END GAME: OUTCOMES—ESTIMATING NUMBERS AT THE FAR RIGHT

As the reader well knows, every path of even the most complex tree will eventually reach its end. There, the decision tree analyst must consider what’s the best numerical estimate of each possible net outcome. There’s no magic to estimating these numbers, though there are some mistakes to avoid.

Even without a formal decision analytic method with trees, branches and terminal nodes, lawyers’ written and oral case analyses will inevitably reference “possible financial exposure” or “likely recovery” values. Lawyers are called upon to respond to defense client questions such as: “What’s the worst case scenario? How much could we be on the hook for?” And the lawyer must try to respond when a plaintiff client asks: “At a minimum, what can I bank on if we win? What’s my upside?” Any client might ask: “Leaving aside best case and worst case scenarios, what’s your sense of where a jury would most likely land if they find liability?” Some cases suggest more discrete logical points at which award would be likely to land. The lawyers may note that their estimates depend upon specific theories of fact and law, on jury receptiveness to certain expert presentations, on the judges’ decision to admit certain evidence, or not. In other cases, the lawyer can only estimate a range of possible outcomes, without particular facts or theories favoring specific points along that range.

Whatever the case, at the end of each path in the litigation, the decision analyst lawyer must estimate a net quantity of dollars (or whatever the relevant currency or unit of value). It consists of what would be gained or lost at this end point, less the cost of arrival, beginning from the time the tree is built. By way of example, the decision analyst might estimate that if a jury finds liability on the fraud claim and punitive damages, and that jury was a particularly generous one— awarding on the high end—the damages award would be $1,500,000, estimated attorney’s fees from the present to that point would be $100,000, and expert witness fees and other miscellaneous costs would be $50,000. Thus, the net payoff would be $1,350,000.

Basic principles reminder: past and non-recoverable expenses have no place in the calculus. Thus, if the total attorney’s fees in the matter would be $200,000 but $100,000 of them had been incurred prior to the tree-building exercise, that first $100,000 has no place in the tree. It is a sunk cost. No decision can be made that would recoup the $100,000. Its expenditure was, and remains, unaffected by now choosing to settle or litigate, or by what path the litigation takes.¹

¹ While keeping unrecoverable sunk costs out of the tree is a bedrock principle for the decision analyst, it is one that often encounters client resistance: “I spent that money and it should be on there! It matters!” Strategies for explaining why past, unrecoverable costs must be excluded and yet, respecting their importance to the client, were offered in Chapter Three.
Avoiding Mistakes by Accounting for Psychology (Again)

Whether using formal decision analysis or not, the lawyer should again be mindful of partisan biases and anchoring effects in estimating damages awards, including “tightness of range.” As explained earlier, the best practice is to first consider factors that would drive a jury number away from the desired direction, and only then consider more favorable factors. So, when the plaintiff client asks, “What’s the most I could realistically hope for?”, the lawyer might first assume the trial has gone very well, but also take into account certain irrefutable facts: the plaintiff is reasonably wealthy already and the defendant did not act willfully. On the other hand, the accident was terrifying for the plaintiff, and the defendant’s negligence could have hurt many others.

Discrete Questions or Default to High, Medium, and Low

Articles and texts on the “how to’s” of decision analysis for legal contexts—litigation risk analysis—often arrive at the far right hand side of the tree, at the outcome or terminal node at which payoffs are calculated, and say simply, “Let’s assume the damages are $150,000 [or any round number].” Even if attorney’s fees or costs are added or subtracted to yield a net payoff, the damages award itself is represented as a single numerical point. In actual practice, except for rare cases of defined, stipulated, or liquidated damages, assuming a single damages award is misleading and unwise. It’s a far better practice to estimate a defined set or range of possible damage awards than a single point.

Texts on statistics or decision analysis written for business or public policy audiences appropriately set out applicable mathematical rules for capturing the range of possible outcomes in the analysis. Those rules are provided and discussed later in this chapter. It’s important for lawyers to know that this math works only for capturing a continuous range of outcomes—a range in which no single outcome is more or less probable than any other outcome within the range. Think of a personal injury case. All of the evidence has been admitted; the jury has found “mere” negligence (not willful or gross negligence). Assume for the moment that pure economic losses have been stipulated at $80,000. Given the plaintiff’s injuries, the lawyer might still acknowledge that the total damage award could come in anywhere between $100,000 and $400,000. He would admit that he has no way of predicting that $150,000 is more or less likely than $350,000. Indeed, within that range, he cannot assign a greater percentage likelihood to one dollar amount than another. That would fit the definition of a continuous range. Math works well here, prescribing fairly simple methods to ensure that this damages area can be captured efficiently without multiplying each single point along the range by its singular probability.

