When is it best to Bid, Pass, or Double?

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When playing bridge, one has to make many decisions whether playing in a team game or in pairs. Most important, among many, are decisions about when to bid on (out bid the opponents), pass, or double the opponents in a completive auction? To help one make this decision, one may use the concept of expected values with IMP or match point scoring. Recall that IMP scoring is used in Knockouts and Swiss team matches while match point (MP) scoring is used in pair's sessions.

Expected Value (EV) is a term from statistics. It means: What is the value (gain or loss) we expect to get if we do the same experiment over and over again? It is defined as the Probability (P) times the Score (S) of an event: EV = P X S; the expected outcome in the long run.

How is that related to Bridge? Let's look at a few examples.

Example 1

Let's say we are playing in a Swiss Team/Knockout Session, which uses IMP scoring. Our partner makes a game invitation and we are in doubt on what to bid: game in a major 4♠ or Pass?

We have 16 points (Bergen Points). Is 16 points good enough for a raise to game or should we pass?

Looking at our cards and the bidding, suppose we can expect one loser in each suit, which means that making 10 tricks will depend upon a successful finesse. So we estimate our chances of making the contract at 50%.

Assuming that indeed the contract has a 50% chance to succeed, what should we do? Should we pass or raise to game? Also, is vulnerability an issue in our decision?

Let's say we're playing speedball on BBO and we get the exact same bidding problem on all 12 hands. We'll check what happens if we would pass on all 12 hands, and what happens if we would raise on all 12 hands.

Since we have assumed 50% success rate, we'll say that on 6 hands we make 9 tricks and on the other 6 we make 10.

Let's begin with the Pass policy:

Contract: 3♠

Tricks	Score	Probability	EV
9	140	50%	70
10	170	50%	85

We can see that our total expected value here is 165 (70+85), the average between getting 140 and 170 whether vulnerable or not.

Now let's see what happens if we raise to 4♠, vulnerable:

Contract: 4♠

Tricks	Score	Probability	EV
9	-100	50%	-50
10	620	50%	310

We can see that our expected value vulnerable is 260, which means that we will gain much more if we bid game. We GAIN more than we lose!

In other words, if we are vulnerable, it is much more profitable, in the long run to bid game. With a 50% change, by bidding game we have much more to gain than to lose.

To make this clearer; the score in IMPs is calculated in this way: Calculate the average of all scores and check how far your score is from the average. This distance is translated into IMPs using a special IMP table.

Let's check these distances.

When not vulnerable:

We score 140 for making 3♠ and -50 for 4♠ -1. This means an average of 45 for the hand. That means that 3♠ made will gain 95, which is 3 IMPs, and 4♠ -1 will lose 95, which is a loss of 3 IMPs.

We score 170 for 3♠ +1 and 420 for making 4♠. This means an average of 295 for the hand. That means that 3♠ + 1 will lose 125 which is 4 IMPs and 4♠ made will gain 4 IMPs.

When vulnerable:

We score 140 for 3♠ and -100 for 4♠ -1. This is an average of 20 for the hand. That means that 3♠ made will gain 120 (140 - 20), which is 3 IMPs and 4♠ -1 will lose 120 (-100 -20), which is a loss of 3 IMPs.

We score 170 for 3♠ + 1 and 620 for making 4♠ = 620. This is an average of 395 for the hand. That means that 3♠ + 1 will lose 225 (395 - 170) which is 6 IMPs and 4♠ made will gain 6 IMPs!

To sum it up, lets translate the IMPs into dollars and translate the play above to flipping a coin.

We flip the coin 12 times and we always choose "heads", which has a 50% chance to come up. On the first 6 flips our award for winning is $4 and our cost for losing is $3. Let's assume that on these 6 flips that we win 3 times and lose 3 times, we earned $3.

On the last 6 flips we win $6 for each "heads" and lose $3 for each "tails". If it's "heads" 3 times and "tails" 3 times we will win $9.

Back to speedball: If in all 12 hands we will raise to 4♠, we are expected to win 12 IMPs in total for our strategy (9 for the 6 hands vulnerable and 3 for the 6 hands not vulnerable). If we pass all 12 hands, we are expected to lose 12 IMPs for our strategy.

Thus we conclude that it is far better to bid than to pass.

Example 2

How many time have your heard, bidding a slam based upon a finesse is a good slam"?

Let's investigate this doing an EV analysis.

Partner's 4NT is a quantitative slam invitation. It is more than likely that if we bid a slam, it would depend on a successful finesse in one of the suits. Let’s assume that making the slam is totally depending on successful finesse. Assuming the success of bidding slam is 50%, should we bid the slam or pass 4NT? Do we gain more than we lose by raising anyway?

Let's do an analysis.

1. Not vulnerable:

a. Contract: 4NT

Tricks	Score	Probability	EV
11	460	50%	230
12	490	50%	245

b. Contract: 6NT

Tricks	Score	Probability	EV
11	-50	50%	-25
12	990	50%	495

The expected value of passing game is 475 and for bidding slam it's 470, about the same.

