MIT 15.S50 Lecture 3
January 15th, 2016
Tournaments vs. Cash Games
<table>
<thead>
<tr>
<th><strong>Tournaments</strong></th>
<th><strong>Cash Games</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed buy-in for a certain amount of chips</td>
<td>Start with any amount of money you want; reload anytime</td>
</tr>
<tr>
<td>Play until you lose all your chips</td>
<td>Start and stop anytime</td>
</tr>
<tr>
<td>Blinds keep increasing, so eventually you lose all your chips</td>
<td>Fixed blind amount (say $1/$2)</td>
</tr>
<tr>
<td><strong>No control over your table</strong></td>
<td>You choose your table</td>
</tr>
<tr>
<td>Goal is to survive</td>
<td>Goal is to kill</td>
</tr>
<tr>
<td>Frequent but fixed losses accompanied by the occasional big win</td>
<td>Big wins, small wins, small losses, big losses can all happen</td>
</tr>
<tr>
<td>More variance</td>
<td>Less variance</td>
</tr>
<tr>
<td>Fun?</td>
<td>Work?</td>
</tr>
<tr>
<td><strong>Wider range of situations (# of players at table, stack sizes, antes, bubbles)</strong></td>
<td>Fixed situations</td>
</tr>
<tr>
<td>Low house rake (premium)</td>
<td>High house rake (premium)</td>
</tr>
</tbody>
</table>
Why we chose tournaments

- Less metagaming
- More exciting
- Wider range of scenarios
- More applicable?
Our club has both

<table>
<thead>
<tr>
<th>Table</th>
<th>Game</th>
<th>Limit</th>
<th>Stakes</th>
<th>Pls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fun Aldea</td>
<td>Hold'em</td>
<td>NL</td>
<td>5/10</td>
<td></td>
</tr>
<tr>
<td>Fun Bolzano</td>
<td>Hold'em</td>
<td>NL</td>
<td>25/50</td>
<td></td>
</tr>
<tr>
<td>Fun Otero</td>
<td>Hold'em</td>
<td>NL</td>
<td>10/20</td>
<td></td>
</tr>
</tbody>
</table>
But only tournaments count for standings
Preflop Percentages
Some preflop numbers to memorize

- Bigger pair vs. smaller pair: 80/20
  - AA vs KK: 81.9%
  - AA vs 88: 80.5%
  - 33 vs 22: 80.4%

- A pair vs. zero overcards: 80/20
  - AA vs AKo: 93.2%
  - AA vs 65s: 77.5%
  - JJ vs T9s: 81.7%
  - QQ vs 74o: 84.8%
  - KK vs K2o: 94.6%
  - KK vs K2s: 89.2%
Some preflop numbers to memorize

- A pair vs. one overcard: 70/30
  - QQ vs AJo: 71.7%
  - QQ vs AJs: 68%
  - QQ vs AQs: 65.7%
  - 88 vs A2o: 70.2%
  - 33 vs A2o: 68.8%

- “Dominating” the other person: 70/30
  - AKo vs AQs: 70.1%
  - AKs vs AQo: 75.4%
  - AKo vs AQo: 74.4%
  - AKo vs KQo: 74.8%
  - AJo vs A2o: 72.6%
  - A8o vs A2o: 65.7%
  - A5o vs A2o: 56.2%
Some preflop numbers to memorize

- Two overcards vs. a pair: 50/50
  - AKs vs 22: 49.9%
  - AKo vs 22: 47.4%
  - AKo vs QQ: 43%
  - T9s vs 22: 54%
A > B > C > D

- **AB vs CD: 60/40**
  - AKs vs 76s: 61.1%
  - AKo vs Q7o: 67.7%
- **AC vs BD: 60/40**
  - AQo vs K9s: 60.1%
  - K7o vs J3o: 63.7%
- **AD vs BC: 60/40**
  - A2o vs K3o: 61.4%
  - A2o vs T9s: 51.6%
  - AJs vs KQs: 59%
Remember some numbers:
- AKo vs AQs: 70.1%
- AKs vs AQo: 75.4%
- AKo vs AQo: 74.4%

Suitedness changes your equity so much when you’re behind! Whereas it changes your equity much less when you’re ahead.

When you’re the one going all-in, you will usually be behind when called. Thus, suitedness matters so a lot, because it gives you additional ways to pull ahead.

When you’re the one calling, you’ll usually already be ahead, so suitedness matters less.

