

WHICH KENO?

STEPHEN WADE, PRINCIPAL, LOTTERY MANAGEMENT CONSULTING, LLC.



Once my eyes were opened to the peculiar charms of Keno, it occurred to me that there might be something important to learn from how players use the many value propositions offered by the game. Typically, it is possible for players to pick anywhere from one to ten numbers, and to bet on the lottery's draw matching some or all of them. Given that the lottery draws 20 from a field of 80, the likelihood of the lottery's draw matching that one number picked by a 1-spot player is pretty high – one in four – and the payout for that win is correspondingly low. On the other hand, the likelihood of the lottery's draw matching every element of a player's 10-spot pick is about one in nine million, and the payout can be correspondingly high. Given this range of opportunities, what do players buy?

I realized that while the definition of Keno does not speak to how often the lottery makes its drawing, the practical reality of the game must depend on how quickly results are served. In some US jurisdictions, only one drawing per day is allowed by law. Lotteries that offer Keno once per day generally find that it has a

small following and does not do a lot of business. An increasing number of lotteries offer Keno in a 'quick draw' form, with drawings every four or five minutes through part of the day. Keno in this form can be very important source of revenue. If Keno every four minutes is good, might not Keno on demand – that is, instant Keno – be better still?

As it happens, the Michigan Lottery is in a better position than anyone to answer that question. The Michigan Lottery was selling quick-draw Keno when legislation was enacted allowing them to venture into selling lottery games over the internet (iLottery). Working with their partner NeoPollard, they were able to develop instant Keno games to suit the new platform. The outcome probabilities behind these on-demand games are the same as in a Keno draw game, but there is not a lottery draw that happens on a published schedule. By all accounts, the Michigan experience with iLottery has been very positive. A browse through their online (digital) offerings shows more than 50 game titles, of which four are varieties of Keno. I will refer to this group as digital Keno, to avoid confusion with one member of the group that is called Instant Keno.

Given this abundance of choice, and the continuous expansion of Michigan's digital business, I am not sure that I would learn much about fundamental player preferences by comparing across digital Keno game titles. The digital Keno games vary not only in obvious things like graphics and whether a multiplier is part of the game definition, but also in non-obvious things like time on the market (novelty vs. familiarity) and the rate at which the players' spending is returned as prizes (that is, the lottery's prize expense).

On the subject of prize expense, the Michigan Lottery digital games all recognize the principle that as players wager more frequently, they need to see a higher rate of financial return in order to stay engaged in the game. Just as the shift from once-a-day Keno to quick-draw Keno is usually accompanied by an increase in prize expense from 50 percent to about 65 percent, the shift from quick-draw Keno to Keno-on-demand is accompanied by a substantial increase in prize expense. The tradeoff between volume and profitability is understood in a general way. Fine-tuning the game offerings to improve the bottom line is a promising area for innovation.

However, within a single game title, the visuals and the prize expense are stable, and there are still ten different wagers available. The rest of this article focuses mostly on identifying the “sweet spots” within each game, after recognizing major differences among games.

The table to the right is based on data kindly provided by Victor Marmorstein, Digital Games Program Manager for the Michigan Lottery, in September 2017. For three of the digital Keno titles that had many months of market history at that time, it shows the proportion of spending on each of the ‘spots.’ For contrast, the corresponding distribution of spending in quick-draw Keno (Club Keno) is shown in the far-right column. The table reveals that spending tends to go to different spots in different games. The concentration of spending at the 10-spot in the digital games stands in contrast to the concentration at 4- and 5-spots in Club Keno.

We know that when comparing instant games, many players express a preference for big top prizes, while others speak of smaller prizes as appearing more winnable. Within Club Keno, the size of the top prize increases from \$75 to \$410 to \$1,100 as the number of spots played increases from four to five to six. Among these three bets, though, the 5-spot is much preferred, and the 6-spot is neglected. What is distinctive about the experience of playing the 5-spot? With reference to the charts below, I suggest the answer is in the winning experience provided to most players who spend less than \$200 on the games.

In the following graphs, each prize-tier is represented by a wedge. The wedge first appears at the level of spending where we can say, “most players who spend this much will win this particular prize tier.” The thickness of the wedge represents the average value of wins across many players (the Expected Value, or Return to Player, at this level of play).

