

MIT 15.S50 Lecture 7

Monday, January 27th, 2016

An in-depth combinatorial hand analysis in cash games



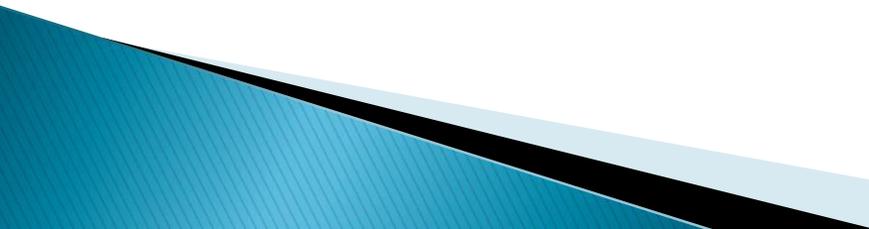
An in-depth combinatorial hand analysis



Flop and Turn Sizing

- ▶ Same principles apply:
 - Don't bet so small that your opponent has odds to call with everything, but don't bet so big so that you're risking too much when you're bluffing.
 - If your raise size commits your entire stack anyway (roughly – 40% or more of your remaining chips) then you might as well go all-in.
 - Remember that raising their bet gives them the option to re-raise.
 - Sizing should be bigger on Drawy boards and smaller on Dry boards.
 - Bet a bit bigger when you're out of position.

Analysis

- ▶ Definitely not folding, and raising is suicidal when we have a medium–strength hand that could play well in position on a lot of turns. We have a back door flush draw, and our straight draw is very legitimate when there is no flush draw out there.
 - ▶ We must be wary of a Big Blind check–raise, although this is less likely when a flush draw isn't out.
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BB folds



He bets 30 on turn



Analysis

▶ Benefits of Calling:

- See the river for sure, instead of having to fold to his turn 3-bet all-in. We really want to see the river because we have plenty of opportunities to improve, and already have a pair to start with, so will win the hand by checking sometimes.

▶ Benefits of Raising:

- Can get him to fold better hands, say JJ.
 - Can bet the river and win a bigger pot when hit a club or an 8. (It is hard to do this when we hit a 9 or 7, since in both cases there is 4-to-a-higher-straight.)
- ▶ I like calling in this situation. With a draw that cannot win showdown like 95cc, I would raise. Or with a draw that is good enough to call his turn 3-bet all-in, like AJcc, I would raise.

Getting the last bet in

- ▶ With the stone cold nuts and weaker draws, generally you want to bet/raise in a way that allows your opponent to get the last bet in, so that you have an easy decision to call/fold.
 - ▶ With your more vulnerable good hands and stronger draws, generally you want to bet/raise in a way that allows you to get the last bet in.
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He checks river.



Analysis

- ▶ Yes, we do have some chance of winning with our pair of 8's, so there may be no need to bluff.

But:

- There are a lot of higher cards on the board now. The pair of 8's that looked pretty good on the flop is a lot worse after a Q turn and A river.
- The pot is big; money went in on both the flop and turn. If our opponent has a Ten or Queen or even weak Ace, he will fold to our bet.
- The Ace is always a scary card.
- The advantage of being in position is that we already know our opponent checked the river. So he is unlikely to have a great hand, and more likely to fold to our bluff.

River Sizing

- ▶ Because there are no more cards to come on the river, there is no need to worry about giving your opponent equity.
 - ▶ Remember that betting small still has the disadvantage of giving your opponent an option to raise, though (with a balanced value/bluff range).
 - ▶ You should still bet big if your range is polarized and contains a lot of bluffs (otherwise your opponent can always call).
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CO folds.



Exact analysis

- ▶ What range of hands do we put our opponent on exactly?
 - ▶ Obviously this is impossible to answer exactly, the entire purpose of poker is to approximate this as well as possible.
 - ▶ We will replay the hand from our opponent's perspective and (exploitatively) put them on a range.
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What is our opponent's range here?