As referenced earlier, in many legal cases, not all outcomes along a range are equally likely. Assume that we are predicting what a jury might award, along the litigation path in which motions in limine were denied, and the plaintiff’s expert’s testimony was permitted. Still, we know that one jury (or vocal jury member) may have been persuaded by a particular theory—a way of viewing the narrative of causation, blame, and harm. Another jury (or vocal jury member) may be stingier, having accepted the defense arguments regarding lackluster efforts to mitigate. Different theories, different weighting of key testimony or evidence, will lead to different and discrete areas within a possible damages range. If that is true, then it seems wise to select areas of the range and assign probabilities representing your best sense of the evidence.
For example, assume you think that a jury is 60% likely to be moved by the plaintiff’s story, and disinclined to blame her for non-heroic efforts to mitigate her injuries in difficult circumstances. Then you would assign a 60% chance to a damages award toward the higher end of the range. (You might distribute that as 20% to $400,000 and 40% to $300,000—whatever feels right.) You might decide that the jury would cast some blame on the plaintiff only 40% of the time, based on the defense expert on rehabilitation therapy, and assign 30% to a verdict at $200,000 and 10% at $100,000. The only “formula” used to derive these percentages is that they must add up to 100%. A lawyer could pick any point, and assign any percentage to it—whatever seems right.

Even so, a mathematical “gut” check is appropriate. If $400,000 is the very highest number the lawyer could imagine as the jury award based upon the damages claimed, does he really think that it would occur in 20% of 100 hypothetical trials of the case? On the other hand, if the lawyer thinks it remotely possible (5% or 10%) that a jury could find a reason to adjust up to $500,000, then perhaps putting 30% in for $400,000 would be wiser. Or the lawyer might use 7.5% for $500,000, 22.5% for $400,000 and 30% for $300,000. As always true for tree-builders, the goal is to represent the range of possible outcomes, and to assign probabilities so that the number—the damages EMV—fairly represents possible damages discounted by their probabilities in the case.

For the Critical Reader: Branches vs. Estimates and Ranges

The critical reader may observe that it should be possible to keep adding layers of branches to the damages end of the tree, to map the possible variety of ways a jury who finds liability could arrive at a damages figure. After thoroughly deconstructing the jury’s or decision-maker’s potential thought processes, one could eventually reach all continuous outcome ranges on the far side of the tree.

By way of illustration, let’s look back to the example above. To the right of “Finds Liability,” you could sketch branches for: “Jury Strongly Weighs Mitigation as Lacking”, and “Jury Disregards Mitigation”. To the right of each of these, you could create a “High, Medium, Low” continuous damages range, as discussed and prescribed in more detail later in this chapter.

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2 At the risk of undue repetition, the reader should be reminded of our tendencies toward “tightness of range,” discussed at length in Chapter 9. This reminder applies to all of this chapter’s examples and discussions of numerical ranges and their probabilities.
Remember that, in the original discussion of the example, I permitted the assumption that economic damages were stipulated at $80,000. In reality, such a stipulation is rare. If a defense economist had pegged economic loss at $60,000 and the plaintiff’s economist at $100,000, one could further deconstruct the damages award into two or three branches: one for economic loss at $60,000, one at $100,000 and perhaps a compromise at $80,000. To deconstruct further, you could insert this layer of branches before or after the therapy mitigation issue. The tree builder could also insert a layer reflecting the possibility that the jury will be angry at the defendant or one of its witnesses. Then, finally, at the far right, the tree would show continuous ranges at each of many branches, as illustrated below.

Our next tree reflects different economic loss branches and also includes a new branch layer to allow for the possibility of significant “jury anger” (which may or may not be linked to the level of economic loss found). It then feathers many “high, medium, low” continuous damage range estimates at the far right side.

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3 In some cases, it might be legitimate to think that jury anger could be reflected in how they view mitigation. In another case, jury backlash might be separate and separable.

4 The earlier age discrimination case discussed earlier has some of this aspect.
As suggested earlier, the critical reader will note that one could deconstruct and map possibilities so thoroughly that, eventually, the tree would show only continuous damages ranges at the far right side. But perhaps this reader would then also recognize this tree’s undue and inaccessible complexity. At some point, too many branches and twigs obscure rather than illuminate. A balance must be struck.

