

Beyond Grey Hair and Gut Instincts: Using Decision Trees to Supplement Analysis in Litigation

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1. Introduction

Lawyers are reluctant to use numbers or percentages when advising clients on risk and outcomes in litigation matters. Many insist on using probabilistic phrases like 'significant chance' and 'reasonable prospects' instead of precise numbers in their advice.¹ This practice can lead to confusion² and can deprive the client of the considered views of her legal advisers following a careful and systematic analysis of the issues in the case. Yet surprisingly few clients insist that their lawyers 'put a number on it' when giving advice. As a result, decisions are often made in deference to grey hair, 'gut instincts' and settlement numbers that 'feel right', in the absence of any robust evaluation of the choices, chances and the financial outcomes of the litigation.

Decision trees – a diagrammatical representation of all choices, chances, costs and payoffs associated with a given project – are commonly used in banking, manufacturing, consulting and medical sectors to manage risk, evaluate options, develop strategies and allocate resources.³ Decision trees are also powerful tools for decision-making in litigation as they provide a methodical framework in which to integrate the views of in-house counsel regarding costs, probabilities of success and potential economic value of the litigation, with those of external lawyers concerning the legal issues and strategy.⁴

Decision tree analysis can be particularly valuable for insolvency practitioners (IPs) when bringing litigation on behalf of insolvent entities, for three reasons. First, IPs are usually better placed than typical clients to contribute to, and interpret, the quantitative analysis provided by decision trees, and to use decision trees to inform their decisions. This is because they are trained in accounting and finance and tend to appreciate

visual representations and analysis presented in a finite number of alternatives, when making decisions. Second, IPs owe duties to creditors and the court. Decision trees are a useful supplementary analysis to justify a decision to pursue, assign or abandon a claim in the name of an insolvent entity. Third, decision trees provide an IP with a comprehensive view of the range of potential outcomes from the litigation, including the potential financial risks of losing the action, which can be of greater importance than winning in the context of a proposed action by an insolvent entity with limited resources.

The first part of this article introduces decisions trees and their key features; the second part describes the key insights that can be drawn from decision trees in a litigation context, as well as the limitations of decision tree analysis; and the final part of this article uses decision trees to demonstrate how IPs can use third party litigation funding to minimise the downside risk of litigation. In all sections, this article draws on a case study – a potential claim for wrongful trading by a company in administration – to illustrate how decision trees can supplement traditional analysis and decision-making in litigation.

2. Decision tree analysis in litigation

What is a decision tree?

In a litigation context, a decision tree is a diagrammatical representation of all choices, chances, costs and payoffs associated with the case that can be used to evaluate the financial outcomes of litigation. Decision trees enable the subjective judgments of lawyers as to the chance of certain outcomes to be translated into

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- 1 See Rothkopf, Robert, 'Litigation Superforecasting Part 1: put a number on it', 12 April 2016, <http://www.balancelegalcapital.com/litigation-superforecasting-part-1-put-a-number-on-it/>
- 2 In a recent survey conducted by Balance Legal Capital, the responses of lawyers from leading international law firms to the question of what percentage chance corresponded to the phrase 'significant chance' ranged between 30% and 85%
- 3 Daley, Brian, Ogilvy Renault LLP, 'Making Informed Decisions, Decision Tree Analysis: An effective method to manage litigation in a business setting', *Passport for Business*, Fall 2008
- 4 *Loc cit.*

quantitative analysis, supplemented with client, lawyer and expert estimates of the costs and payoffs associated with certain outcomes.

Fictitious case study: a wrongful trading claim

Consider the case of an IP that has been appointed as administrator of ClaimCo. ClaimCo has £2m in liquid assets and debts of £60m to creditors. ClaimCo has a claim against its former directors for wrongful trading. Senior counsel has advised that ClaimCo has a 60% chance of establishing liability and, upon doing so, a 60% chance of being awarded £20m and a 40% chance of recovering £40m. There are two key issues which are likely to affect the outcome of the case: (a) whether ClaimCo can get copies of documents held by Acme Bank to support its case on liability; and (b) whether ClaimCo can retain top expert, Mr Big, to give evidence as to the level of loss suffered by ClaimCo. As things stand, senior counsel gives (a) and (b) each a 50% chance of occurring. In pre-litigation correspondence, the defendant directors have offered to settle all claims against them for £10m.