(Suitedness also matters a lot for postflop play.)
Preflop All-ins
These are not highlight-reel plays and could be considered “boring”

But it’s the routine boring decisions that determine your win-rate, not the occasional brilliant insight.
Don’t be afraid to go all-in in preflop

- Late in tournaments, with the addition of antes and declining stack sizes, winning the blinds and antes is so valuable.

- What you gain is so large relative to what you lose.

- Remember Lesson 1: “Any 2 cards have a chance against any 2 other cards preflop”!

- Of course, don’t take this too far
Always just go all-in if you’re gonna play the hand at all, when:

- Effective stack size $\leq 12BB$, with antes
- Effective stack size $\leq 10BB$, without antes
Recall that we said your BTN opening range should be similar to your SB opening range.

However, for all-ins, your SB opening range can be a lot wider, since position doesn’t matter.

Also, I would go all-in with up to 15BB with antes, 12BB without antes.
Review of Theory: Do you go all-in or fold? (Suppose we are reasoning exploitatively.)
Is the BB a gambly player? Is it likely that he or she will call with a wide range of hands?

How have I been playing? Do I look like a crazy all-in monkey, or will my all-in get the credibility of a very good hand?

(Suppose it is far from the pay bubble.)
Analysis

- Let’s suppose the BB calls a “reasonable” range:

- Your equity against this range:
Do the math

- 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
- \[0.75(+2.5) + 0.25(0.36(+16.5) + 0.64(-14.5))\]
- \[=0.75(+2.5) + 0.25(-3.34)\]
- Clearly positive.
- \[=1.04BB\]
- 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...
Now we have 28% equity, instead of 36% equity, against his calling range

Expectation when he calls:
- $0.28(+16.5) + 0.72(-14.5) = -5.82$

Overall expectation:
- $0.75(+2.5) + 0.25(-5.82)$

Still positive! This shove is an EXCELLENT play that earns you 0.42BB’s, not a “crazy bad” play. We are still earning positive chips/money!
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 32o).

Your equity with QJo:

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

- BB calls only 25% of hands
- To exploit this, SB shoves with 100% of hands
- To exploit this, BB calls with a very wide range (say 67%)
- To exploit this, SB shoves 40%
  - BB calls 30% (too low)
  - SB shoves 80% (too high)
  - BB calls 50% (too high)
  - SB shoves 50% (too low)
- Etc.
Let’s take a look at the Nash ranges

- **SB** 66.8%, 22+ Kx+ Q2s+ Q5o+ J2s+ J7o+ T2s+ T7o+ 93s+ 96o+ 84s+ 86o+ 73s+ 76o 63s+ 65o 53s+ 43s

- **BB** 38.5%, 22+ Ax+ K2s+ K5o+ Q6s+ Q8o+ J8s+ JTo T9s
When to use/not use this

- This is a potential formula to follow, when figuring out which hands to go all-in with from the SB, and which hands to call with from the BB.

- However, if the BB is calling way fewer than 38.5% of hands, then as SB you can go all-in with a lot more than 66.8% of hands.

- If the SB is going all-in with way fewer than 66.8% of hands, then as BB it is a huge mistake to call with as much as 38.5% of hands.
If the SB is going all-in with 66.8% of hands, then the optimal strategy for the BB is go call with 38.5% of hands.

If the BB would call an all-in with 38.5% of hands, then the optimal strategy for the SB is to go all-in with 66.8% of hands.
Learning the Ranges
How to learn the ranges?

- Memorization
- Understanding theory
- Extrapolation
A few more nash ranges

**BTN, 10BB**
- 43.9%, 22 + Ax + K2s + K6o + Q5s + Q9o + J7s + J9o + T6s + T9o + 96s + 98o + 85s + 75s + 65s + 54s

**CO, 7BB**
- 38.8%, 22 + Ax + K2s + K9o + Q5s + QTo + J7s + J9o + T7s + T9o + 96s + 86s + 75s + 65s + 54s

**LJ, 10BB**
- 23.4%, 22 + A2s + A8o + K7s + KJo + Q8s + QJo + J8s + JTo + T8s + 98s

**UTG (9 handed), 3BB**
- 24.1%, 33 + A2s + A8o + K6s + KTo + Q8s + QTo + J9s + JTo + T9s
UTG All–Ins (approximated for pedagogical reasons)

- 15BB: 6.2%
- 10BB: 13.4%
- 5BB: 33.3%
Another example of extrapolation: HJ

- 15BB: 23.4%
- 10BB: 28%
- 5BB: 50.4%
All-in.
Big all-ins with small pairs

- Small pairs, while having good implied odds when very deep ("set mining"), have terrible implied odds when 15–20BB deep.

