



# MIT 15.S50 LECTURE 6

Monday, January 30<sup>th</sup>, 2012



# MORE ANNOUNCEMENTS

- Verneer Reading
- Subscribe / thumbs up Youtubes please! =)
- This Thursday night will also be your last chance to get the 10 points necessary to pass the course. If you don't already have 10 points, you need to start playing more tournaments now! Reports for those who did not get 10 points will be due Monday, February 6<sup>th</sup>.





## MORE ON POSTFLOP PLAY

- In this class, we will give more examples on postflop play, especially turn and river play.
- Before, we have mostly only covered how to play draws (while covering implied odds), and how to get all the money in on the flop.
- Turn and river play happen less frequently than flop play (since you will often get it all-in preflop or on the flop), but pots are bigger by the turn and river. So bets are bigger and mistakes are more costly.





## CASH GAMES...

- For a change, all the examples will be using a 6-handed “Cash Game” setting, instead of a tournament setting, but the play is the same as for 9-handed “Tournaments”.
- The reason we do this is because players usually always have at least 100BB's in a cash game. Which means there will be more interesting turn and river play.
- Compare this to tournaments, where after the first few levels you are down to 30BB's, which means you will usually be all-in preflop or by the flop.





BB  
\$198

SB  
\$199

BTN  
\$200

CO  
\$200

HJ  
\$200

UTG  
\$194

\$6

\$2

\$1

Chat Notes Stats Info

Last Action  
UTG raises to 6\$





RAISE TO 6 DOLLARS (NOT 6 CHIPS), BOTH  
BLINDS CALL





# THEY CHECK TO THE PREFLOP RAISER...





# BET A GOOD FLOP FOR VALUE





# SB CALLS, BB FOLDS





# HE CHECKS, WE BET





# CHECKPOINT

- Remember how I said “bet half pot”? Why have we been betting bigger than half pot?
  - The “bet half pot” rule is only good if we are shallow enough (have few enough BB’s) such that we can get the money all-in by the river without ever having to bet more than pot.
  - In this case, this is not true, so we bet  $\frac{3}{4}$ -pot, to bloat the pot and win more money.





# AREN'T WE AFRAID OF A FLUSH?

- Yes, he could have a flush (although he may have raised a flush draw on the flop, so this reduces the chances).
- Nonetheless, we bet and fold to a raise. I would definitely fold to a raise, because of 3 principles:
  - Don't put in all your money (in a singly raised pot with one pair).
  - Getting raised on the turn or river is a lot scarier than getting raised on the flop. On the flop, lots of speculative hands still have back-door draws and could be raising you just to "test the waters". On the turn/river, with one/zero cards to come, people are raising less often with draws and more often with real hands.
  - Don't call a turn raise when you could be drawing dead (we are drawing dead to a flush, sets 22 44 99).





A screenshot of a Texas Hold'em poker game interface. The game is in progress on a green felt table. The community cards are 2♣, 4♣, A♦, and 9♣. The pot is \$44, consisting of a \$25 chip, a \$5 chip, and a \$4 chip. The blinds are \$30 (BB) and \$40 (UTG). The stack sizes are: BB \$194, UTG \$151, HJ \$200, CO \$200, and BTN \$200. The action is on the Button (BTN) position, who has a yellow button and a 'Call' button. The cards A♥ and K♠ are visible for the player in the UTG position. The interface includes a 'Chat' window at the bottom left, a 'Notes' window, and a 'Stats' window. The 'Last Action' window at the bottom right shows 'SB calls 30\$'. The background is a textured, stone-like surface.





## MORE ANALYSIS

- Fortunately, he doesn't raise; he just calls, which leads us to believe that we have the best hand. We should continue value-betting on the river.
- The 3<sup>rd</sup> club is actually not a bad card for us in some cases because it forces him to put in more money with one pair + club hands, like any hand involving the Ac, 88 with 8c, etc.
- If a 4<sup>th</sup> club comes on the river, we shouldn't be putting in any more money.





# WE HIT A GREAT RIVER CARD AND BET





# HE CALLS AND WE WIN A BIG POT





# SUMMARY

- We extracted a lot of value for one pair, by betting on all streets, and betting big.
- Our opponent's play is likely alright, especially since he had the Ac on the turn.
- The worst hand I would've done this with is AQ probably. I don't expected to get called by worse too frequently if I only have AJ.
- If I raised from the BTN instead of UTG, then I think I can extract this much value from AJ, maybe even AT. The reason is because my range is a lot weaker, and AJ is relatively a lot stronger in my range.





LEAVE TABLE  
VIEW LOBBY

Fold

UTG  
\$194

\$2

\$6

SB  
\$194

HJ  
\$200

BTN  
\$200

CO  
\$200

Chat Notes Stats Info

Last Action  
BB folds





# WE CHECK AND SEE THE TURN





# WHY DID WE CHECK?

- I think betting is not terrible, but checking is good for a few reasons:
  - Our hand is not good enough to bet-bet-bet anyway (not good enough to “get 3 streets of value”). It is probably only good enough for “2 streets of value”. It is alright if we check through the flop, and bet the turn and river (assuming they are safe enough).
  - There are a lot more draws in his range this time (clubs, JT, even QT) that could check-raise us, and we would have to fold to such a raise, because there are also more good hands in his range this time that check-raise us (A8, A9, 98, 88, 99, slowplayed AK preflop, etc.).
  - We are not vulnerable to overcards.