An example list of key issues and assumptions that may be made by the IP and his legal team in relation to this wrongful trading claim are set out in Figure 1. Items 3 and 5 reflect the position in the UK, Australia and other common law jurisdictions (however, notably, not the USA) in which the losing party to litigation must

make a payment to the winning party on account of its costs of the litigation. The amount payable is subject to assessment, but generally equates to approximately 65% of actual costs incurred by the winning party.

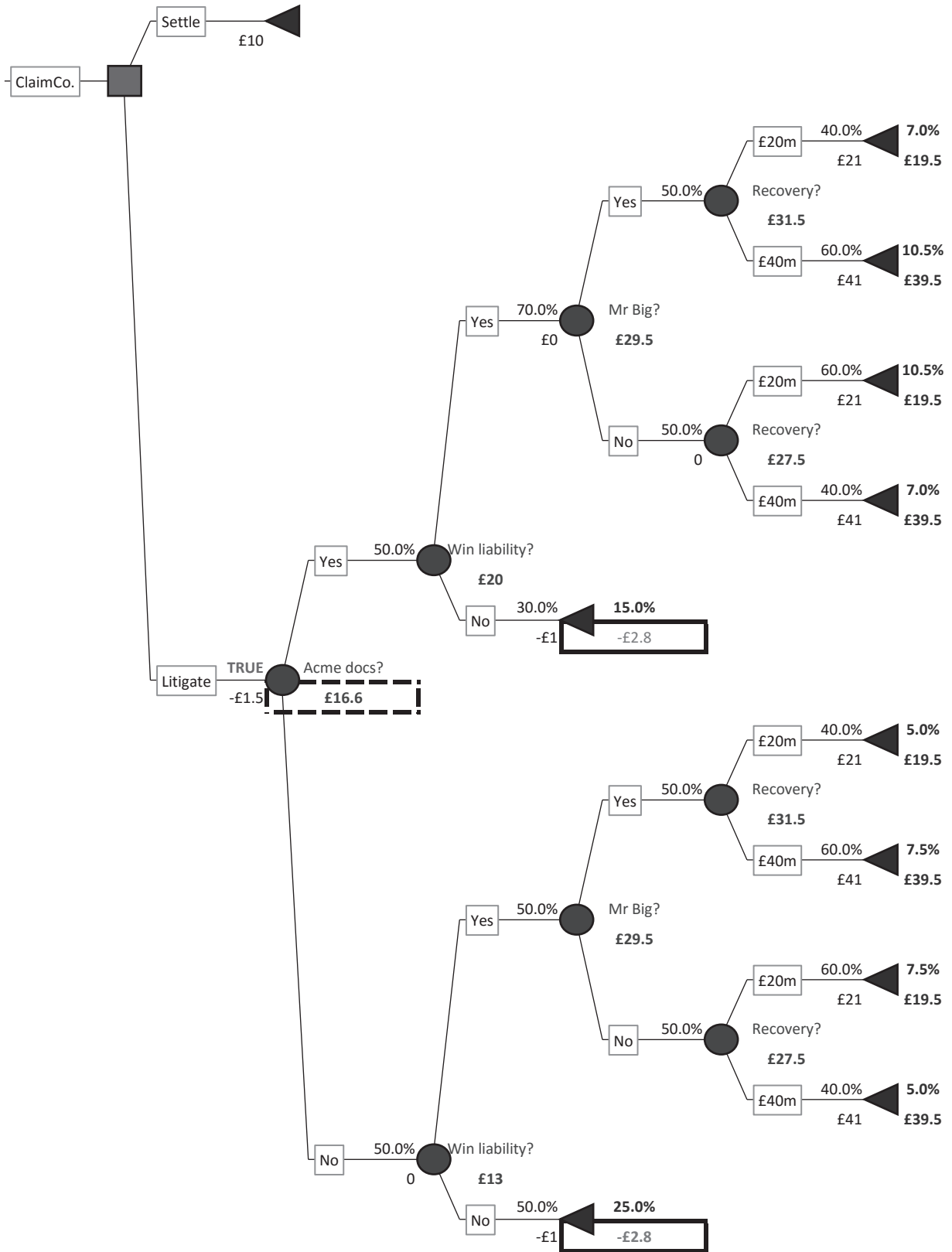
A decision tree prepared for the fictitious claim described above is set out in Figure 2. The key aspects of the decision tree are as follows:

- The tree reads from left to right, starting at the single branch 'ClaimCo'. The tree is read by following the branches until you reach the numbers and percentages on the far right, each representing a scenario in which the proceedings are finally resolved.
- The square at the top left of the tree is a 'decision node' which represents a choice that is within the claimant's (in this case, the IP's) control. In this case, the IP must decide whether to bring the wrongful trading claim, which could lead to damages of up to £40m, or settle the claim for £10m.
- The circles are 'chance nodes' which represent uncertainties. For example, the second branch from the left of the tree represents the uncertainty regarding whether the claimant will succeed in obtaining documents from Acme Bank to support its case. In this particular case, it is estimated that there is a 50% chance of getting these documents (shown directly above the relevant branch). The probabilities of all outcomes stemming from a single chance node must equal 1 (or 100%).

Figure 1. Assumptions

1	Defendant offer to settle pre-action		£10.0m
2	Claimants costs of litigation (IP and legal fees and disbursements)		£1.5m
3	Claimant's costs recoverable on success 65%		£1.0m
4	Defendants' costs of litigation		£2.0m
5	Amount payable on loss on account of defendant's costs	65%	£1.3m
6	Chance of obtaining documents from Acme Bank	50%	
	Prospects of winning on liability		
7	With documents from Acme Bank	70%	
8	Without documents from Acme Bank	50%	
9	Chance of engaging Mr Big as expert	50%	
10	Likely recovery		
11	With evidence from Mr Big	40%	£20.0m
		60%	£40.0m
12	Without evidence from Mr Big	60%	£20.0m
		40%	£40.0m

Figure 2. Self-funded claim



- The financial impact of a decision or outcome (positive or negative) is shown below the relevant branch. For example, on the third branch from the left, a loss at trial means that the claimant will have to make a payment on account of the defendants' costs (estimated at £1m). The numbers below the branches at the far right of the tree represent the damages awarded in the various scenarios (for example, £21m is awarded on the very top branch).
- The outcomes represented on the branches after a 'chance node' must be 'mutually exclusive' (an outcome cannot fall into two branches) and 'collectively exhaustive' (the uncertainty must be capable of being resolved in each of the ways described in the branches with no other outcomes possible). For example, on the third branch of the tree there are two scenarios following a full trial: either the claimant wins, or the claimant loses, the case.⁵
- A scenario is a path along the branches starting at the node on the very left of the tree and ending with an outcome on the very right of the tree. For example, the outcome on the top right of the tree is a payout of £19.5m to ClaimCo which occurs when: (i) the IP decides to bring the claim; (ii) documents are obtained from Acme Bank; (iii) the claimant establishes liability; (iv) Mr Big gives evidence on loss; and (v) the court awards damages of £20m (plus costs of £1m).
- The numbers below the percentage at the very right of the tree represent the net financial outcome of each scenario. In the scenario at the top right of the tree, the claimant gets a net payout of £19.5m. This is the total recovery of £21m (damages plus costs) minus the full costs of bringing the claim (£1.5m).
- The percentage at the far right of the tree represents the percentage chance of that outcome occurring. It is calculated by multiplying the percentage chance at each chance node along the branch leading to that outcome. For example, there is 7% chance of the scenario represented by the top branch occurring.