For a practitioner whose cases are generally described as being of “medium” complexity, I advise moving to an end range of terminal nodes for hypothetical juries whose “inputs” were the same. This jury would have seen the same “movie”—the same important witnesses and evidence, perhaps received the same jury instructions (if there’s a major controversy around a jury instruction). Tracing your way along the path of a hypothetical tree, at the end of the line, one hypothetical jury will have the fraud issue and evidence before it, and all of the plaintiff’s expert witness testimony. But, then let’s look separately at the path along the tree where summary judgment was granted on the fraud issue, some but perhaps not all evidence relevant to fraud was excluded, and the plaintiff’s economic expert as to long term business impact was also excluded. That jury will have seen, in effect, “a different movie.” Thus, at the end node, a different range of damages should be considered and applied.

We know that one practical reason to resist mapping all possible jury musings is to avoid a spidery and unreadable web at the far right. A second reason is that, once the trial “movie” has been presented, more branches are just musings. Jury deliberations have a strong black box quality. Once you have mapped the inputs, it seems right to channel our various hypotheses about a jury’s deliberations into probabilities assigned to liability findings, perhaps probabilities assigned to well defined damage categories (punitive, not punitive), and then to ranges of possible outcomes.

The tree-builder undeterred by spidery layers of branches after layers of branches, or the tree-builder in a highly complex, very high stakes damages case, is welcome to reject this advice. You may wish to create a separate damages tree, mapping each theoretical way a jury might possibly weigh the evidence. That tree could be rolled back to a “damages only” EMV to be plugged into the main tree at appropriate terminal nodes. If the devil in your case is in the damages (and not so much in judicially excluded or included evidence), you may wish to spend considerable time with your client reviewing this damages tree.

Even in cases of low to middling complexity, but with difficult-to-predict damages, it may be worthwhile for the lawyer to map his musings on a separate tree, sketching out the different ways a jury might come to a damages conclusion. The exercise will help the lawyer clarify and articulate his own thinking. Once that is done, the lawyer is likely to see some numbers coalescing or clustering as outcomes/payoffs. He might then decide to use these numbers as the basis for estimating outcome ranges (whether continuous or discrete) on the main tree.

**The Right Math for Continuous Ranges**

Sometimes, damages predictions are not tied to alternative legal theories or discrete logical points suggested by specific evidence. Instead, if liability is found, it’s anyone’s guess as to where the verdict will fall. In mathematical terms, the possible damages outcomes constitute a continuous range. Our goal must be to insure the value of that continuous range is appropriately represented and thus, accurately calculable.
To quickly review: the entire decision analysis method is built upon the idea of taking possible outcomes, and discounting them by the cumulative probability that each will occur. Assume there really is an 80% chance of surviving summary judgment, a 50% chance of a liability finding and then a 20% chance of a $200,000 verdict (double defined damages), a 60% chance of a $100,000 verdict (defined damages), and a 20% chance of a $60,000 verdict (after deducting a claimed set-off). Then we know that there's a cumulative 8% chance of the $200,000 outcome, a cumulative 24% chance of $100,000 and an 8% chance of $60,000, as illustrated in the tree below. The cumulative probabilities for each outcome are reflected on the far right hand side. As discussed earlier, multiply each outcome by its cumulative probability, add them together, and you’ll have the same overall case EMV as if you had “rolled back” the tree from right to left.

$200,000 \times 0.08 = \$16,000$
$100,000 \times 0.24 = \$24,000$
$60,000 \times 0.08 = \$4,800$
$0 \times 0.40 = \$0$
$0 \times 0.20 = \$0$

TOTAL = \$44,800$

Take a look at the boxed figure just above and to the right of the chance node before the branches for each possible outcome. That number, (\$112,000) is the roll back or EMV of just the damages: 20% x \$200,000 = \$40,000, plus 60% x \$100,000 = \$60,000, plus 20% x \$60,000 = \$12,000. \$40,000 plus \$60,000, plus \$12,000 = \$112,000. In other words, if the jury was polled and it had found liability, the discounted value of the damages would be \$112,000. The method is entirely consistent with the decision analytic arithmetic done so far. Each outcome is multiplied (discounted) by its likelihood, and these are added.
But what if we agree that the verdict could be anywhere between $100,000 and $500,000 (including those two numbers), and we have no ability to say that any particular number within that range is more likely than another. Theoretically, we could take each number point within the $400,000 dollar difference, and multiply each by its own likelihood.