2. Vulnerable:

a. Contract: 4NT

Tricks	Score	Probability	EV
11	660	50%	330
12	690	50%	345

b. Contract: 6NT

Tricks	Score	Probability	EV
11	-100	50%	-50
12	1440	50%	720

The expected value of passing is 675 and for bidding slam it's 670, about the same.

Conclusion: There is no significant loss or gain if we always bid a slam here, whether vulnerable or not when the percentage is 50%. Bid the slam.

Example 3

How about bidding a grand slam versus a small slam? Is it worth risking a small slam that is sure to make, for a grand slam with a 50% chance to make?

Let's check again using an EV analysis.

1. Not vulnerable:

a. Contract: 6NT

Tricks	Score	Probability	EV
12	990	50%	495
13	1020	50%	510

b. Contract: 7NT

Tricks	Score	Probability	EV
12	-50	50%	-25
13	1520	50%	760

The expected value of staying in a small slam is 1005 and for bidding a grand slam is 735. Not worth trying a grand (on a 50% chance). You have much more to lose than to gain.

What is the probability that the expected strategies are the same? Let P denote that probability. Then they are equal if (1-P)(495)+P (510)=(1-P) (-25)+ P (760) or P=52/57 or about 0.675.

Conclusion: The value would be equal if we had a 67.5% chance to make, more that 50%.

2. Vulnerable:

a. Contract: 6NT

Tricks	Score	Probability	EV
12	1440	50%	720
13	1470	50%	735

b. Contract: 7NT

Tricks	Score	Probability	EV
12	-100	50%	-50
13	2220	50%	1110

The expected value of staying in a small slam is 1455 and for bidding a grand slam is 1055. Not worth trying a grand (on a 50% chance). You have much more to lose than to gain.

What is the probability that the expected strategies are the same? Let P denote that probability. Then they are equal if (1-P)(720)+P (735)=(1-P) (-50)+ P (1110) or P=770/1145 or about 0.672.

Conclusion: The value would be equal if we had a 67.2% chance to make, more than 50%.

There are many more aspects to discuss related to expected value, and this subject can be expanded to more decisions that are not 50%-50%. Some of our decisions will be made due to vulnerability, and there are also different decisions to be made if we use IMP or MP scoring.

Example 4

Non-vulnerable:

Partner's 2♣ overcall shows approximate opening values (overcall at the 2nd level = 12-15 points).

At IMPs it's better to pass:

Whether you make a part score or set the opponents (+130, +110, +100, +50)

OR

Whether they make their bid or you go down (-130, -110, -100, -50)

The result would be not too different (might be up to at most a 2 IMP difference).

But at MPs there are more things to take into account:

+50 (3♣-1) is likely to be a bad score if we can make +90 (or +110), also

+100 (3♣-2) can be bad if we can make +110 (3♣).

Expected value here says if we PASS, we lose.

So, the r**ecommend action In MPs: Double is best.**

Partner is likely to leave it (he didn't bid 3♣ and he didn't Double, so he has no more to add). Say there is a 25% chance they make it. You will get a 0 if they make it, but high chance on other 75% times to score high. While if you PASS, you get a bad score in all the situations as you lose to ones staying on 2♦ or bidding another part score.

Suppose your hand is:

♣1092 ♦AK32 ♥987 ♠Q43

Notice that many would not bid 3♣ with such a hand, but if they did. It is also likely that our partner has ♣ as he didn't double nor did he bid 3♦. On the example above 3♣ goes 2 down (3 hearts 1 club and 2 diamonds for defense) while 3♦ makes (lose 3 spade and 1 clubs). If we let them play 3♣ we get +100 instead of +110 (many will be in 2♦+1 = 110. Some might even play part score in NT, with our cards, scoring 8 tricks = 120). +100 will get us a negative score at MPs, while +300 will surely be close to a top.

Let's change the hand a bit in such a manner that each side may make their bid.

Now each side can make 8 tricks: 2♦ loses 3 spades, diamond and club. 3♣ loses 1 club 1 diamond and 3 hearts. If we pass 3♣, +50 will not give us a good score as many N-S would play 2♦, making +90. 3♣ doubled -1 will give us +100 which is a good score for sure as 1NT is made exactly and 2NT is going down which means that no part score will score higher than +100.

But what will happen if they make 3♣ doubled with, say

3♣ loses 3 hearts and 1 diamond. Say that we stick to our policy and double 3♣ and we get 0% (-470) for them making it. But remember that this is not us getting a bottom instead of a top score. If we pass 3♣, -110 will still be a bad score worth around 20-30% as most will likely be playing 2♦ on our side, going down 1 (-50). Notice! Here, at MPs, the gap between -110 (around 20-25%) and -470, is not that big.

In other words if we double, estimating that opponents are most likely going down, we will upgrade our score from a bad score to a great score, while the opponents make, our score will go from a very bad score to a bottom.

What if this was IMP scoring?

At IMPs, the calculations are completely different. Whether the score is 90, 100, 110, or 120, it makes no difference as it gives us the same IMPs. However, if they make 3♣ doubled, we can lose 9-10 IMPs, which will make us lose much more than we can gain. At IMPs - PASS!