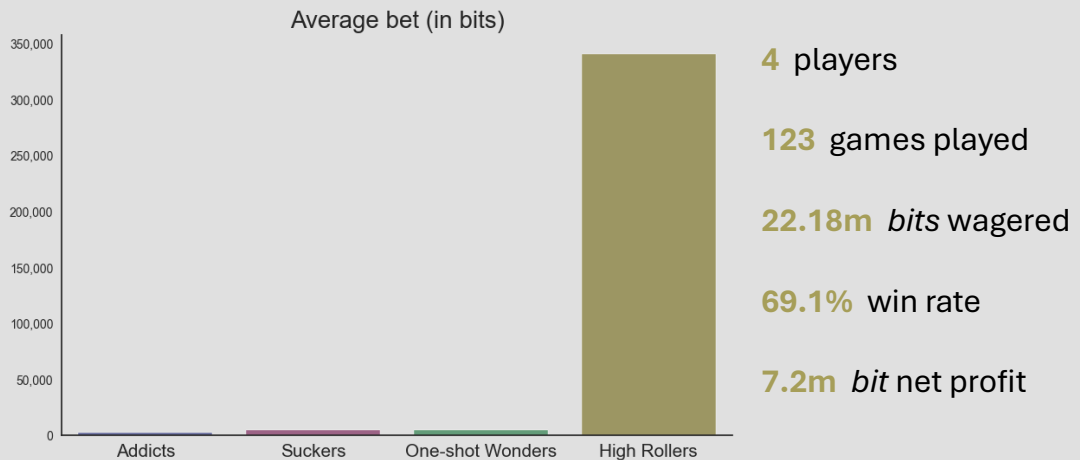- The game starts at 1x, which is this dotted line. If a player never lost, their score is 0 – so for the categories below the line, they had enough players that never lost to drag down the average.

- What does this mean for the Suckers? It shows that on average, they waited the longest before they lost.

- So it's not that the Suckers are unlucky per se, they just generally suck at this game.

One-shot Wonders – in the name

Average number of games played over the period

Win Rate
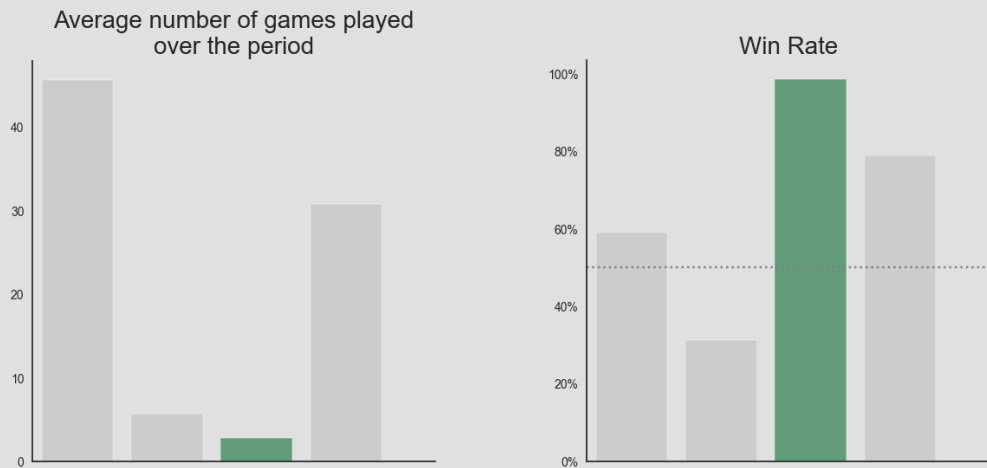
One-shot Wonders – it's in the name. They play very little, but have a very high-success rate.

High Rollers – there's only one thing that counts

Average bet (in bits)

4 players

123 games played

22.18m *bits* wagered

69.1% win rate

7.2m *bit* net profit

Now to the High Rollers – where could they show up in the data? Average bet size – everyone else is basically playing for chicken feed in comparison.

There are only 4 players in this category, so let's have a look at how they did... 22.18m bits = $16k (2016 price), $1.5m (today's price).