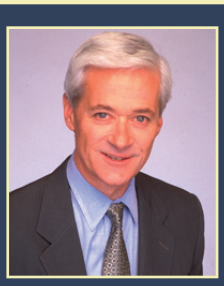
Dunn on Damages

The Economic Damages Report for Litigators and Experts



Robert L. Dunn

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Risk and Economic Damages: Theoretical and Practical Issues

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INTRODUCTION

There is no disagreement that expected future economic losses must be discounted to present value to avoid overcompensating a plaintiff for the harm that a wrongful act will inflict in the future. From a financial perspective, discounting is necessary to account for the time value of money and the risk associated with the uncertainty of the future cash flows that comprise the estimated losses. Every financial analysis of future dollars – budgeting, forecasting, borrowing, lending, capital acquisition, damages – incorporates the concept of discounting to present value.

Although the concept of discounting future economic losses is not controversial, experts frequently disagree about the theoretical and practical issues of incorporating the concept of risk in measures of economic damages and business valuation. There are two alternative approaches to incorporate risk in a present value analysis that have been discussed in the literature for over twenty years. The AICPA's 2012 Practice Aid calls the approaches the *capital markets approach*, which accounts for risk with the use of a risk-adjusted discount rate, and the *expected cash flow approach,* which by comparison places a greater emphasis on adjustments for risk directly in the cash flow model and on the use of a lower discount rate.[1] This article compares and contrasts the two approaches.

In this article, the authors choose to refer to the *capital markets approach* as the "risk-adjusted discount rate" approach and the *expected cash flow approach* as the "risk-adjusted cash flow" approach. In our opinion, the AICPA has incorrectly named the expected cash flow approach by including the word "expected" in its title. When an adjustment is made to a properly determined future cash flow amount to attempt to remove the risk, the result is to change that cash flow FROM the statistically "expected" value to something else. For the sake of clarity, we will use the term "risk-adjusted cash flow" to describe this approach.

ESTIMATING FUTURE LOSSES

The objective of a lost profits analysis is to place the plaintiff in the same financial position that it would have been in if the defendant had not breached the contract or interfered with the plaintiff. Damages for lost profits are not intended to make a plaintiff better off than it otherwise would have been; they seek to restore the plaintiff to a position of equivalency, but for the unlawful conduct of the defendant. A plaintiff is entitled to nothing more or nothing less.[2]

In a typical damages analysis, the intent is to establish a difference in the plaintiff's economic condition by comparing the assumed circumstances, but for the alleged wrongful act, to the plaintiff's circumstances after the alleged wrongful act. Typically, the difference in economic condition is measured either in terms of cash flows or profits. This calculated difference becomes the basis of the damages analysis, and the correct discounting of this difference (assumed lost profits or assumed lost cash flows) is the subject of the present discussion.

Any determination of economic value, whether of lost profits or of an entire business, must contend with the fact that future cash flows are uncertain, and depend on many risk factors that are both outside of a firm's control and within a firm's control. Generally, the financial analyst will "summarize" the uncertain estimates of future cash flows or profits that have been lost (or realized) in a variety of different scenarios into a forecasted stream of cash flows. The approach implemented in each case should be chosen based on what is most reasonable and feasible given the information available. In valuation, the value of an asset is the present value of the expected cash flows on the asset, discounted back at a rate that reflects the riskiness of these cash flows.[3]

"Expected value" cash flow

The "expected value" cash flow is the one that represents the statistically valid expected cash flow given the range of possible alternatives. Expected value is the probability-weighted average value of all possible outcomes of a variable.[4] A discount rate, or at least a discount rate derived using common methodologies such as variants of CAPM or the build-up method, is properly applied to the "expected value" cash flow rather than other estimates of future cash flows to determine the present value of the future cash flow stream.

