MIT 15.S50 LECTURE 4

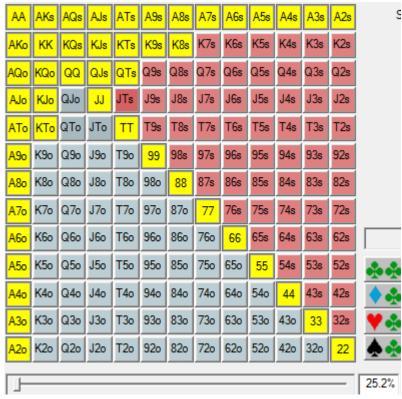
Wednesday, January 25th, 2012

STARTER: DO YOU GO ALL-IN OR FOLD?

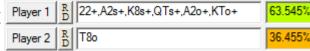


ANALYSIS

• Let's suppose the BB calls a "reasonable" range:



• Your equity against this range:



DO THE MATH

- o 75% of the time, he folds, and we win 2.5BB's
- 25% of the time, he calls,
 - 36% of the time, we win the all-in and win 16.5BB's
 - 64% of the time, we lose the all-in and lose 14.5BB's
- 0.75(+2.5) + 0.25(0.36(+16.5) + 0.64(-14.5))
- \circ =0.75(+2.5) + 0.25(-3.34)
- Clearly positive.
- \circ =1.04BB
- You're making an entire big blind by shoving instead of folding! We really are maximizing our expected # of chips by shoving!

IF WE HAD THE WORST HAND POSSIBLE...



DO THE MATH AGAIN

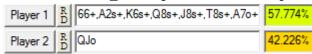
- Expectation when he calls:
 - 0.28(+16.5) + 0.72(-14.5) = -5.82
- Overall expectation:
 - \bullet 0.75(+2.5) + 0.25(-5.82)
- Still postive! This shove is an EXCELLENT play that earns you 0.42BB's, not a "crazy bad" play. We are still earning positive chips/money!

THE POINT?

- If you're only calling this 25% from the Big Blind in this situation, then you're allowing the Small Blind to shove any 2 cards profitably.
- Let's suppose we consider adding QJo to our calling range. We need to call 14BB to win a total pot of 31BB, so we need 45% equity.
- Nonetheless, since most Small Blinds don't shove enough, we might not actually have this!

More Math

- Let's assume that the Small Blind only shoves the top 25% of hands (instead of 100%, which includes 320).
- Your equity with QJo:



• You only have 42% equity. Not enough to call the all-in!

So...

- If your Big Blind calling strategy against a Small Blind shove in this situation is to only call 25%, then the optimal strategy for the Small Blind is to go all in with any 2 cards.
- The Big Blind calling strategy I posted is probably similar to what most people do, so I would advise everyone go all in more frequently from the small blind!
- If people start doing this, then I would advise that BB's start calling pre-flop all-ins more.
- Until then, it's okay to keep your "calling only 25% strategy".
- The point of all this mess is that "the current strategies I see are not a Nash Equilibrium".

WHAT ABOUT RAISE-FOLDING?



SOME TERMINOLOGY...

- The first re-raise preflop is usually called a "3-bet".
- The next re-raise preflop is usually called a "4-bet", etc.
- Going all-in is usually called **shoving**.
- When you say something like **3-bet-calling**, it means you're going to 3-bet with the intention of calling an all-in.
- When you say **4-bet folding**, it means you're going to 4-bet as a bluff with the intention of folding to an all-in.

BIG ALL-INS FROM THE SMALL BLIND ARE GOOD...

- In general, I said that if you have 15BB's, then you technically could raise to 2BB's, and escape to an all-in.
- However, I advise against it here, because you are out of position the entire hand if he calls you are forced to play the pot postflop! It's a lot better from the BTN.

AN ACTUAL TOURNAMENT...

- Mostly preflop play this time ("turbo")
- Lots of theory first, then lots of examples
- Will finish this next class
- I will often say "I would go all in with this set of hands in this spot", without doing the mathematical calculation every time. The hope is that after watching me do this so many times, you build some intuition and save some calculations.
- These are real hands instead of made up hands. I will play through an entire \$109 buy-in online tournament I played this winter while in Canada.
- Starting # of chips = 2000

REMEMBER THE 3 FACTORS OF PREFLOP ANALYSIS

- 1. My position (how many players behind me)
- 2. My stack size (actually, effective stack size)
- 3. My cards
- The idea is to know what to do in all possibilities of (1,2,3).
- To do this, you need to learn examples, and extrapolate. To extrapolate well, you need to
 - 1. Give your self lots of data points by seeing lots of examples.
 - 2. Understand the theory so that you actually know how to extrapolate.

