

## Discount Rate, Risk & Economic Damages: Practical Considerations

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When calculating damages awards in litigation, it is undisputed that the plaintiff's projected economic losses must be discounted to their present value to avoid over-compensating for the harm caused by a defendant's wrongful act. Economically, discounting is necessary for two reasons:

- *Time value of money*: A dollar today is worth more than a dollar in the future, because today's dollar can be invested at an interest rate that will add value over time.
- *Risk*: Future cash flows are uncertain, and investors typically prefer low-risk projects to those with higher risk.

Accordingly, damages awards should account for both the time value of money as well as the risk of achieving projected future profits.

Although the concept of discounting future economic losses is not controversial, experts frequently disagree about the theoretical and practical considerations of incorporating risk when measuring economic damages. Two important related questions arise: 1) What cash flow stream should be discounted? 2) What is the appropriate rate at which to discount the cash flows? <sup>1</sup>

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<sup>1</sup> This article addresses risk and the discount rate from both a financial and case law (legal) perspective, but it is by no means an exhaustive discussion; nor should it be read as offering legal advice. For a more comprehensive but still limited discussion, readers should refer to the authors' complete paper, copies available

### What stream should be discounted?

In a damages analysis, the intent is to establish the difference in the plaintiff's economic condition "but for" the defendant's alleged wrongful acts. Typically, this difference is measured either in terms of cash flows or profits. Valuation, whether of lost profits or the underlying business, must contend with the fact that future cash flows are uncertain and depend on both external circumstances and management decisions.

Generally, the damages expert will "summarize" the uncertain streams of future cash flows or profits (which may or may not be realized under a variety of scenarios) into a forecasted stream of cash flows. In each case, the expert will implement an approach based on what is most reasonable and feasible given the information available. The following four implementation approaches are the most common.

**1. Most likely cash flow.** Frequently, analysts consider only a single likely future cash flow. This

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by request to the editor: [sherryehbvresources.com](http://sherryehbvresources.com), or to subscribers of *BVRResearch*™ at [BVRResources.com](http://BVRResources.com).

In addition, we recommend two excellent sources: The AICPA's *Calculating Lost Profits*, Practice Aid 06-4, (2006: New York, NY); and *The Comprehensive Guide to Lost Profits Damages For Experts and Attorneys*, edited by Nancy Fannon, (BVRResources, 2009). The latter covers the current analytical and legal landscape for calculating lost profits damages, including how financial experts can meet the evidentiary standards of reliability, relevance, and reasonable certainty.

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approach requires the analyst to conform to defensible and reasonable assumptions regarding the most likely outcome. It is important to note that the “most likely” cash flow is not necessarily the same as “expected” cash flow in a statistical sense. At best, it is “expected” only in the sense that it is based on possible (perhaps even probable) future events.<sup>2</sup> This cash flow does not necessarily represent a statistical average computed over all possible states. Typically, the expert selects a scenario that represents a generally reasonable outcome, ignoring extremely positive or extremely negative results.

Although this approach may be appropriate in a particular case, it may also be subject to criticism. For instance, it may not adequately account for the possibility that if conditions do not evolve as hoped, the company could adjust its capital investment and/or production plans, altering its cash flows. Further, the most likely outcome may not be the expected outcome and may not adequately characterize the range of possible outcomes. If the most likely cash flow is not the expected cash flow, the resulting damage estimate will be in error. In these cases, it is not possible to fix misestimates in the cash flows by adjusting the discount rate.

**2. Expected Cash Flow.** The expected cash flow represents the statistical average of all possible cash flow outcomes.

Under this approach, one attempts to model explicitly the probabilistic nature of future cash flow streams and generate a series of projections for the business, with each projection representing a different set of assumptions regarding the economic conditions affecting the business. In addition, the expert must attach a likelihood to

<sup>2</sup> In this discussion, we use the term “expected” in the statistical sense: that is, as a measure of central tendency of a distribution of numbers. More specifically, the expected value is the sum of the product of all possible outcomes times the probability of each outcome.

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the occurrence of each set of assumptions (and corresponding cash flows). Lost profits are analyzed under different probable scenarios.

For example, one scenario might represent rapid, widespread adoption of a certain technology combined with the absence of sustained competition for the technology in the market. Another might reflect widespread adoption of the technology, but the entry of multiple competitors. Still another might reflect a more gradual adoption of the technology, while a final scenario would reflect public (market) rejection of the technology. The analyst then combines these future cash flows to create an “expected” cash flow in the statistical sense of reflecting the arithmetic average, weighted by the probability that each projection will occur.