Under the most exacting version of this approach, the expert explicitly models the probabilistic nature of future cash flow streams and generates a series of projections for the business, with each projection representing a different set of assumptions regarding the economic conditions affecting the business. The expert must attach a probability to the occurrence of each set of assumptions and corresponding cash flows. These fu-

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ture cash flows are combined to create an "expected value" cash flow in the statistical sense that reflects the arithmetic average, weighted by the probability that each projection occurs. The expected value cash flow is the sum of the product of all possible outcomes times the probability of each outcome.

An exhaustive analysis to determine the statistical expected value cash flow 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. Experts may be hesitant to pursue this approach because of the extensive information requirements. Also, because this approach requires experts to explicitly make a large number of assumptions based on subjective perceptions, this approach also creates opportunities for disagreement among competing experts on issues that cannot be factually resolved. Of course, all of those same assumptions or disagreements 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 technology would be rejected while the other believed that there was only a thirty percent chance of rejection, then, all else the same, their single-scenario cash flows would have to differ as well.

"Most likely" cash flow.

Frequently, the financial expert considers only a single estimate of the anticipated future cash flow, referred to as the "most likely" cash flow. The selection of the "most likely" cash flow should conform to defensible and reasonable assumptions. It is important to note that the "most likely" cash flow is not necessarily the "expected value" of a future cash flow in a statistical sense. At best, it is "expected" only in the sense of being based on possible (perhaps even probable) future events. This cash flow does not necessarily represent a statistical average of all possible outcomes. The most likely outcome may not be the expected outcome and may not adequately characterize the range of possible outcomes. For example, consider a project that is highly likely (70 percent) to earn $100. That may be termed the "most likely" cash flow. However, there is a small (30 percent) chance that the project will fail, earning zero. The expected value of the project is $70, not $100, even though the most likely outcome may be $100.

To determine the "most likely" cash flow, the expert typically selects a scenario that represents a generally reasonable outcome, ignoring the possibility of extremely good or extremely bad results. If the "most likely" cash flow is not the expected value cash flow, the resulting damage estimate will be in error statistically because there will be no correlation between the discount rate and the projection. Further, it is not possible, except by coincidence, to fix misestimates in the cash flows by adjusting the discount rate. Again, a discount rate, or at least a discount rate derived using common methodologies such as variants of CAPM or the build-up method, is properly applied to the "expected value" cash flow rather than merely the "most likely" cash flow.

"Single forecast" cash flow.

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 because of the number of assumptions required. Instead, the analyst constructs a single cash flow similar to the "most likely" cash flow described above. The difference is that the "single forecast" cash flow is intended to represent not just a likely outcome, but the weighted outcome corresponding to the expected value of the possible outcomes. If this is done, the forecast can be used and discounted 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 future cash flow estimate should reflect an appropriate blending of the possible outcomes. This approach is often the easiest and most appropriate for a given set of circumstances, especially when probabilistic modeling is not practical.

THE APPROPRIATE DISCOUNT RATE FOR DAMAGE CALCULATIONS

A discount rate has two components: a component that reflects the time value of money (i.e., that one dollar to be received at some point in the future is worth less than one dollar today); and a component that reflects the risk of achieving the expected future amount (i.e., the risk premium).[5] In valuation, "risk" refers to the likelihood that the investor will receive a return on an investment that is different from the return that the investor intended to make.[6] Investors are generally risk-adverse; if two investments have the same expected value, but one has a higher risk (variability in the return), the higher risk investment will have a lower value.