# WE CALL HIS TURN BET





# ANALYSIS

- The turn was fairly good for us and we could consider raising to charge draws (which there are lots of) more to see the river.
- But I think calling is decent too because for every time you successfully charge draws more by raising, there is also a time you put in more money with the losing hand by raising.
- We can still bet the river if he checks, or call a safe river if he bets. This guarantees that we can still get more money in on the river with our good hand, so no need to raise now.





# HE LEADS THE RIVER, WE CALL





## ANALYSIS

- The river is not great for us, completing JT, and back-door diamonds, but we still call.
- He could be bluffing missed clubs, or value-betting Ax (which means Ace with a small card). Any card less than Ten can be considered small on this board, since Ten is the smallest relevant kicker.





# WE WIN A DECENT POT AGAINST HIS MISSED DRAW





# ANALYSIS

- Had we bet the flop, our opponent definitely would've check-raised for value with his monster draw and blown us off our equity.
- Our opponent played well.
  - He should definitely be betting the turn to potentially get folds out of better hands, and bloat the pot for rivers he hits.
  - The Qd is a good river to bluff because he isn't winning the pot without bluffing (with Ten high), and the Qd completes lots of other draws that are not his, so it is a scary card.





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# ANALYSIS





# WE BET THE FLOP





# REASONS FOR BETTING

- We had a similar-strength hand in the last example with AT, but in this case we bet instead of check.
  - More overcards could come and destroy our hand.
  - We are out of position this time. Even if we check, we do not automatically advance toward showdown; he could still bet the flop. We are not denying him the opportunity to check-raise by checking.
  - Yes, there are draws like 78, 79, diamonds, that could raise our bet and blow us off our hand, but we really have no choice here.





# HE CALLS





# WE CHECK AND HE BETS 23





# WE FOLD





# ANALYSIS

- Even though our pair of 8's is not bad on the turn, our implied odds on the river are terrible.
  - Lots of scary cards can come on the river (either overcards or cards that complete draws).
  - He is in position, so he always has the opportunity to bet after we check. We will make lots of mistakes either folding the best hand or calling with the worse hand.
  - Good chance he had a Jack (or better) to start anyway, since he called our flop bet.
  - We only have 2 cards that improve us.





# THE IMPORTANCE OF POSITION!

- Look at all the sub-optimal things that could've happened only because we were out-of-position:
  - We were forced to bet the flop despite some reasons for checking, because our opponent could bet anyway if we checked.
  - Our opponent can raise the flop with a lot of weak draws (97, A7ss, Ad8, etc.) and we'd fold an overwhelming majority of the time
  - We had to check-fold the turn with a decent hand because it would be too hard to play the river out-of-position.





# NEXT HAND





# CALLING FOR IMPLIED ODDS IN POSITION





BB ALSO CALLS.





# CO CONTINUATION BETS





# WE CALL WITH OUR MEDIUM STRENGTH HAND





# 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.





# 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.





WE CALL.





HE CHECKS RIVER.





# WE BLUFF THE 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.





## 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.
- To do this, we must put ourselves in our opponent's shoes.





# WHAT IS OUR OPPONENT'S RANGE HERE?





# 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 33% is probably reasonable. This includes pair, any suited ace, any two Broadway cards, but not unsuited hands, and stuff like T8o.





# WHAT IS OUR OPPONENT'S RANGE HERE?





# 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.





# 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.





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# 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”:
  - A6, K8, AK, AJ, Q9, QJ, J7, etc.
- Hands that he check-folds because they have zero equity:
  - Q5, 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”:
  - A6, K8, AK, AJ, Q9, QJ, J7, etc.
- ~~○ Hands that he check folds because they have zero equity:~~
  - ~~• Q5, 33, A2ss, etc.~~





# THE SITUATION ON THE TURN





## BETTING AGAIN ON THE TURN

- You bet a good hand for value on the flop, and your hand is still good on the turn. Most likely your hand is good for 3 streets of 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.





## THE SITUATION AGAIN...





# ANALYSIS

- Hands that he value bets:
  - AA-JJ, 66, T8, 86, T6, AT, KT, etc.
- We can eliminate JJ, AT, KT, which are no longer good enough to bet for value.
- Hands that he “bluffs”:
  - AK, AJ, Q9, QJ, J7, etc.
- A lot of hands found an incentive to keep betting: AK, AQ, AJ, KQ, KJ, QJ, A5cc, J9.
  - A6, K8, J7, K7 would probably give up.
  - Q9 might check, being not strong enough to bet for value.