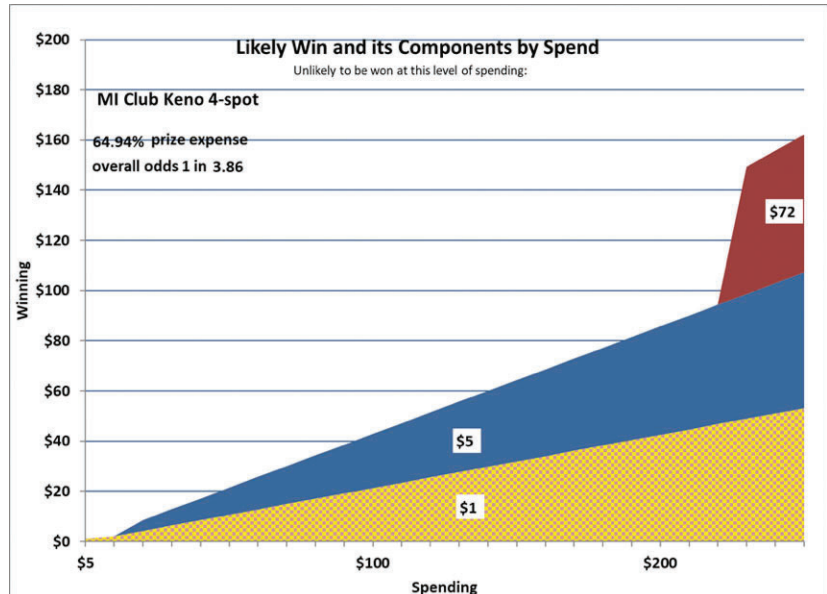
The most common prize in the game is the first to appear as spending increases. Usually this is also

Distribution of Wagers: Michigan Digital Keno and Club Keno

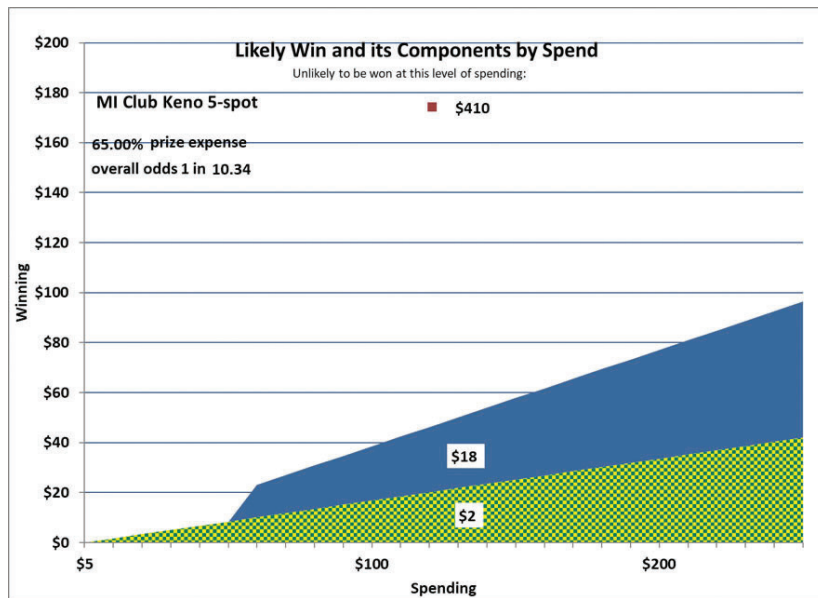
Share of Bet Counts (%) within each Game

Number of Spots Played	Instant Keno Multiplier	Instant Keno	Fuzzball Keno	Club Keno
1	0.1	0.6	20.0	0.1
2	1.4	0.7	1.5	9.6
3	2.6	1.1	1.0	10.7
4	7.1	15.5	8.6	24.0
5	9.1	8.1	5.2	35.6
6	3.1	9.8	4.3	3.4
7	9.4	11.0	9.3	4.0
8	9.4	15.3	5.6	7.3
9	15.2	8.6	8.4	0.9
10	42.6	29.2	36.1	4.4
RTP (approximate)	77%	87%	87%	65%