- Therefore it is encouraged to go all-in with them even with more than 12BB.
All-in.
All-in.
Ax suited is a lot better of a hand than it looks for going all-in preflop

The Ace removal is also relevant
All-in.
Ax offsuit also has terrible implied odds, so going all-in for more than 12BB is okay.

- It also protects your small-pair shoves a bit.
All-in.
Small cards

- 76s is similar to a small pair in that it has great implied odds when very deep, but mediocre implied odds when 15–20BB deep.

- Once again, just going all-in is acceptable.
Not a good all-in
Pay attention to other stack sizes in tournaments!

- The Big Blind only has 3BB and is guaranteed to call

- Even if they call with a “worse” hand, you’re much better off having a chance of winning the blinds for free
Curves for Extrapolation/Interpolation
The next 2 slides both contain “ambitious, exploitative” ranges that are more applicable to situations with lots of beginners where everyone folds too much.

They are more aggressive than Nash and can be exploited.
The most # of BB’s I’m willing to go all-in for from each position, with A4o.
The most # of BB’s I’m willing to go all-in for from each position, with 76s.
With A4o, the maximum # of BB’s I could risk declined drastically with each position, because when you get called, you are usually so far behind.

With 76s, the maximum # of BB’s I could risk declined slower with each position, since it does relatively better against the monster hands.
Getting it in when really short
Don’t fold with ridiculously good odds preflop!

- “Any two cards have a chance against any two other cards preflop”

- It is difficult to have less than 30% equity preflop no matter what cards you have, unless your opponent is raising from early position

- It is difficult to have less than 30% equity preflop if you have an Ace in your hand, even if your opponent’s range is really strong
Raise 98s from HJ

Last Action
HJ raises to 1600$
BB goes all-in for 10BB’s
We only need 37% equity to call
Any hand we would raise from here in the first place, we have enough equity to call.
We have 4BB’s in the Big Blind
We go all-in, knowing he will call
He calls, as expected.
Analysis

- If we go all-in for 4BB’s we know we will get called
- But still, we would be risking 3BB’s to win a total pot of 9.5BB’s, so we need just under 33% equity
- Assuming he raises the top 20% of hands (which is a pretty tight player), we are still 34% against his range
Re-raising Preflop
Too much of this...
And this...
Not enough of this...
And this...
Why is THIS so bad

Last Action
UTG+1 raises to 1600$
But THIS okay?
When you get caught in the first case, there is no escape anyway
Analysis

- Need to call ~8BB to win a total pot of ~22.5BB (10+10+1+0.5+1)
- Only need 36% equity
- You definitely have this with ATcc, so you’re basically committed
- Your equity against 66+, AJ+, KQ is 39% (Pokerstove)
Recall the “Sweet Spot” Theory:
- The reason for raising small is to ESCAPE when you have a bad hand. ATs is definitely a “bad hand” in your range: in fact, it’s the worst hand in your range of 77+, ATs+, AJo+, KQ.
- The reason for raising big is to disallow the Blinds to have such good odds to call and defend against you stealing.

But we just proved that you CANNOT ESCAPE anyway!

So you might as well raise AS BIG AS POSSIBLE ie. all-in.

Sure, you can raise to 4BB (out of your 10BB) to deny your opponent good odds, but this is still worse than just going all-in (although mostly equivalent).
The second case...
Analysis

- Need to call ~ 17BB to win a total pot of ~ 40.5BB (19 + 19 + 1 + 0.5 + 1)
- Need 42% equity
- You definitely don’t have this, so you can “escape” and fold
Call or Re-raise?

- In the first class, we only covered how to “open” preflop, ie. raise if no one has yet entered the pot.