## HIS RANGE GOING INTO THE RIVER

- AA (6), KK (6), QQ (3), 66 (3), T8s (2), 86s (1), T6s (1 out of 2 combos), QT (6 out of 9 combos), Q8 (2 out of 6 combos), Q6 (1 out of 2 suited combos)
- AK (11 out of 16 combos), AQ (12), AJ (16), KQ (9 out of 12), KJ (16), QJ (8 out of 12), Q9 (4 out of 12), J9 (16), A9cc, random K9's





# RIVER SITUATION





# CROSS OUT THE HANDS THAT BET THE RIVER

- ~~AA (6), KK (6), QQ (3), 66 (3), T8s (2), 86s (1), T6s (1 out of 2 combos), QT (6 out of 9 combos), Q8 (2 out of 6 combos), Q6 (1)~~
- AK (~~118 out of 1612~~ combos), ~~AQ (12)~~, AJ (~~1612~~), KQ (9), ~~KJ (16)~~, QJ (8 out of 12), Q9 (4 out of 12), ~~J9 (16)~~, A9cc, A9 (~~2 out of 161~~), K9 (~~2 out of 16~~ 1 out of 2 since he bluffs the river sometimes)
- Total combinations that call your bluff:  $13(2\text{pair}) + 4(\text{AK}) = 17$
- Total combinations that fold to your bluff:  
 $4(\text{AK}) + 6(\text{KK}) + 12(\text{AJ}) + 9(\text{KQ}) + 8(\text{QJ}) + 4(\text{Q9}) + 2(\text{A9}) = 45$
- Total combinations where it doesn't matter (you win regardless whether you bluff): 1 (K9)





## DO THE MATH

- Checking: win 2% of the time (negligible). Equity is
  - $0.02 (107) + 0.98 (0) = \$2.07.$
- Say you bluffed 70. 73% of the time, he folds a better hand and we win 107. 27% of the time, he calls and we lost 70. Equity is
  - $0.73 (107) + 0.27 (-70) = \$59.21$
- As you can see, even if he called 50% of the time, it would be profitable to bluff. Bluffing is **overwhelmingly** profitable.





# COMPARISON

- Suppose we had A9 instead, where we beat a lot of his combinations without bluffing.
- Total combinations that fold to your bet (that would've beat you):
  - AK (2), AJ (8) = 10
- Total combinations that call your bet (and win):
  - T8s (2), 86s (2), QT (6), Q8 (3), Q6 (1), AK (2) = 16
- Total combinations that you beat (but won't call your bet):
  - KQ (9), QJ (8), Q9 (4) = 21
- Total combinations that you beat (but will call your bet):
  - 0. Your hand just isn't good enough to "value bet".





# NEW MATH

- Equity of Checking:
  - $21/47 (107) = \$47.81$
- Equity of Bluffing:
  - $16/47 (-70) + 31/47 (+107) = \$46.74$
- The equity of checking is just barely higher.





## UGH MORE MATH...

- Suppose we had A9 instead, where we beat a lot of his combinations without bluffing.
- Total combinations that fold to your bet (that would've beat you):
  - AK (2), AJ (8) = 10 = A
- Total combinations that call your bet (and win):
  - T8s (2), 86s (2), QT (6), Q8 (3), Q6 (1), AK (2) = 16 = B
- Total combinations that you beat (but won't call your bet):
  - KQ (9), QJ (8), Q9 (4) = 21 = C
- Total combinations that you beat (but will call your bet):
  - 0 = D. Your hand just isn't good enough to "value bet".





## UGH MORE MATH...[2]

- Checking Equity:
  - $(C+D)$  (107)
- Betting Equity:
  - $B(-70) + (A+C)(107) + D(177)$
- Subtracting the former from the latter, we get
  - $A(+107) + B(-70) + D(+70)$
- We bet if this is positive, and check if this is negative. Almost always, either  $A = 0$  or  $D = 0$ .
- In the case where  $D = 0$ , we are “bluffing”, and it is profitable if  $A / B > 70 / 107$ .
- In the case where  $A = 0$ , we are “value betting”, and it is profitable if  $D > B$ .
- Of course, changing bet sizing changes these numbers.





# SUMMARY

- Postflop play is complicated. There are volumes and volumes written on this. We did a lot of theory without too many examples, but here are the 7 main lessons from today's lecture:
- 1) Bet sizing – often you should bet more than pot! (Unless the pot was 3-bet preflop)
- 2) If you only put in 3BB preflop, don't put in 97BB postflop with one pair.
- 3) In general, don't call a turn/river raise with one pair. Don't call a turn raise when you could be getting it in drawing dead (straight on a 3-flush board).





## SUMMARY [2]

- 4) Always have a sense of how many “streets of value” your hand is worth. Only the best one-pair hands are worth 3, weak top-pairs and strong second-pairs are usually worth 2.
- 5) We tried to give lots of situations where position drastically affected the hand.
- 6) We gave principles of when to continuation bet and when to follow through on the turn.
- 7) We showed an example of how to count combinations and put our opponent on an exact range.