3. Insights provided by decision trees

Using decision trees in litigation

Decision trees are used in litigation in three main ways.

a. To determine the probability of a particular outcome occurring

The decision tree in Figure 2 can be used to estimate the probability of certain outcomes. For example, the probability of the case resulting in a recovery of more than £20m (double the settlement offer made prior to litigation) is 30%. This is calculated by adding the percentages above each of the scenarios at the end of the branches that exceed £20m. Similarly, the probability that the case will result in an 'adverse costs' payment by ClaimCo is 40%. This can be found by adding the percentages above the two negative financial outcomes (both –£2.8m) at the end of the branches.

b. To calculate expected recoveries at given points in the litigation

The numbers that appear in the middle of the branches represent the expected value, or average result, being the weighted average of all outcomes on that branch. For example, on the second branch, £16.6m represents the expected recovery, or average result, of litigating the case 100 times. To take another example, on the top branch, five branches along, £31.5m represents the expected or average return if: (a) documents are obtained from Acme Bank (branch 2); (b) the claimant wins on liability (branch 3); (c) and Mr Big is instructed as expert (branch 4). The expected value on this branch (branch 5) is double the expected value on the second branch because these three uncertainties have been resolved in ClaimCo's favour.

c. To measure the impact of particular uncertainties on the overall outcome

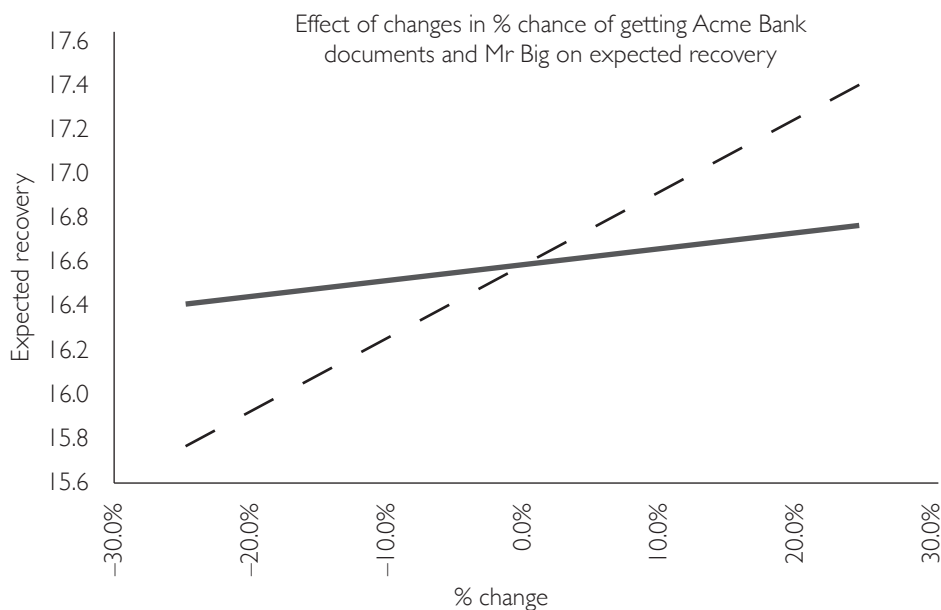
Sensitivity analysis – measuring the effect on outcomes when the assumptions are varied – can be performed on decision trees to show the effect that changes in particular estimations have on the overall result. This can inform decisions about where the greatest risks lie and where money can be most effectively spent to improve the chance of a favourable outcome. It can also assist a party in planning a settlement strategy by focusing on areas of conflict that are likely to have the biggest impact on the overall outcome.

Figure 3 is a graph which show the effects of: (a) getting documents from Acme Bank (the broken line); and (b) getting evidence from Mr Big (the unbroken line), on the expected recovery from the litigation. The Y-axis shows changes in expected recovery; the X-axis shows ±25% variations in chances of getting the Acme

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⁵ The potential for settlement throughout the life of the claim has been omitted for the sake of simplicity in the examples used in this article. Settlement scenarios would be a feature of most decision trees prepared for most litigation.

Figure 3. Sensitivity analysis



Bank documents and instructing Mr Big. The steeper slope on the broken line suggests that getting the Acme Bank documents will have a bigger impact on the overall outcome of the litigation than instructing Mr Big. Increasing the chance of getting the Acme Bank documents by 25% increases the expected return by approximately £1m compared with £200,000 for the same percentage increase in the chances of getting Mr Big. This insight might prompt lawyers and clients to alter their strategy in the case, perhaps devoting more resources to improving the chances of getting documents from Acme Bank.