Let’s do the math. It looks complicated, but it’s not. If 100%—total probability—has to be divided among 400,000 separate little branches or points—one for each $1 of the $400,000—we know that the probability of each one is only .00025. (100% divided by 400,000)

So, must we do the operation: .00025 x $100,000, plus .00025 x $101,000…. and so on? Fortunately, the answer is NO! We know intuitively that if there is a 100% chance that the damages award will be between $100,000 and $500,000, you take the mid-point of the $400,000 range, or $200,000—and add it to the starting point of $100,000.

And so, it will end up at $300,000, the average of or midpoint between $100,000 and $500,000.\(^5\) Note that the average is the same as the weighted average because all probability “weights” are the same.

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\(^5\) To reemphasize the importance of outcomes being “mutually exclusive,” damages ranges should not overlap within any given branch. And, it should be remembered that ranges represented by averaged numbers (which can be denoted by a “±”) are actually still “collectively exhaustive.” Victor, Marc, *Interpreting a Decision Tree Analysis of a Lawsuit* (1988, revised 2001), available in pdf on his website: litigationrisk.com.
Graphically, we have captured the entire area under a line, representing the percentage likelihood of each separate point—each possible dollar result.

The next graph enables us to visualize the cumulative likelihood that a result will be greater or smaller than a particular figure.
Thus we see from the graph above: if all possible and equally likely results range from $100,000 to $500,000, as we move to dollar points higher up in the range, you see an increase in the cumulative chance that the award number will not be higher. To be more concrete, since $400,000 is 75% of the way between $100,000 and $500,000, there is a 75% probability that the award will be at $400,000 or lower, and only a 25% probability that it will be between $400,000 and $500,000. And the way we’ve described this neat and clean hypothetical, there is 0% chance that the award will be higher than $500,000.

As is so often true, the math gets a little bit more complicated when reality intervenes—when using numbers that better reflect our imprecise knowledge. It is generally unwise and inaccurate to claim a 100% chance that an outcome will fall within a certain range or a 0% chance that it won’t. We are wiser, and less likely to be proven wrong, by predicting a 90% chance that an outcome will be higher than $X and a 90% chance that it will not be lower than $Y. There is no magic to 90%. The parameter could be 95% or 85%.

When using statistics to test the strength of evidence and empirical or experimental studies, 95% is the most common measure or dividing line. For example, when examining a claim of class-wide discrimination, the statistician is asked the probability that an age, race, or gender distribution found in the employee population would have occurred by chance. If the statistician finds a 5% (or lower) probability that the distribution occurred by chance, and thus a 95% (or higher) probability that it occurred as a result of discriminatory practice or culture, the case for discrimination is recognized as strong. To avoid jumping to a conclusion with severe consequences, courts often err on the side of conservatism and require a 95% cut off.

Conservatism may cut the other way for a tree-builder in litigation. When choosing the end points for a range of possible outcomes, is it better to ask and answer: (1) What are the bounds beyond which the actual outcomes would fall only 5% of the time, at the high and low end?; or (2) What are the bounds beyond which actual outcomes would fall up to 10% of the time? The fictional assumption underlying both questions is still that the trial would be repeated many, many times. For a “95%/5%” figure, the tree builder must strain to think wider—to imagine possible outcomes far outside of the ordinarily predicted. For the “90%/10%” figure, the tree-builder must still reach for the improbable outlier, just a little bit less so. The reason it matters for the analysis (particularly in a potentially large dollar case), is that math works differently.

The more difficult question is whether it is best practice to ask for the 90%/10% numbers or the 95%/5% numbers. The source of our quandary is too much knowledge about the power of anchoring and tendencies toward “tightness of range.” If the tree builder or lawyer has come up with a mid-point (articulated or not), and is asked for numbers further out, at the 90% or 95% end of a possible range, we justifiably fear the midpoint will serve as an anchor. His tendency will be to adjust insufficiently from the anchor. It would be dishonest, but tempting, to ask for the 95%/5% range, but act as if it were 90%/10%.