The image shows a poker hand in progress. The flop is 8c7c. The pot is \$2. The stack sizes are: BB \$198, SB \$199, UTG \$200, HJ \$200, and CO \$194. The CO position has bet \$6. The BTN position has a \$200 stack. The SB position has a \$199 stack. The BB position has a \$198 stack. The UTG position has a \$200 stack. The HJ position has a \$200 stack. The CO position has a \$194 stack. The flop is 8c7c. The pot is \$2. The stack sizes are: BB \$198, SB \$199, UTG \$200, HJ \$200, and CO \$194. The CO position has bet \$6. The BTN position has a \$200 stack. The SB position has a \$199 stack. The BB position has a \$198 stack. The UTG position has a \$200 stack. The HJ position has a \$200 stack. The CO position has a \$194 stack.

Chat | Notes | Stats | Info

Last Action
CO raises to 6\$

Analysis

- ▶ Usually, trying to put him on exact hands preflop is difficult, especially when he opens as late as the Cutoff.
- ▶ Estimating that he opens somewhere around 30% is probably reasonable. This includes pairs, any suited ace, any two Broadway cards, suited hands as bad as 53s, but not offsuit hands like 98o.

What is our opponent's range here?

LEAVE TABLE
VIEW LOBBY

BB
\$194

UTG
\$200

10♣ 8♥ 6♦

\$19

SB
\$199

HJ
\$200

8♣ 7♣

BTN
\$194

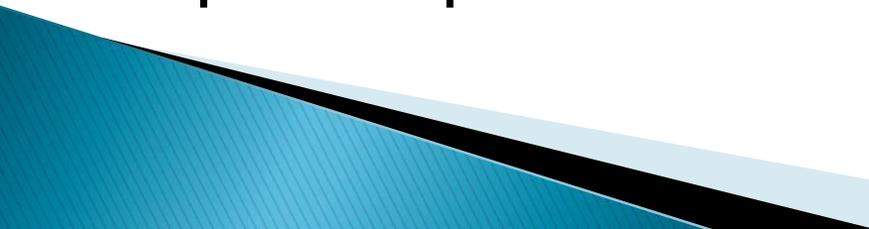
Bet

\$14

Chat Notes Stats Info

Last Action
CO bets 14\$

Analysis

- ▶ Our opponent continuation bet.
 - ▶ What do we put him on? Let's look at what he would and wouldn't continuation bet.
 - ▶ Let's review the factors of when a player would continuation bet. We talked about this when we introduced continuation betting, and also when we talked about playing draws postflop.
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Rules for continuation betting

- ▶ **Incentives for Continuation Betting:**
 - Your hand is good enough that it beats even most of his calling hands.
 - Your showdown value is poor, but you have some equity (or back door equity).
 - You are out of position and cannot see a free turn by checking.
 - Few opponents (1 or 2).
- ▶ **Incentives against Continuation Betting:**
 - Your hand is so dominant that you need to give him a turn card to hope that he improves.
 - You have decent showdown value.
 - You have zero equity because your hand is just so terrible.
 - You are in position and can see a free turn by checking.
 - There are too many people in the pot to get them all to fold.

Analysis

- ▶ Hands that he checks to trap or check-raise:
 - 97, TT, maybe 88 (unlikely because we have an 8)
- ▶ Hands that he value bets:
 - AA-JJ, 66, T8, 86, T6, AT, KT, etc.
- ▶ Hands of medium-strength that he check-calls:
 - JT, T9, 99, 77, T7, 76, etc.
- ▶ Hands that he “bluffs”:
 - AK, AJ, Q9, QJ, J7, etc.
- ▶ Hands that he check-folds because they have zero equity:
 - 53s, 33, A2ss, etc.