The benefits of using decision tree analysis in litigation

Decision tree analysis has four major benefits in litigation.

a. Support analysis of key issues and assumptions

The very act of preparing a decision tree requires the lawyer and client to think systematically and carefully about every stage of the proceedings.⁶ This process can: draw new information out of the client; lead to the identification of underlying risks and opportunities; promote alignment between client and lawyer on case strategy, and help set realistic expectations about outcomes.

b. Provides objective support for a settlement position

Decision tree analysis provides objective support for a settlement position. In theory, if two parties can agree on the chances of particular outcomes in litigation and the financial costs/payoffs associated with those outcomes, then they should be able to agree a settlement figure. Decision tree analysis can be an effective tool for a lawyer when formulating a settlement strategy with a client, deciding whether to accept a settlement offer from an opponent, or seeking to persuade the other side to accept a settlement offer. For example, Figure 2 suggests that the *expected recovery* from bringing the litigation is £16.6m (see the broken line box). Therefore, it may be rational for the IP to reject a pre-litigation settlement offer of £10m.

c. Promotes better budget management

Decision trees support costs budgeting by focusing lawyers and their clients on the range of contingencies in a case and the likely impact these will have on costs and the overall outcome of the case, enabling these issues to be prioritised in the allocation of resources. This can be particularly beneficial to IPs when bringing claims with limited (or zero) available funds.

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⁶ Remus, Paul, 'Using Decisions Trees in Mediation', 22 February, 2008, <https://www.nhbar.org/publications/archives/display-news-issue.asp?id=4329>

d. Assists in identifying and managing downside risk

Decision trees identify the full range of outcomes available and their probabilities of occurring. Importantly, this includes the worst possible, or ‘doomsday’, outcomes. For IPs bringing litigation in the UK, the worst result from the litigation is not just the loss of money expended on the litigation (in our example, £1.5m) but also a payment towards the opponent’s legal costs of defending the litigation (an ‘adverse costs’ payment). The outcomes in the thick unbroken line boxes in Figure 2 represent these ‘doomsday’ scenarios in which ClaimCo makes a total loss of £2.8m in the case. These outcomes have a combined probability of 40% (15% + 25%). Identifying these scenarios enables an IP to take steps to reduce uncertainty and control down-side risks.

Limitations of decision tree analysis

Decision tree analysis has several limitations which mean that it should be used as a *supplement*, and not a *substitute* for, traditional techniques for analysing litigation issues.

a. ‘Garbage in, garbage out’

The most obvious limitation of decision tree analysis is that the model is only useful if it is structured in a way that represents the true set of decisions and uncertainties and if the inputs represent a good approximation of reality. If a decision tree is poorly structured, this will skew the model and render it next to useless. Equally, inputs into the model – the percentages assigned to chance nodes and the cost/payouts associated with certain decisions/outcomes – must be reasonable estimations of reality for the model to have any value as a decision-making tool. These risks of poor structuring and/or bad inputs can be mitigated by giving careful thought to the issues; gathering various views from experienced people on structure and inputs for the model; and running sensitivity analysis to check the impact of variations in key inputs on modelled outcomes.

b. Fails to take non-financial factors into account

Decision tree analysis fails to take into consideration non-financial aspects of litigation such as: the public relations impact of bringing (or refraining from bringing) a claim; management time spent dealing with a claim; the emotional toll of litigation on witnesses; the future financial consequences of having a binding

court judgment/precedent on the claim issues in the public domain; and the control over an outcome that comes from agreeing to settle a dispute (and the loss of control that occurs when a matter goes to trial). Decision tree analysis also fails to take into account the risk appetite of the party and the party’s ability to survive a ‘doomsday’ outcome, however small the risk of this occurring (eg. the slim chance of having to make a payout that would put the company into insolvency). A company in this position might be willing to pay a premium (or accept a discount) on what it might reasonably expect, in order to avoid risking an outcome it could not bear. This is discussed further in section 4 below.

An effective way to incorporate non-financial factors into decision tree analysis is to list these matters next to the outcomes on the right hand side of the tree so that outcomes can be checked against these matters. For example, in Figure 2, the non-financial benefits of reaching a settlement (e.g. control over outcome, ability to devote resources to other projects) could be listed next to the branch reflecting the settlement offer (£10m) so that these too could be weighed against the expected return of commencing litigation (£16.6m). An alternative method for incorporating non-financial matters is to attempt to quantify these matters as either a ‘cost’ or a ‘benefit’ and add these to branches in the model. For example, a pound sterling equivalent for the emotional cost of litigation for key witnesses could be added to the fees and disbursements associated with the litigation (£1.5m) on the first branch of the decision tree in Figure 2.