Of course, honesty, transparency, and discussion must trump temptation. It makes sense, perhaps, to ask first for both ends of the 90%/10% range: “Focusing on the high end, can you name a jury verdict number such that you can say with confidence, you are 90% sure it wouldn’t be higher than this, or, you are 100% sure it wouldn’t be higher than this 90% of the time?” The same question should be asked on the low end. Then, it’s worthwhile to ask: “Well, what if the question was 95%, how much would your
numbers change?” Then, it’s worth asking whether the new numbers best inhabit the 95% or the 90% place. That may be a way to nudge further away from an unintended anchor. Before moving to explain the correct mathematical way to account for these numbers, it is worth noting that if I am confident that 90% of the results will be lower than X and that 90% of the results will be higher than Y, I have carved out only 80% of the total range of possible numbers. A 10% tail is left at each end. When the question is asked at 95%, for both high and low, only 90% of the range is covered, with a 5% tail at each end.

![Graph showing probability distributions](image)

**Math Matters where The Number isn’t the Answer**

There are right and wrong ways to insert probabilities to account for a continuous range. Here’s the wrong way—one I confess to having used too in earlier days:

Ask: “Can you imagine a jury award that is so high that nine times out of ten, the jury award would be lower than that, or you are 90% sure the jury award will be lower?” And so on, for the middle and then the low end.

Then, the wrong thing to do is to assign 10% to the high outcome, 80% to the middle one and 10% to the low one, and use those probabilities and numbers when rolling back to an EMV.
Note that we have assumed a damages range of $1,000,000, $600,000, and $200,000 for all of these examples. This is wrong because it underweights the real extremes. If you think about it, you see that this calculation assumes that the result will never be higher than X or lower than Y. In fact, each is assumed to happen 10% of the time. Thus, the EMV fails to fully account for the impact of that remaining portion of the range that exists above X or below Y. Yet the goal, when working with a continuous range, is to account for every possible outcome in the range and to give each appropriate weight.

When the end node is acknowledged to be a continuous range, the 90%, 50%, or 10% numbers have been selected to describe that entire range. It’s important not to lose sight of the goal: to capture the entire range and appropriately include it in the analysis. As well as possible, we seek to mathematically recreate every point on a line and the probability underneath it. Thus, really, the numbers are target points along the range. Our calculations should enable the target numbers to “radiate” or expand to the space between the numbers, thus covering the entire line. We are using those numbers to carve the line into segments, or “fractiles” (the mathematical term).
Three is generally accepted as the minimum number of points needed to approximate a distribution. If you want to use the 10%, 50%, and 90% fractiles, one approach often used is to assign a .30 probability to the 10% fractile, a .40 probability to the 50% fractile, and a .30 probability of the 90% fractile. Why use .30, .40, and .30 as weights? The supporting math is beyond the capability of this author or the level of this piece. As Professor George Wu, noted in his HBS Note, Canonical Decision Problems (N9-396-308, April 8, 1996), “It turns out that .30, .40, and .30 work well in approximating many standard probability distributions, including symmetric distributions such as the normal.”

Other well-respected scholars and practitioners of decision analysis, R. T. Clemen and M. Victor, suggest applying .25, .5, and .25 as weights for the 10%, 50% and 90% fractiles.

Returning to our hypothetical case, here’s what the damages end of the tree would look like, with the prescribed weighting or probabilities, under the two methods.

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7 Chapter 12 in Victor, Marc; Glidden, Craig; Lea, Clyde; and Whitworth, J. Bryan, “Evaluating Legal Risks and Costs with Decision Tree Analysis,” Successful Partnering Between Inside and Outside Counsel (2000):11.
Obviously, the EMV numbers are different. Just as importantly, the probability of each portion of the outcome range is different.

Given that two sets of highly respected decision analysts disagree somewhat as to the “right” weights for the 90%, 50%, and 10% fractiles: .30/.40/.30 vs. .25/.50/.25—that is left to the tree builder’s judgment. It all comes back to his sense of the case. To what extent does he suspect the outcomes will cluster closer to the middle? If the midpoint seems stronger, then he might use .25/.50/.25. It feels like the distribution would be flatter along the middle, then perhaps using .30/.40/.30 is the better choice. The good news is that, especially if using software, it’s easy to try both.

Another three-point approach called “extended Pearson-Tukey method” uses the median or midway point and the 5% and 95% fractiles. As reflected on the tree below, the tree builder would consider what amount would be higher than 95% of all possible damages awards and what would be lower than all but 5% of all possible awards, and which is considered the median—50% would be higher and 50% would be lower. Note that the question is not about “average,” but rather the median. Then the 95% and 5% estimates would be assigned a probability of .185 and the median (the .50 fractile estimate) would be assigned a probability of .630.8

Assuming that our tree-builder would acknowledge higher highs and lower lows if using 95% and 5%, our hypothetical tree might look like the figure below, and roll back to a damages EMV as indicated.