RE-RAISING PREFLOP



BET SIZING

- If I raise to any reasonable size, say at least 1300, then I've put in almost half of my stack. Since my opponents know I'm never going to fold preflop anyway, I might as well just go all-in preflop and not give them a chance to call profitably with some hand.
- (I happen to have AA here, so they can never call profitably, but if I had AK instead, it would be fatal to raise to 1300 and let them call. I go all-in just to not give away the fact that I have AA.)
- If I want to raise to a size small enough such that I don't announce that I'm "all-in preflop", I'd have to raise to 950, which is way too small (giving them 7-to-1 odds).

WE HAVE FEW ENOUGH CHIPS TO JUST ALL-IN OR FOLD. DON'T RAISE SMALL!



My Range

- 88+, AJs+, AQo+
- Depends on how frequently I thought the CO was opening, and how frequently the BTN would reraise preflop without a monster hand.
- If the answer is "frequently" (high % of hands) to both answers above, I could go all-in with hands as weak as A2s, JTs, 22, although in general I would advise against doing this.

WHAT ABOUT CALLING INSTEAD?

- Remember one of the biggest arguments in favor of calling instead of re-raising:
 - You don't give them the opportunity to re-raise again.
- But in this case, when there already is a raise and a re-raise, the CO has the opportunity to reraise again anyway with a good hand.
- Thus, one of the biggest advantages of calling has dissapeared. By calling, we only deny the BTN the opportunity to re-raise.
- Therefore, in spots like these, with a raise followed by a re-raise, I would very rarely just call. Re-raise or fold!

THE RESULT...I THINK HIS CALL IS CORRECT



NEXT BIG HAND



My calling range here

- I would probably call TT+, AQs+, AKo
- Note that in high level tournaments, no one really just "plays around with their stack". You usually just go all-in or fold.
- "In for a penny in for a pound." The idea is that when your # of BB's is not that high, you shouldn't be putting some BB's into a pot without putting all of them.
- o mohair69's play is poor

VERY GOOD SITUATION



RE-RAISING PREFLOP BUT NOT ALL-IN



BET SIZING

- Here, we can make it a reasonable size without making it clear that we are not folding pre-flop.
- Try to raise around 2.2x (previously 2.5x) his raise, without putting in 25% (previously 20%) of your effective stack size. These numbers are slightly off from my previous numbers (in parentheses), but those were only guidelines anyway, and bending them a bit is fine as long as you understand the theory.
- We can successfully do this by making it 1500 or so.

WE DO IT



HE GOES ALL-IN...



SKIPPING SOME MATH...

- I would expect his range here to be something like 77+, AJ+, KQ+, with occasional random bluffs.
- Against this range that he goes all-in with, I am profitable to make this play (re-raise to 1555 and call an all-in) with about 99+, AQ+.

GENERAL CALLING VS. RAISING COMPARISON

Advantages of Calling

- Don't give him the opportunity to re-raise again preflop.
- You can make good decisions postflop if you're in position and your cards have high postflop playability.
- Don't let him fold hands that you dominate, ie. gives you a chance to hit an Ace-high flop when you have AQ and he has AT.

Advantages of Raising

- Gives you a chance to win the pot right there and then. Even if you have a good hand, he could always get lucky on the flop.
- Might make him fold some better hands.
- When you have a really good hand, allows you to build a bigger pot to win.

WHAT ABOUT CALLING INSTEAD?

- On the previous slide, I said that I would only make this play with 99+, AQ+.
- However, if you give yourself 88 in this situation, you will calculate that you still have enough equity to call his all-in barely.
- o Often, when you only barely have enough equity to call his all-in after you re-raise, you are much better off just calling his initial raise instead. Even though calling his all-in at the last stage is "profitable", it is only so because you already put all those chips in the pot to raise. But you could've chose not to put those chips in the pot!

FLAT-CALLING RANGE

- I would just call with hands like 88, 77, AJs, KQs.
- The HJ-1 can have lots of hands that lose to you, like AT, KJ, 66. You can win a lot of money KJ vs KQ on a K-high flop. If you raise, he will fold all of these hands that you beat.
- By raising, I give him an opportunity to go all-in preflop, to which I'm usually folding, and when I do call I'm not happy. Taking the less-risky option of calling and seeing a flop in position is better.

