

Multiple Pocket Pairs

Brian Alspach

You are playing in a 10-handed hold'em game and find that you have been dealt pocket 8s. When thinking about possible hands for other players, it is natural to wonder whether other players also are holding pocket pairs—especially pairs of larger rank.

The probabilities in the table below should be of interest to all players. I also want to emphasize that the values are a result of exact calculations rather than simulations.

pair	one rank	two ranks	three ranks
K-K	.0439	-	-
Q-Q	.08412	.001863	-
J-J	.12161	.005435	.0000768
10-10	.15519	.01044	.0002844
9-9	.1857	.01662	.0007109
8-8	.2132	.02397	.001367
7-7	.2380	.03218	.0023
6-6	.2603	.04114	.003538
5-5	.2801	.05071	.0051
4-4	.2977	.06076	.007
3-3	.3133	.07118	.009251
2-2	.3269	.08186	.01186

Let's describe the entries of the table so that there is no confusion over their meaning. The column headed "pair" tells us the rank of the pair held by a fixed player. The column headed "one rank" gives the probability there is exactly one larger rank for which either one or two pairs of that rank have been dealt to other players. The column headed "two ranks" gives the probability there are exactly two larger ranks for which either one or two pairs of each rank have been dealt to other players. There is an analogous meaning for the column headed "three ranks".

Two examples will make everything perfectly clear. Look at the row corresponding to a player holding pocket kings. The entry .0439 under the column headed "one rank" is the probability that one or two players are holding pocket aces. To obtain percentage chance simply multiply by 100. So, if you have pocket kings, there is a 4.39% chance that one or two other players have pocket aces. This translates into odds of about 21.8-to-1 against someone holding pocket aces. There are no entries under the other columns because there is only one rank larger than king.

Now look at the row corresponding to a player holding 8-8. We see there is a probability of .2132 that there is exactly one larger rank with someone holding pocket pairs of the larger rank (21.32%). This is slightly bigger than one-fifth so that approximately one in every five times you find 8-8 in your hand, you are going to be going against a pocket pair (or two) of one larger rank.

I have not bothered to filter out situations when you are facing two people holding pocket pairs of the same larger rank. Of course, as a player holding 8-8, for example, having one player with 10-10 against you is worse than having two people holding 10-10 against you. Two people with 10-10 prevent the larger pair obtaining trips which is to your advantage. On the other hand, because a 10 cannot come on board, your chances for a straight are diminished.

The reader can judge for herself/himself the strength of pocket pairs. Look at the row corresponding to 2-2. We see that the probability of a pair of larger rank having been dealt is .3269 (32.69%). In other words, about one-third of the time, a pair of larger rank will be dealt. Not only does a player with pocket deuces have to worry about overcards pairing another player, but about one-third of the time he already is up against a larger pocket pair. Looking in the third column, we find a probability of .08196 (8.19%) that there are pairs of two larger ranks against pocket deuces. Thus, the odds against two larger pocket pairs is only about 11.2-to-1. This is significant and indicates just how weak pocket deuces are.