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*Note that this tree includes a higher number to factor in the possible “runaway” or angry jury. The facts of the case suggest greater range on the high side.*

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**From Abstraction to Application**

As discussed earlier, the lawyer should be mindful of partisan biases and anchoring influenced by those biases. To reiterate, best practices involve first considering factors that would drive a jury number away from the desired direction, and then more favorable factors. So, when the plaintiff client asks, “What’s the most I could realistically hope for?” the lawyer might first take into account certain less favorable but irrefutable facts: the plaintiff is reasonably wealthy already and the defendant did not act willfully. On

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the other hand, the accident was terrifying for the plaintiff, and the defendant’s negligence could have hurt many others.

Assume you are assigning values at an end node to the right of a “high damages” branch of a “high—medium—low” triplet. You might ask yourself: “At what number am I pretty sure that only 10% of the actual numbers—real jury awards—would be higher? Or, if this case was tried many, many times, and there were a liability verdict 100 times, at what number would at least 90% of the verdicts be lower? At what number would 50% be higher and 50% be lower?”

Using the fractile percentages discussed above, you would assign weights of .25, .50, and .25, or .30, .40, and .30 to these numbers.

Or, you might ask yourself: “At what numbers am I pretty sure that only 5% of actual awards will be higher, and 5% lower?” Using the Pearson-Tukey approach, you would assign weights of .185 to the high number, .63 to the median, and .185 to the lower number.

As was true for estimating probabilities, it’s important to avoid the problem of anchoring to a number influenced by bias, followed by insufficient adjustment. Thus, it’s not wise for the decision analyst to start by asking of defense counsel, “What’s the worst that could happen?”, take his first guess, and then try to argue with it, citing the case’s unattractive facts or data from similar cases that landed far higher.

From Simplest Three to Five Point Brackets or More

Nowhere is it written that a continuous range must be described by only three points. Another approach utilizes “bracket medians.” The tree builder estimates what the median damages number would be within certain intervals or brackets—say 0%–20%, 20%–40%, 40%–60%, 60%–80%, and 80%–100% cumulative probability. Then the question becomes: what is the median number within each bracket range—the number at which the probability is midway between the two ends of the bracket, at the 10%, 30%, 50%, 70%, or 90% marks. Multiply .20 x each of five numbers that plot out the 10%, 30%, 50%, 70%, 90% points on the curve and you would have the damages EMV for the continuous range.

For the mathematically and graphically inclined, see the next figure demonstrating what the bracket median would look like.9

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9 A savvy decision analyst might use this method when he senses the range isn’t exactly continuous – through a series of questions – basically asking what the lawyer/client thinks would be the median number in the bracket range. Or, you could make a graph and figure it out by seeing how the line plots. I cannot guarantee how meaningful this type of questioning would be, but it may be a way of getting at cases with discrete points – theories that cause you to favor one target damages number over another. It’s worth considering which of these two ways to estimate and weigh damages – discrete points vs. a continuous probability distribution – is a better fit for the case.
Here is what the tree would look like using the median bracket numbers, and then rolled back to a damages EMV.\(^\text{10}\)

\(^{10}\) Founder of the field, Professor Howard Raiffa, offers a terrifically illustrative dialog between a decision analyst and a subject (client) to determine fractiles for calculating a continuous range in a hypothetical case, in Raiffa, Howard, *Decision Analysis: Introductory Lectures on Choices under Uncertainty* (1968): 161–165.
Data is Theoretically Good and Practically Challenging

Once again, if probative jury verdict data were available, it could theoretically be used as the basis for a neutral anchor point. However, what is possible in theory may not be possible in the many legal cases where damages are inextricably linked to specific and often numerical evidence. Damages in breach of contract cases turn on the contract terms, on lost profits, reliance claims, or other consequences of the breach. While data from personal injury cases may provide insight into damages for certain types of injuries, many case specific factors affect the award. Perhaps the average wrongful death case in the county yielded a jury award of $300,000. But what if most of those cases involved deaths in childbirth or shortly thereafter, and thus little or no economic damages? In this case, the deceased was a high wage earner, on whom his family relied. How relevant are the other wrongful death cases?

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11 As indicated earlier, some jury verdict research databases include settlements. These clearly should not be included in any calculation of jury verdict averages or range. The data sought for the neutral anchor is an average or range of awards AFTER a jury has found liability.