An exhaustive analysis of this type is laborious and requires the expert to make explicit assumptions, not only regarding how future conditions affect profitability but also about the likelihood that certain conditions will occur. Thus, experts may hesitate to pursue this approach because of the extensive information requirements.

Also, because it requires experts to make numerous, explicit assumptions based on subjective perceptions, this approach creates opportunities for disagreement among competing experts (and challenges by attorneys) on issues that cannot necessarily be factually resolved. Of course, all of the same assumptions may implicitly exist in a single-scenario estimate of future performance. For example, if one analyst believed that there was a fifty percent chance that the market would reject the technology but the opposing expert believed that there was only a thirty percent chance of rejection, then, all else remaining the same, their single-scenario cash flows would also have to differ according to these different assumptions.

**3. Single forecast analysis.** In many cases, the analyst either does not have sufficient information to construct a series of probability-weighted scenarios or chooses not to do so due to the number of assumptions required. Instead, the analyst constructs a single cash flow model similar to

the “most likely” model described above. The difference is that in a single forecast approach, the cash flow is intended to represent not just a likely outcome but the weighted outcome corresponding to the expected value of the possible outcomes. By doing so, the analyst can use this single forecast model as a part of a lost profits estimate.

For example: If a particular outcome is the “most likely” but a second, less likely outcome is also possible, the expected cash flow should reflect an appropriate blending of the possible outcomes. This approach is often the easiest for a given set of circumstances, especially when probabilistic modeling is not practical.

**4. Real options analysis.** Real options valuation recognizes that projects are often irreversible (sunk), and firms can delay the decision to invest until they have resolved some of the uncertainty. The real option value is what a profit-maximizing firm would pay for the right to undertake an irreversible project with uncertain outcomes.<sup>3</sup>

Real options analysis captures the differences among scenarios associated with different economic circumstances (those beyond the control of the business owner), as well as the differences that arise from the owners making rational, strategic decisions in light of different economic circumstances, either of the firm or of the market in general.

A real option may exist, for example, if the firm would decide to build a manufacturing plant should demand turn out to be high, but outsource the product to another firm should demand turn out to be tepid. Similarly, a real option may exist when the firm has the ability to tailor its capital investment according to information that it receives in the future regarding the competitive landscape.

<sup>3</sup> For a theoretical discussion of real option values, see e.g., Robert S. Pindyck, “Irreversibility, Uncertainty, and Investment,” *Journal of Economic Literature*, Vol. 29, No. 3 (Sep., 1991), pp. 1110-1148.

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Ultimately, this approach requires a significant amount of information and imposes stringent assumptions. Computation of real option values also requires sophisticated modeling techniques, and a detailed discussion is beyond the scope of this article.

**What is the appropriate discount rate?** Another way of looking at the purpose of a lost profits damages award is to provide a sum of money that, were the plaintiff to invest it in a comparable project, would yield an amount equivalent to the plaintiff's expected losses. Thus, lost future profits should be discounted at a rate that is commensurate with the risk that the plaintiff would have borne in seeking those alternative profits.

As previously discussed, the appropriate discount rate should include a component that reflects the time value of money as well as the risk of achieving a certain return on investment (the risk premium).<sup>4</sup> Almost by definition, the appropriate risk-adjusted rate for a business investment is higher than the risk-free rate.

Valuation experts routinely use several empirical approaches to calculate the discount rate for a stream of anticipated future business income,

including: the cost of equity; the cost of debt, and the weighted average cost of capital.<sup>5</sup>

1. *Cost of equity.* Analysts will typically calculate a company's cost of equity using either a "build-up" approach or the Capital Asset Pricing Model (CAPM).

i. Build-Up Method:  $E(R) = R_f + RP_m + RP_s + RP_c$

ii. CAPM:  $E(R) = R_f + \beta^*(R_m - R_f)$

Under both methods: R is the rate of return required by investors,  $R_f$  is the risk-free rate of return and  $R_m$  is the market rate of return.  $RP_m$ ,  $RP_s$ , and  $RP_c$  are the market risk premium, size risk premium, and the company-specific risk premium.

Analysts usually estimate the size premium from a comparative analysis of small company returns to the larger companies that dominate the public markets. (The two most common, commercially-available sources for this data are Morningstar/Ibbotson's *Stocks, Bonds, Bills, and Inflation* or Duff & Phelps' *Risk Premium Report*.)