4 Managing downside risk of litigation by using third party litigation funding

The decision tree in Figure 2 predicts a 40% (15% + 25%) chance of a ‘doomsday’ outcome – that is, that the case is lost at trial and ClaimCo not only loses the money it has spent pursuing the case (£1.5m) but is also required to pay ‘adverse costs’ of £1.3m, meaning a total loss for ClaimCo of £2.8m in this litigation. In the fictitious case presented, ClaimCo only has £2m in liquid assets. In these circumstances, an IP may decide that it cannot bear the risk of losing £2.8m and may decide to seek third party litigation funding to cover the costs of bringing the claim and to bear the risk of having to pay adverse costs.

Figure 4 sets out the standard terms for third party litigation funding in the UK for a matter that goes to trial.⁷ The third party funder has agreed to pay the full costs of bringing the proceedings (£1.5m) plus assume

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7 Funders generally accept a lower return if a matter settles before trial.

Figure 4. Third party finance

13 Fees and disbursements	£1.5m
14 Adverse costs indemnity fee	£0.5m
15 Total committed capital:	£2.0m
Payable to funder (assuming full trial):	
16 * drawn down back	£2.0m
17 * return (multiple of committed capital) 3 x	£6.0m
18 Total:	£8.0m

responsibility for any adverse costs award (the fee for which is £0.5m). In return, the funder gets its total commitment (£2m) plus a return of three times its total commitment (3 x £2m = £6m).

- The decision tree in Figure 5 is a reproduction of the decision tree in Figure 2 (minus the first branch relating to settlement) except that the IP has decided to obtain third party funding to cover the costs and disbursements associated with bringing the claim, and provide an indemnity in relation to potential liability for adverse costs. As a result of this arrangement:
- The £1.5m required to pay fees and disbursements associated with the claim does not come out of ClaimCo's estate because this cost is being met by the funder.
- The 'doomsday' outcomes in Figure 2 are no longer in the model because of the adverse costs indemnity provided by the funder. The worst result for ClaimCo is now a £0 return because the costs of bringing the action, and risk of an adverse cost award, is taken by the third party funder.
- The recoveries made by ClaimCo upon success in the matter have been reduced by the amount required to pay the funder its return. The maximum recovery by ClaimCo on success is reduced by £6.1m (15%) from £39.5 to £33.4; and the lower recovery is reduced by £6.1m (31%) from £19.5m to £13.4m.

The overall expected return to ClaimCo from litigating is reduced from £16.6m to £14m.

These insights can be used to inform the IP's decision-making in the case. The shifting of the financial risk of

the litigation to a third party funder comes at a cost of £6.1m of any future recovery in the case. Is this deal in the best interests of creditors given their attitude to the litigation and the asset position of ClaimCo? If so, is the adjusted expected return for ClaimCo with third party funding (£14m) sufficiently higher than the current settlement offer (£10m) to justify bringing the claim? Could the funder provide additional funds to be used to improve the chances of obtaining the Acme Bank documents and thereby increasing the expected return of the litigation?

5. Conclusion

The process and thinking required to prepare a decision tree, and the insights gained from the decision tree itself, are valuable supplements to traditional analysis of litigation issues by lawyers and their clients. There are additional benefits to be gained from decision tree analysis for IPs involved in litigation because IPs' training makes them better-equipped than lay clients to contribute to, and interpret in a meaningful way, decision-tree analysis and because decision tree analysis can support decisions as to how best to discharge an IPs' duties to creditors and the Court.

Litigants can use third party litigation funding to remove the downside risks of litigation (eg. the costs of bringing a claim and/or an adverse costs order) in exchange for providing the funder with a share of any recovery made upon success in the litigation. Decision trees are useful tools for modelling the effect of obtaining third party funding. Third party funding can be an effective option for IPs who are contemplating bringing a claim on behalf of insolvent entities where little or no money is available to support the proceedings.

Figure 5. Claim with third party finance