The same might be said in employment cases—the highest verdicts in this federal district might have been between $600,000 and $800,000, but what was the wage base? Were emotional distress or punitive damages included? What was the ratio of base lost wages to emotional distress or punitive damages? Using caution and critical discernment, the decision tree analyst-lawyer might look at a sizeable data base of employment cases, for example, to calculate an average ratio between back pay and total award (if possible), and apply that ratio.

Jury verdict data can also be useful for reducing bias when trying to imagine a possible verdict range for your client’s case. As was true for predicting probabilities, the larger the data pool (all federal age discrimination cases versus those within your federal circuit or district court), the greater the likelihood of broad verdict ranges. If you use the jury verdict number from the high or low end of a broad range for your “high” and “low” estimates, the lower the likelihood that your client will be unpleasantly surprised by an actual award outside the range. However, if you use a narrower data pool, its range may be misleadingly narrow. In a smaller data pool, one or two extreme outcomes among a small number may very much skew the average and cause exaggerated alarm or optimism (depending upon where they fall). Yet, removing or failing to count what seem to be extremes as so-called “outliers” may eliminate entirely possible outcomes—possibilities that should be considered in the analysis.

Whether or not external data is appropriately entered into damages estimates in a client’s decision tree, this data might be discussed to temper what appear to be entirely optimistic projections, on the plaintiff’s or the defense side. To the defense client who believes that the worst exposure he may have in this sexual harassment case is $1 million, it is worth pointing out that at least twenty, or X% of all sexual harassment cases with liability findings ended with verdicts well over $Y million. To the plaintiff’s lawyer or client confident that, if she wins, the verdict will of course be more than $5 million, it is worth pointing to data establishing that there have been only three verdicts at that level in the last five years. Moreover, in more than 80% of sexual harassment cases where the plaintiff won, the award amount was less than $1.5 million. Indeed, in 50% of the cases, it was $100,000 or lower—whatever the truth is.

If possible, the tree builder should introduce the data early in the process of estimating numerical outcomes—before initial numbers have been named. Indeed, the external data, to the extent it is probative, might be considered along with the list of positive and negative case factors considered.

**Being Wrong**

Given that the litigation will not be played ten or a hundred times, but only once, our probability predictions for most tree branches cannot be proven wrong (unless a possibility and thus a branch was missing and then occurs). In other words, if the tree-builder recorded an 80% chance of surviving summary judgment, the only way to test its accuracy is to “play” the summary judgment motion repeatedly, to see if the survival rate averages 80%. But, if a tree-builder predicts a range of possible outcomes (after a liability verdict) from $100,000 to $500,000, allocating 100% probability across that range, he is rather

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13 Despite appearances to the contrary, I am not proposing that the decision analyst use external data to manipulate projections. Full disclosure as to what’s contained in the data references is important. And integrity demands an effort to use data that does relate to the question at hand.

14 According to Breiman, this can be somewhat artificially accomplished by creating a significant number of decision trees regarding the same problem (“forests”) where each tree has randomly selected, say, 10% of data removed or altered and the final EMVs for all trees are averaged to arrive at an answer that better accounts for all of the
definitively proven wrong by a “surprise” verdict at $1,000,000 or $10,000 (or any number far greater than $500,000 or far lower than $100,000). In short, there’s “exposure” for the decision analyst if an outcome estimate is inadequate. The client will notice if the highest number in the payoff range on a pre-trial decision tree was $600,000 and the damages award comes in at $5,000,000.

Refinement by the Factor of Time Value

Oh patient reader, before closing what might be viewed as the most technical portion of this text, please bear with one last foray into mathematical method. It would be irresponsible not to explain and suggest finding and using the present value of estimated numerical outcomes on a decision tree.

In large dollar cases, particularly where the time frame to trial is lengthy and ambient interest rates are high, technically the best practice is to use the discounted present value of anticipated dollar recoveries or losses. Imagine a world in which trial wouldn’t take place for two years, and the general interest rate is 12% per annum (or the particular client earns a 12% return on investments). Without compounding, paying $1,000,000 now would be equivalent to paying $1,240,000 in two years. From a different perspective, a verdict of $1,240,000 in two years would be equivalent to approximately $1,000,000 in today’s dollars. Unless the estimated attorney’s fees will be incurred only after two years—close in time to the trial—discounting would not be applied to the attorney’s fee portion of anticipated expenditures. There’s no magic to the operation of discounting to present value. Once the interest rate and time frame are set, it can be done on a calculator or using common financial software.

Present value of a future amount can be derived as follows: Present value is the Future Value = the future anticipated award/(1 + r)n, where “r” is the rate of return (interest rate on money) and “n” is the length of time.