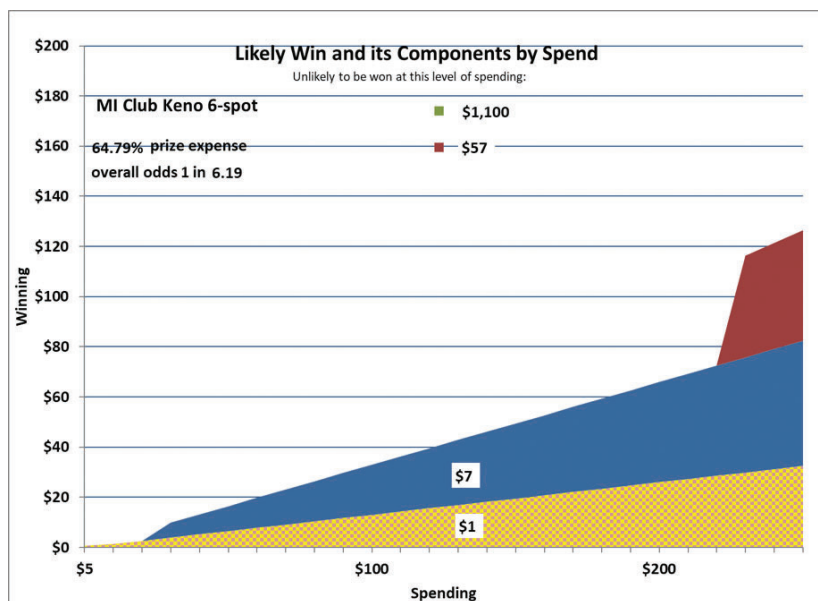
Michigan Club Keno 4-Spot



Michigan Club Keno 5-Spot



Michigan Club Keno 6-Spot



the lowest-value prize. In these charts, the lowest-value prize is represented differently depending upon whether it is the same as the wager (a break-even prize of \$1, as in the 4- and 6-spot Club Keno games) or bigger (as in the 5-spot Club Keno game).

First, what does not differ much among the three: the return to player for the first \$200 spent is not high – around 35 to 40 percent. Next, what distinguishes the 5-spot from the 4- and 6-spot is the absence of a celebration-worthy prize for most players who spend between \$200 and \$250. A further distinction of the 5-spot is that it avoids the break-even prize that accounts for a big share of the return to player in the other bets. The 5-spot wager returns double-your-money wins from fairly early, and 18-fold wins to most who spend \$50 or more. But it pays nothing larger to most players who spend less than \$1,000. Does this seem like a less satisfying winning experience, compared to winning \$57 (6-spot) or \$75 (4-spot) for less than \$250 spent? Perhaps it is. But success in the lottery business is not always about satisfying the customer, it is about keeping the customer engaged. And I submit that the higher dollar volume attracted by the 5-spot Club Keno prize structure suggests that it is superior in keeping players engaged. Quite likely, most players spend less than \$200 in a session. Even though the rate of return to the player is similar, winning in chunks of \$2 or \$18 appears more engaging than winning a similar amount in chunks of \$1 and \$5, as in 4-spot Club Keno. The rate of return for spending less than \$200 is notably lower in 6-spot, and players may feel this.

The preference for 10-spot play among the digital Keno games stands in contrast to the concentration at 4- and 5-spots in Club Keno. Why are players more willing to go for the higher spots in the digital Keno games compared to Club Keno? A glance at the prize tables shows that the digital games are very much more oriented toward keeping the player engaged, especially at high spots. Although the prize expense is much higher in the digital games, the size of the top prize is 1/10 that in Club

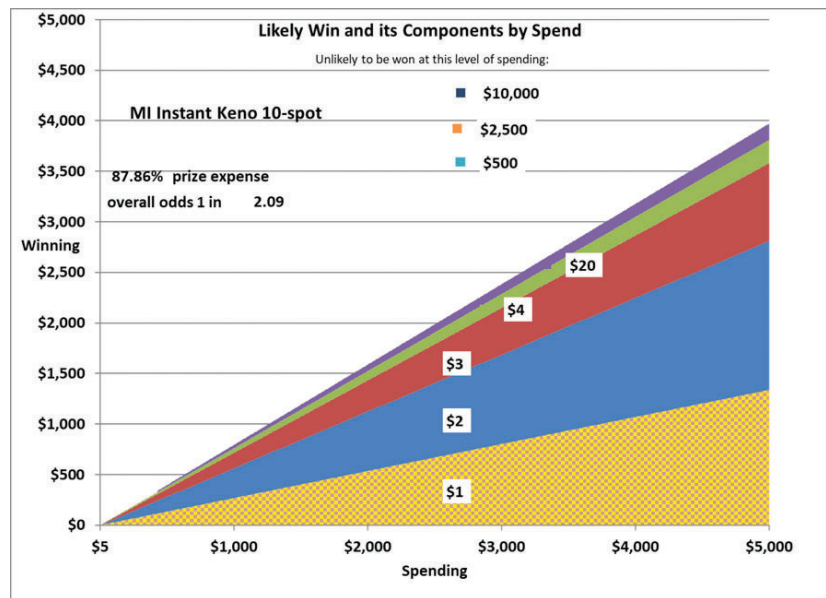
Keno. The extra return to players is delivered mostly in small chunks, not in show-stopping amounts. Common outcomes, that are near-wins in Club Keno, are paid wins in the digital Keno games. A typical offer is shown in the first chart on this page.