TWO PROBLEMS WITH MY STRATEGY

- Problem 1: Whenever I raise, I always have a good hand, so my opponent can just fold a lot and get away.
- Problem 2: Whenever I call, I can NEVER have a good hand (since I would've raised with 99+, AQ+), so people behind me can re-raise and I will fold.

SOLUTION 1

- Problem 1: Whenever I raise, I always have a good hand, so my opponent can just fold a lot and get away.
- Osolution 1: Also raise some hands as bluffs! However, these should not be the hands barely worse than your {99+, AQ+}, like 88/AJ. Raising them and folding them to his all-in is such a "waste" when your hand is this good. You would rather raise your hands even less good, like 66/KJs/JTs, because folding these to his all-in is less of a waste.

THE PARADIGM

- Best hands: (99+, AQ+) Raise and call an all-in.
- Next best hands: (77-88, AJs, KQs) Call.
- Next best hands: (66, AJo, KQo, ATs, JTs) Raise and fold to an all-in.
- Everything else: Fold.

POLARIZATION

- This kind of paradigm is usually called "polarization". It is different from the equity analysis I told you to do in Lecture 1.
- Polarization is theoretically a good idea. It is less effective than the equity analysis (of just raising if and only if your equity is high) if your opponent is bad and unpredictable.

THIS IS CONSISTENT WITH SOME PARADIGMS WE HAD BEFORE!

- The idea of these paradigms is, we have a very easy decision if he goes all-in, since when we raise, our hand is either very good or very bad. If we raised our medium hands, we'd have a tough decision if he went all-in, which is always bad.
- "Raise your good hands, call your mediumstrength hands, raise your speculative hands (flush and straight draws), and fold everything else."
- "Bet for value when you have a strong hand, bet as a bluff when you have a weak hand, and don't bet when you have a medium-strength hand."

SOLUTION 2

- Problem 2: Whenever I call, I can NEVER have a monster hand (since I would've raised with 99+, AQ+), so people behind me can re-raise and I will fold.
- Solution 2: There really is no great solution.

 Occasionally you can try to call here with a hand like QQ, but it will suck the times he has JJ and the flop comes Ace-high and you don't get much money from him. It doesn't matter if you NEVER have a monster hand here, if people behind you aren't capable of re-raising a lot to take advantage.

THE RESULT



A FEW HANDS LATER...



SAME THING...

- His stack size is basically the same as last time, and his position is one earlier than last time.
- My play vs. this is very similar:
 - 3-bet-call 99+, AQ+
 - Just call 77-88, AJs
 - 3-bet-fold a few other hands like Ajo, KQs

THE RESULT



BLIND DOWN FOR A BIT... (SOMETIMES, YOU JUST DON'T GET GOOD CARDS, THAT'S OKAY...)



MY RANGE FOR GOING ALL-IN

- Once again, it's all-in or fold
- 88, AJs+
- The limp changes a lot, because the preflop raiser is opening a lot less when there is a limp already. If there was no limp already, I would add hands like 66-77, AJo, KQ to my range

THE RESULT...I THINK HIS CALL IS VERY BORDERLINE BUT NOT WRONG



NEXT HAND...



ANALYSIS

- I'm planning on calling his all-in whenever I make this re-raise...I've put in 25% of the effective stack size...
- My range here is maybe A7s+, A9o+, KTs+, KJo+, QJs, 55+
- Note how much wider this is, just because positions are later!

THE RESULT...LUCKY!



I ALWAYS HAPPEN TO HAVE A GOOD HAND, BUT I'LL SAY MY RANGES...



MY RANGE

- I would comfortably calls this with A5s+, A7o+, K9s+, KTo+, QTs+, QJo, 22+
- Once again, notice how this range is even wider than the last!

THE RESULT

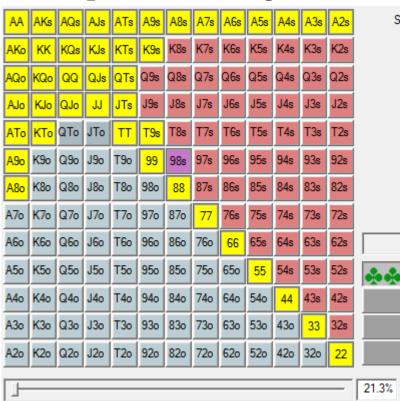


NEXT HAND...