In particular, in cases involving small businesses and professional practices, the size risk premium may be substantial. For very small businesses, it is not unusual to conclude an appropriate, risk-adjusted discount rate of 40%, 50%, or even as high as 100%. (Stated inversely, these discount rates amount to multiples of income of 2.5x, 2.0x, and 1.0x, respectively.) The probable explanation for using such high discount rates is that the cash flows for very small businesses fail to distinguish between the new owner's return to investment and return to labor and human capital. They may also reflect the high risks associated with some small businesses.

A company-specific risk premium is conceptually appropriate when using a build-up model to develop a discount rate. The selection of an appropriate company-specific risk premium

4 As a matter of public (but not economic) policy, courts have often applied risk-free rates to discount lost earnings to present value in personal injury and wrongful death litigation. This policy decision does not consider financial risk; the courts are simply awarding the plaintiff a sum that could be invested, risk-free, to replace the (admittedly not risk-free) lost income stream. These simplified rules should not be compared to or applied in lost profits cases, even though the calculations are economically analogous. See Robert M. Lloyd, "Discounting Lost Profits in Business Litigation: What Every Lawyer and Judge Needs to Know," *Tenn. J. of Bus. Law* (Fall 2007), Vol. 9, No. 1, p. 28. Professor Lloyd's article contains a thorough discussion of the applicable economic theory and legal precedent in lost profits litigation; in addition, he contributed the chapter "Discounting Damages: Case Law" for *The Comprehensive Guide to Calculating Lost Profits Damages For Experts and Attorneys* (see note 1).

5 AICPA Practice Aid 06-04, p. 26. Other alternatives are also possible.

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depends on the company's particular facts and circumstances and requires the analyst to apply an element of subjective judgment.

2. *Cost of debt.* Some practitioners use a variation of the subject company's borrowing rate as the basis for determining an appropriate discount rate to apply to projected lost profits.<sup>6</sup> Others use this rate to assess prejudgment interest.

3. *Weighted average cost of capital.* The weighted average cost of capital (WACC) is the cost of invested capital to a firm considering its blended cost of debt, equity, and other capital.

$$\text{WACC:R} = R^d (1 - \text{Tax Rate}) * (D/V) + R^e * (E/V)$$

Here,  $R^d$  is the cost of debt,  $(D/V)$  is the debt ratio,  $R^e$  is the cost of equity, and  $(E/V)$  is the equity ratio. Risk is specific to the stream of cash or income being discounted.

A business is valued by discounting its expected cash flows at the WACC. By using the WACC to discount expected lost profits, the lost business value and lost profits are the same (after adjusting for taxes). This is as it should be. In the case of partial impairment, the discount rate to be applied to lost profits may be either higher or lower than the company's overall WACC. In the case of a business that has been entirely destroyed, the WACC may be an appropriate choice of discount rate, as it reflects the average risk of all of the company's operations.

If an analyst concludes that lost marginal profits are riskier than the normal, anticipated profits of the business as a whole, then a higher discount rate should apply to those lost profits, resulting in a lower present value. For example, anticipated lost profits that strain the business' existing capacity or stem from some new and unproven technology—or from some other, more speculative venture—may be riskier than anticipated lost profits from the ongoing, regular operations of the business.

<sup>6</sup> *Ibid* at 28.

If an analyst concludes that lost profits are lower risk than the normal, anticipated profits of the business as a whole, then he/she should apply a lower discount rate to those lost profits, resulting in a higher present value. For example, an identifiable segment of the business might be lower risk than its "average" operations or overall profitability. Cash flows from existing contracts or those derived from passive royalties may also warrant a lower discount rate than the profits anticipated from average operations of the company.

*Conclusion.* The calculation of lost profits is a complex matter that is heavily dependent upon the unique facts of each particular case. In its simplest form, the calculation is a projection of the plaintiff's hypothetical profits that would have existed "but for" the defendant's action, minus the actual profits that the plaintiff earned during the same loss period. The basis of the calculation is primarily factual, although the computation may involve some judgment regarding the probability that certain circumstances will prevail in the future (or would have prevailed in the future, viewed at the time of the alleged wrongful act; or would have prevailed in the past "but for" the defendant's actions, to the extent these actions influenced the past).

The financial analyst should have a logical, defensible position supporting the assumptions of anticipated revenues as well as the costs associated with those revenues. Economically, it is difficult to comprehend that the present value of all the profits of a business enterprise would be greater than the tax-adjusted fair market value of the entire business; apparent exceptions to this general rule often reflect the different economic streams that are being discounted. In the end, analysts must connect the discount rate to the risk inherent in the subject cash flows, and should not use it as an "approximate" means for addressing business or economic risks that the future will generally resolve.

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*The authors would like to thank Dr. Georgina Moreno and Dr. Kristen Willard for their valuable editorial assistance.*

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