However, among the digital Keno games there are still some notable sweet spots, aside from those with highest top prize. These are exceptions to the pattern discussed above.

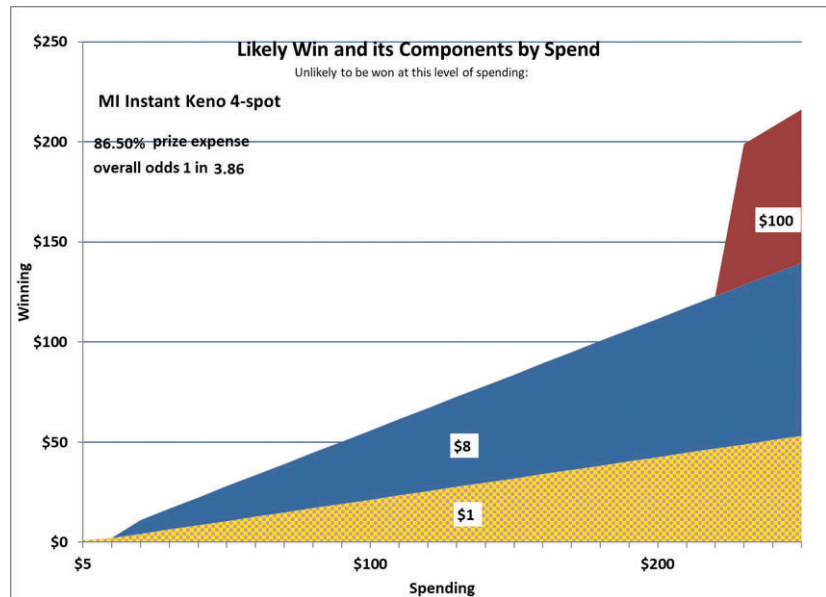
The first sweet spot that caught my attention was the 1-spot bet in Fuzzball Keno, attracting 20 percent of the spending in that game, while no other 1-spot bet took even one percent of the volume in the other games. A glance at the corresponding prize table showed why: Every bet in 1-spot Fuzzball Keno wins something! The lottery pays double the wager in the event of a match (probability one in four), or half the wager in the event of no match (probability three in four). Instant Keno has a similar prize expense, but it pays 3.5 times the wager for the 1-spot win and otherwise nothing. Evidently, the distinctive ‘double or half’ proposition answers a player preference that is not met by other games.

As a further exception, within Instant Keno, there is a notable player preference for 4-spot play. For this wager, in contrast to the higher spots just mentioned, the prize structure is oriented toward actually delivering a notable top prize. Fully 30 percent of the value of the wager goes to fund the \$100 top prize, and that prize is within the likely winning experience of players who spend more than \$230. Compared to the Club Keno 4-spot examined earlier, the number of prize tiers and the probability of winning them is the same, but setting the middle prize at \$8 instead of \$5 may help sustain engagement in a way that eventually brings more players an actual top-prize win. In this case, the accumulation of player dollars to the 4-spot Instant Keno may show that the \$100 prize is relatively reachable.

Michigan Instant Keno 10-Spot



Michigan Instant Keno 4-Spot



These examples illustrate the versatility of the Keno framework. Within the one game definition, we find it possible to build a huge variety of gaming propositions. Unfortunately, this may make it hard to explain to players just what

Keno is, other than a game involving extraordinarily many numbers. As the digital era provides improved insight into how individual players use the game, it will be very interesting to learn whether one player uses primarily one spot, or several. ■