- What happens if someone has already raised (or didn’t follow my rules and called aka. “limped”)?
Re-raise Sizing

- Same principles apply:
  - Advantage of re-raising to a small size: risk less when you intend to fold your hand to a re-re-raise.
  - Advantage of re-raising to a large size: deny your opponent the odds to call profitably.
  - If your re-raise size would cause you to commit over a “critical portion” of your stack such that you cannot escape, then just re-raise all-in instead.
This is disastrous! He needs to call 1.5BB to win 9BB (2.5+4+1+0.5+1). You’re giving him 6-to-1 odds!
He needs to call 3000 to win 9100 (2000+5000+800+400+900). 3-to-1 odds, much less ludicrous!
This “critical portion” gets smaller as ranges get stronger:

- I told you to go all-in when you have 15BB or less. Essentially what I’m saying is, “commiting 2BB of your 15BB in a min-raise is already a critical portion” (13%).
- If you are re-raising pre-flop, I’d say you need to commit 25% before it’s critical.
- So in the previous hand, if you had 20000 chips or less, I’d just go all-in instead.
Recall that I said you should never just call preflop, if the pot hasn’t been raised yet. But, if the post HAS been raised, like in the previous example, then just calling is okay.

Why is this?

The big blind can put in another raise preflop when he has a good hand, even if you limp.

The first preflop raiser does NOT get to put in another raise preflop if you don’t re-raise him.

While limping has NO advantages, calling a preflop raise has SOME advantages. So it is sometimes a viable option.
In position with a hand that plays well in a multiway pot...it’s all good
Disaster!
How to deal with callers?

- Even though I’ve explained why you should never be just calling when the pot has not been raised, people will inevitably still make this mistake.
- We call such people “limpers”, usually a derogatory term.
- Either way, you need to be prepared to punish such people and raise their limps.
- But, you need to be aware that you should change your raise size.
- Be wary of the limp-raise.
If you follow the “raise to 3BB” rule, you’re giving the limpers too good a price to call!
Not just 3BB... 3BB + 1BB for each limper = 6BB
Keeping it Simple
Suppose I am too scared to go all-in... can I raise to 2BB as an alternative?
Let’s put ourself in BB’s shoes...

- If we go all-in, BU will need to call 6 to win a pot of 17.5, so he will call so long as he thinks he has at least 34% equity against our range.
  - So he will pretty much always call. (“When given 2-to-1 to call a pre-flop all-in, you can pretty much always call unless you are guaranteed to be a 70-30 or worse.”)
- When we go all-in, assuming BU calls, we risked 7 to win a pot of 17.5, so we need 40% equity for this to be profitable.
If our hand has 40% equity vs. BU’s range, then going all-in is +EV.

If our hand doesn’t have 40% equity vs. BU’s range, calling could still be +EV, since we are given 4.5-to-1 to see the flop.

Even if our hand has 40% equity vs. BU’s range, calling could be more +EV than going all-in.
Strategy for BB

- If our hand has more than 50% equity vs. BU’s range, then it is most likely in our interest to get all-in instead of just calling, since it is in our favor to put money in 1-to-1.
- If our hand has less than 50% equity vs. BU’s range, then it is most likely in our interest to just call, even though we have Reverse Implied Odds postflop from being out of position.
- Even if our hand has less than 40% equity vs. BU’s range, as long as it has more than ~30% equity, it is probably +EV to call given 4.5-to-1 odds to see the flop.
None of these opportunities for the BB would’ve arisen had the BU just went all-in in the first place!
The BB would’ve just had to call the hands with 40% equity, and fold the rest.
But now, we’re allowing the BB to still get the money in when he has 50%+ equity, play any hand with ~30% equity, etc.
What about raising to 4x?
Analysis

- If the BB were to fold, then raising 4x is equivalent to going all-in.
- If the BB were to re-raise all-in himself, then raising 4x is equivalent to going all-in (since we are going to call his re-raise).
- Are there situations where the BB is better off calling, and folding some flops? Probably not, since the pot will be 1880 on the flop where each player has 800 left. So the BB calling is equivalent to the BB re-raising all-in, since no player is ever folding postflop.
However, the analysis for the last bullet is hard. Maybe there are some opportunities for the BB to squeeze extra EV with a few of the hands in his range, but just calling preflop.

Going all-in gives the BB strictly fewer options, so it is the “right” play.

For raising to 2x or 3x or 4x to be a better play than going all-in, the BB has to be SO STUPID that having more options will somehow cause him to make a worse decision. This is the same concept as what Bill Chen called a “sucker bet” in his lecture.
Don’t do anything funny!
All-in.
Don’t be afraid to defend against late position (BTN, CO, HJ) steals!
All-in.
Again, don’t do anything funny, especially when your opponents are already given such good odds to call.
“Squeeze-play” all-in.