Let’s take a case in which your client may receive $100,000 in 3 years when the litigation is complete. Keeping it simple, we’re assuming there’s a liquidated damages clause, and your client will either win or lose his breach of contract claim. There is no middle ground. Let’s further assume that your client’s general rate of return on invested funds is 5%.

Present value of that award would be: $100,000/(1.05)3, or $100,000/1.157635 = $86,484.99.

The higher the number of years between the present and anticipated recovery, and the higher your client’s rate of return on investments, the greater the discount. In short, the discounted present value becomes lower.

Using the same example, if verdict and payment were estimated to take four years, and your client generally earns a 10% rate of return, the present value of that future $100,000 verdict would be: $100,000/(1.10)4 = $100,000/1.4641 = $68,301.34


Id. at 1576-1577, footnote 103 (description of formula and diagram of integration into decision trees). Theoretically, one could also discount attorneys’ fees to present value based upon when they would be incurred. The emphasis here is on “theoretically.”

Id. at 1557-1586.
Reassessing the discounted present value at future stages in litigation (some time later) is also advisable if there is still a chance of a revised settlement offer.\textsuperscript{18} Interest at 12\% or higher was common in the late 1980’s and early ’90’s, but not in more recent history. As of this writing, bank accounts yield well below 1\%. Thus, the author admits to often skipping the present value discount, particularly on trees done quickly, and to generate client discussion. Often, cases subjected to decision analysis are scheduled for trial within a relatively short time frame. (If a significant statutory or contract interest rate will apply to a damages award, timed from the date of breach, for example, I would recommend calculating interest as part of the anticipated “pay-off” for the plaintiff, or exposure for the defense.)

Nevertheless, it can be useful to point out that $100,000 received in settlement today, and then invested, might be worth far more over time. Even at modest interest rates or anticipated rates of return, a $100,000 settlement received now would be worth considerably more in three or four years, by the time the trial would have concluded.

To find that future value—that would have been received, calculate

\[ F = P (1 + r)^n, \]

- \( P \) is the amount presently invested
- \( r \) is the rate of return
- \( n \) is the number of years
- \( F \) is the future value that would be received.

If the settlement offer is $100,000, and your client claims a rate of return on investments of 8\%, over 3 years, the calculation is $100,000 (1.08)\( ^3 \) = $125,971.

The truth is that in a high dollar case, or where rates of return are significant and the time to trial is long, best practice is to work with present value calculations. Where a client resists using these numbers directly on the tree, you might simply write them in the margin of the tree document, or reference them in discussion. Some business clients are used to dealing in present value calculations and welcome their incorporation here.

\textsuperscript{18} The same math would apply to a discussion with your client regarding the high cost of investing present dollars in the litigation (from the plaintiff’s or the defense side). Imagine a large high stakes case, requiring initial investment of $100,000 in attorneys’ fees, investigation, discovery and initial expert consultations within the first year of litigation. (Let’s leave aside for the moment later amounts to be expended in pretrial preparations and motions.) It’s fair to note that if the client could have invested those funds into something else, it would be worth more over time.

To find that future value—calculate: \( F = P (1 + r)^n \), where

- \( P \) is the amount presently invested
- \( r \) is the rate of return
- \( n \) is the number of years
- \( F \) is the future value that would be received.

If your client must soon invest $100,000, and its common rate of return is 5\%, over 5 years, the calculation is $100,000 (1.05)\( ^5 \) = $127,688.

Yes, you could subtract this higher fee number from the discounted value of the anticipated verdict when calculating the net payoff. On the other hand, the intellectually honest decision analyst will also note that fees and costs paid well into the future would be discounted down, in the same way as the anticipated recovery.
Congratulations!
All who have followed this text and its trees up to this point have shown patience and commitment to learning the basics and more advanced subtleties of decision analysis for legal cases. Congratulations!

The truth is that lawyers develop and discuss decision trees with clients; mediators develop and discuss trees with lawyers and their clients in mediation; and decision tree experts are retained as consultants by lawyers, clients, or mediators as consultants. Technicalities aside, lawyer-client or mediator relationships and emotions become involved. Often, the tree reveals that the path to a desired outcome is more complicated and uncertain, the risks greater, and the range of outcomes wider than the client had wished. The tree maps the possible realities, and that map may not be pretty. The upcoming section explains how decision analysis can facilitate communication that protects the lawyer, client, and mediator relationships.