# Making Money on Scratch Tickets—The Impact of Prize Structures

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## Motivation



## Our Questions:

- ► Is a given game worth playing?
- ▶ If not, how likely is it that it will become worth playing?

## Instant Tickets

- ► Games are played once
- ► Each game never resets
- ▶ Randomness is limited to location of tickets

# An Example:

# **SAPPHIRE 7S**





VISIT VILOTTERY.COM FOR A 2ND CHANCE TO WIN

VERMONT LOTTERY

### **TOP PRIZE \$7,777**

Game # **1522** 

Ticket Price \$5

Start Date **08/02/2019**Overall Odds **1:4.50** 

#### **UNCLAIMED TOP PRIZES**

\$7,777 **1** \$1.000 **13** 

\$700 **26** 

# Of Tickets 420,000

% of Tickets Sold 70

Total Unclaimed \$429,273

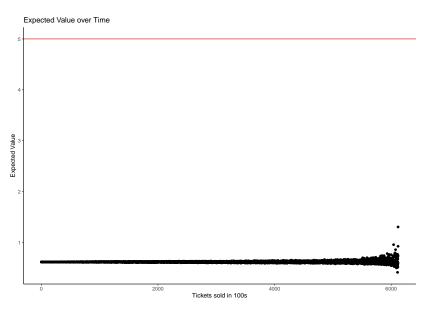


# Our intuition is correct at the outset

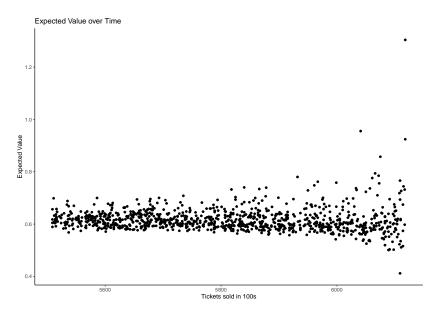
Value	Probability	
0	0.78789	
7	0.14286	
15	0.02632	
25	0.0303	
70	0.01235	
700	0.00019	
1000	9e-05	
7777	2e-05	

Expected Value = 3.365172 < 5.

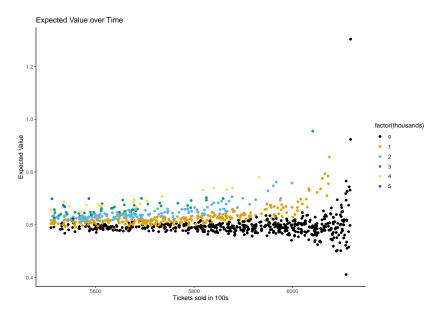
# This game is sometimes worth playing!



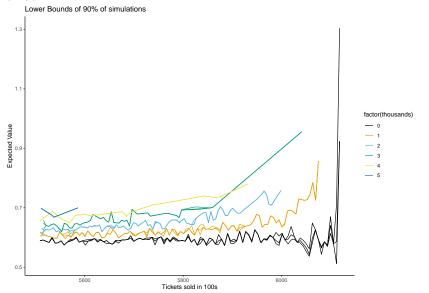
## Let's take a closer look:



## Then make use of the information available to us:



# We have the necessary information to estimate the value of a ticket



# Another game:

# **WIN EITHER \$50 OR \$100**







WINNING NUMBERS					
16	45	9	37	26	
2	33	YOUR MARKETS 21	4,4	9 \$50	
\$100	\$10	\$50	\$100	\$50	
\$100 \$100 \$100 \$100 \$100 \$100 \$100 \$10 \$1	33 110 11000 11000 425 125 12600 11000 11000 11000 117 117 118 118 118 118 118 118	21 \$50 FFTY000L 23 \$11 \$25 Tarrison	15 100 (APTHOR) 5100 (APTHOR) 525 (APTHOR) 5100 (APTHOR) 525 (APTHOR) 510 (APTHOR)	46 \$10 TENDOX	
29 \$10	48 \$10	6 \$50 FETYOOL	50 \$25	31 \$25 THE BOX	
36 \$50	17 \$25	6 \$50 FFTYOOL 25 \$100 ORDHING 27	8 \$10 TENDOL	46 FRX \$10 FRX \$25 THE CO.  42 FRE \$50 FRE \$100	
19 \$10	38 \$50	27 \$50 FFTY00L	40 \$25 THE GOT,	10 \$100	

#### **TOP PRIZE \$100**

Game # 1494

Ticket Price \$10

Start Date 08/02/2019

Overall Odds 1: 9.78

#### **UNCLAIMED TOP PRIZES**

\$100 680 # Of Tickets 299,880 % of Tickets Sold 94 Total Unclaimed \$128,300

# It's all in the name:

Value	Probability
0	0.89904
50	0.0625
100	0.03846

 $\label{eq:expected_Value} \text{Expected Value} = 6.9711538 < 10.$