“Bayesian updating”, or more “Bayesian eliminating”

- ▶ ~~Hands that he checks to trap or check-raise:~~
 - ~~97, TT, maybe 88 (unlikely because we have an 8)~~
- ▶ Hands that he value bets:
 - AA-JJ, 66, T8, 86, T6, AT, KT, etc.
- ▶ ~~Hands of medium strength that he check-calls:~~
 - ~~JT, T9, 99, 77, T7, 76, etc.~~
- ▶ Hands that he “bluffs”:
 - AK, AJ, Q9, QJ, J7, etc.
- ▶ ~~Hands that he check-folds because they have zero equity:~~
 - ~~53s, 33, A2ss, etc.~~

His incentives for betting again on the turn

- ▶ You bet a good hand for value on the flop, and your hand is still good on the turn. You're betting for more value.
 - ▶ You bluffed a speculative hand on the flop, and now either hit the turn or improved your draw.
 - ▶ An overcard to the board came, so you thought bluffing the turn could be good.
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The situation again...



River situation

LEAVE TABLE
VIEW LOBBY

BB
\$194

UTG
\$200

10c 8h 6d Qc As

\$107

SB
\$199

HJ
\$200

8c 7c

BTN
\$150

Check

Chat Notes Stats Info

Last Action
CO checks

He checks river...

- ▶ It seems improbable that our opponent would be trying to trap us with his check:
 - He's already been showing plenty of aggression, so it's not like he can pretend he has a bad hand by checking.
 - With the pot already so big, he can get a large % of the remaining stacks by just betting (instead of check-raising).
 - The Ace is not a good card for our range, so not a card we're likely to bet.
- ▶ So it's unlikely that he has a nutty hand.
- ▶ However, he could very easily still have a hand that beats us and calls our potential bluff.

Analysis on board...

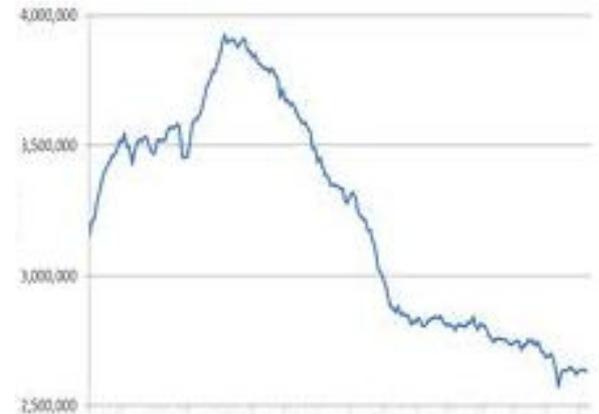
- ▶ We conclude that his range on the river will consist of
 - AKs, AJs, KQs (that had backdoor flush draw on flop)
 - QJ, Q9s, KK
 - A9, T8s, 86s
- ▶ Assume that he will call with exactly top pair or better.
- ▶ We are risking 70 to win 100.
- ▶ Since he calls less than 50% of the time, the bluff is profitable.
- ▶ Note that we are only winning once in a blue moon by checking, in the rare case he has K9 or something weird like 74s, 65cc and decided to not bluff the river.

Some General Topics



Moneymaker Effect

- ▶ How can there be so much money in poker?
- ▶ Can anyone smart and motivated succeed?



Aspects of Poker

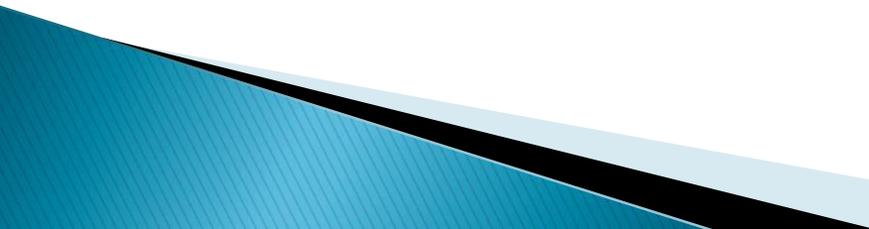
In my opinion, these are the 4 unique aspects of poker that allowed for there to be so much money in poker:

1. Everyone is overconfident
 2. Gambling self-control
 3. Fast evolution
 4. Being results-oriented is bad
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1. Overconfidence

- ▶ Normal for people to be overconfident (statistical “95% confidence interval” experiment)
 - ▶ Poker is among the things where it’s **easiest** to overestimate your own abilities (others?)
 - ▶ “If you can’t spot the fish at the table, then you are the fish.”
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Why overconfidence is so common in poker?