RANGES

• I expect his range to be about



CHECK-POINT

- Are you really going all-in frequently enough?
- (I suspect you aren't. Not to offend anyone =P)

My range

- If you do the math, my profitable calling range against this is something like ATs+, AJo+, 66+
- Note that I did not include KQ! This is because there are so many Ace+random hands in his range.

SOME HANDS WITH POSITIVE EQUITY I MUST FOLD, BECAUSE OF THE 4 PLAYERS BEHIND ME



A POSTFLOP HAND...



ANALYSIS

- Option 1: Fold. My hand is probably too good for this.
- Option 2: All-in. This is good because it may bluff him off a lot of better hands. However, it is unnecessarily risky when Option 3 is so good...
- Option 3: Call. I'm getting good odds, I'm in position postflop, and I have a hand that plays pretty well postflop:
 - I usually have a hand good enough to go all-in when I hit a pair (since stacks aren't that deep and both my cards are high enough). I can make a lot of good bluffs with straight and flush draws.
 - This play would be terrible with 44. But if we had a lot more chips, then "set mining" would be alright.
 - This play is always terrible with a hand like A3o.

HE BETS THE FLOP...



ANALYSIS

- I do hit a pair, but I choose not to raise:
 - The Jack isn't the highest card. I'm losing to a King.
 - Even if my hand is good enough to go all-in, I'm not really scared of too many turn cards. Only a Ace and Queen are truly scary. (Compare this to the flop coming K84 instead of KJ4, then there's a lot more cards that scare me.)

So I CALL



HE CHECKS TURN...



NO NEED TO BET

o Once again:

- Our hand is really on the border of being good enough to get him to "call with a worse hand".
- Overall, I would consider our hand a "mediumstrength hand", so I do not bet.
- Part of the reason is because he re-raised preflop! So he could have hands like QQ, AJ, etc...hands that will call our bet and beat us.
- Also, the turn is not scary at all, and there are not that many scary river cards.

HE CHECKS AGAIN



I THINK BETTING WOULD'VE BEEN FINE TOO, BUT VERY BORDERLINE



NO NEED TO WIN EVERY POT...



FOLD.



WE'RE "ESSENTIALLY" ALL-IN PREFLOP...



RANGES

- His range: any pair, any ace, any suited king,
 K70+, Q5s+, Q80+, J8s+, J90+, T90, T7s+, 97s+,
 87s+, 76s, 65s, 54s?
- My range: any pair, A5s+, A8o+, KTs+, KJo+,
 QJs
- Once again, I have to be careful of the two players behind.

NOTICE SOMETHING?

- The person who raises all-in ("bluffer") can have lots of small suited hands in his range, because these hands, while losing to garbage like Q30, still never do that bad against good hands like AK. They do similarly well against everything.
- The person who calls the all-in ("caller") never has these small suited hands. They usually have hands like A70, that can be **way ahead or way behind** another hand.

WE PUT IT ALL-IN ON THE TURN (DOESN'T REALLY MATTER WHEN) AND I LOSE.



SOME HANDS LATER...



ANALYSIS

- Rule of thumb: when you have less than 20BB's, a single re-raise (3-bet) will put you all-in
- My range: any pair, A5s+, A8o+, K9s+, KJo+,
 QJs, JTs

THE RESULT...WIN A 30-70



NEXT HAND (MY RANGE IS BASICALLY THE SAME)



THE RESULT



NEXT HAND



ANALYSIS

- Rule of thumb: When the effective stack size is 10BB or less, you cannot fold to an all-in after you've already raised
- Indeed, I've put in a high enough % of the effective stack for calling the all-in to be positive expectation

RESULT...WIN ANOTHER 30-70 =)



NEXT HAND



WE BET QUITE SMALL AFTER THEY BOTH CHECK



REASONS

- Not many scary cards to come, so it's okay if we give them good odds
- Gives them a chance to call with a weak hand or make a random bluff
- Even if they have an Ace, we can still get all their money in by the river!

Unfortunately, they both fold.



My range is similar to the analysis we did in the first slides, except even wider, since we have 10BB instead of 15BB



RESULT



TRYING TO STEAL...



FAILED STEAL...



THAT'S OKAY



MY CALLING RANGE?

• I would've called his all-in with A5s+, A7o+, KTs+, KJo+, QJs, 44+

A FEW HANDS LATER...FAILS AGAIN...WE FOLD



NEXT CLASS

• I will finish the tournament, and play through every hand of the final few tables, even if I fold!