- ▶ Easy to assume you are one step ahead of your opponent
 - ▶ Selective memory (remember bad beats, don't remember suck-outs)
 - ▶ Lack of clear benchmark; easy to bend benchmarks
 - ▶ Hit lucky streak and consider it “all skill”; blame all losing streaks on luck
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Necessity of Confidence

- ▶ Confidence is necessary to take the right risks.
 - ▶ Confidence is necessary to out-read your opponent if you're playing exploitively.
 - ▶ Confidence is necessary to trust you've made a good decision even when it yields a bad result.
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Admitting Defeat

- ▶ “pay \$10 to see a movie” mentality



- ▶ David Einhorn – won \$4 million in a \$1 million buy-in poker tournament and donated it all to charity



2. Gambling self-control

1. After getting unlucky in the previous hand, playing the next hand poorly
 2. Playing when you're tired, just to get "unstuck" (win back the money you lost)
 3. Being irrationally scared to go all-in, especially far in a big tournament
 4. Rationalizing gambling (getting over the stigma); gambling under pressure
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3. Fast evolution

- ▶ Texas hold'em was a new game with a lot of hidden depth.
- ▶ The best player in 2000 would be below average by 2004; the best player in 2004 would be below average by 2008, etc.

Online resources

- ▶ Cardrunners.com – best paid resource
 - ▶ www.twoplustwo.com – forums, best free resource
 - ▶ Twitch streams – a pretty good free resource too, although more entertaining than educational sometimes
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Books reading list

- ▶ *Small Stakes Holdem* (Ed Miller, David Sklansky, Mason Malmuth) – only for limit hold'em, but still one of the classic books in poker and written by mathematicians
- ▶ *Harrington on Holdem 1 and 2* (Dan Harrington) – slightly outdated but very good
- ▶ *Kill Phil / Kill Everyone* (Lee Nelson et al)
- ▶ *Every Hand Revealed* (Gus Hansen) – more entertaining than educational
- ▶ *The Mathematics of Poker* (Bill Chen) – not that practical, but theoretically very interesting
- ▶ *Building a Bankroll* (Pawel Nazarewicz) – mostly for full ring cash games

4. Not being results-oriented

- ▶ We talked about the “decision mentality” in the first class
 - ▶ This can be very antithetical to start and motivated people
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Underestimating variance

- ▶ Statistical experiment involving making up sequences of coin flips
- ▶ Everyone thinks they're unluckier than mathematically possible
- ▶ Controlling “tilt”

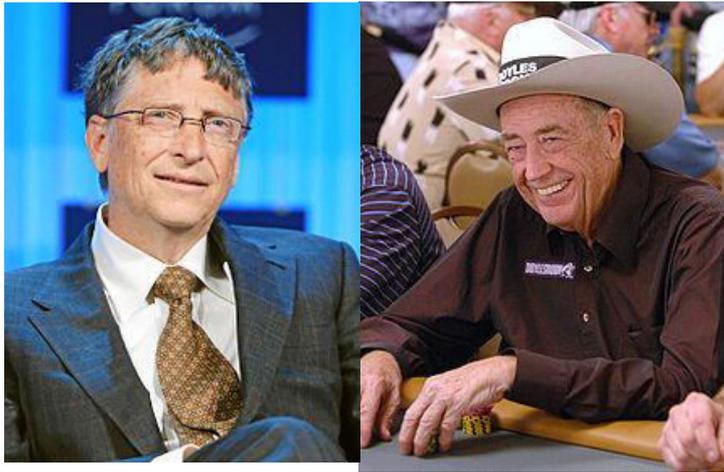


Making it

- ▶ Even if you are very smart and work in the right way, you need some lucky big scores along the way, especially at the start, to get into poker
 - ▶ This is also antithetical to smart and motivated people
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The Joy of Making Good Decisions

- ▶ Bill Gates / Doyle Brunson story



- ▶ “life is luck”
- ▶ “yolo”
- ▶ “One long session”