If the objective of a damages analysis is to place the plaintiff in an equivalent financial position but for the conduct of the defendant, the specific purpose of a damages award is to provide a sum of money that, were it invested in a comparable project, would yield the plaintiff 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 would have been borne by the plaintiff in seeking those profits. Often, the proper discount rate to use in calculating the plaintiff's lost profits will be the plaintiff's cost of capital.[7]

The development of plaintiff's cost of capital typically requires consideration of the cost of equity, the cost of debt, and the weighted average cost of capital (WACC).[8] The approaches used to estimate these costs include the capital asset pricing model (CAPM), the build-up method and the weighted average cost of capital (WACC). These methods have been thoroughly discussed in the valuation literature and are not presented in detail here.[9] Importantly, all the methods used to estimate an appropriate discount rate incorporate judgment by the analyst or appraiser. The fact that professional judgment is required – in the estimation of both the discount rate and the expected value of the future cash flows – does not eliminate the necessity of a conceptually correct calculation that recognizes the financial relationship between the discount rate and the future cash flows.

In the case of partial impairment or the loss of a particular project, the discount rate to be applied to lost profits

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may be either higher or lower than the company's overall cost of capital. If the marginal profits that are assumed to be lost are higher risk than the normal anticipated profits of the business as a whole, a higher discount rate should be used for those lost profits, resulting in a lower present value. For example, lost anticipated profits that strain the existing capacity of the business, or that stem from some new and unproven technology of the business or some other factor that causes them to be more speculative than the ongoing profit from regular operations, may be riskier than the overall anticipated profits of the business and thus require a higher discount rate.

Alternatively, if the profits that are assumed to be lost are lower risk than the normal, anticipated profits of the business as a whole, a lower discount rate should be used for those lost profits, resulting in a higher present value. For example, lost anticipated profits from an identifiable segment of the business that is considered lower risk than the "average" operations or profitability of the business as a whole may be discounted at a rate lower than the WACC. Cash flows from existing contracts or cash flows derived from passive royalties may have a lower discount rate than the average operations of the company.

Some risks are not handled through the discount rate. Discounting to the present value does not capture risks to the stream of cash flows that are resolved at a particular future time. An approach that does capture this risk will need to be applied and accounted for in calculation of the expected cash flow. Risks that are discretely resolved include risk inherent in a new product introduction and risk inherent in research and development. For example, suppose an oil exploration project has a 70 percent chance of success (i.e., locating an oil deposit in a particular area). The uncertainty regarding whether there are oil deposits in a particular location will be resolved when a well is sunk in the potential field. In the event that the project finds oil, the firm will enjoy a high income stream, with some time-related uncertainty (tied to the evolution of oil prices, costs of production, etc.). In the event that the project does not strike oil, the firm incurs costs, but earns no revenue. The present value of the expected income stream from the oil exploration project should account for the uncertainty regarding the presence of oil in constructing the expected value cash flow, but it should account for the (time-dependent) uncertainty regarding the cash flows by applying a discount rate consistent with the variation in the cash flows conditioned on finding oil. Note that the existence or non-existence of oil is not dependent on time, so it is inappropriate to deal with that particular risk via the discount rate. (This can be seen by considering the situation that the presence or absence of oil is determined immediately, so no time-based discounting can be applied. Also note that this example is essentially identical to the example discussed earlier under the "'Most likely' cash flow" heading.)

COMPARISON OF APPROACHES

Some analysts value future cash flows by discounting risky cash flows at a risky discount rate. Others assert that they reduce the risky cash flows to risk-free cash flows which is then discounted at a risk-free rate. A mathematical comparison of the two approaches for discounting future losses to present value is informative. Done properly, the two approaches are financially equivalent in concept, but that should not be surprising because each approach purports to measure the same thing: the present value of an economic loss. So, the notion that one approach necessarily yields a higher or lower result is erroneous. However, it is quite easy to misapply the approaches and arrive at different results in practice. It is important that the analyst recognizes the fixed financial relationship between the projected cash flows and the discount rates applied in each approach and applies the financial theory correctly.

Table 1 sets forth a comparison of the risk-adjusted discount rate ("capital markets approach") and the risk-adjusted cash flow ("expected cash flow approach") by comparing two ten-year cash flows that are discounted to yield the same present value amount. Both cash flows begin with an amount of $100,000 at present (time zero). The fu-

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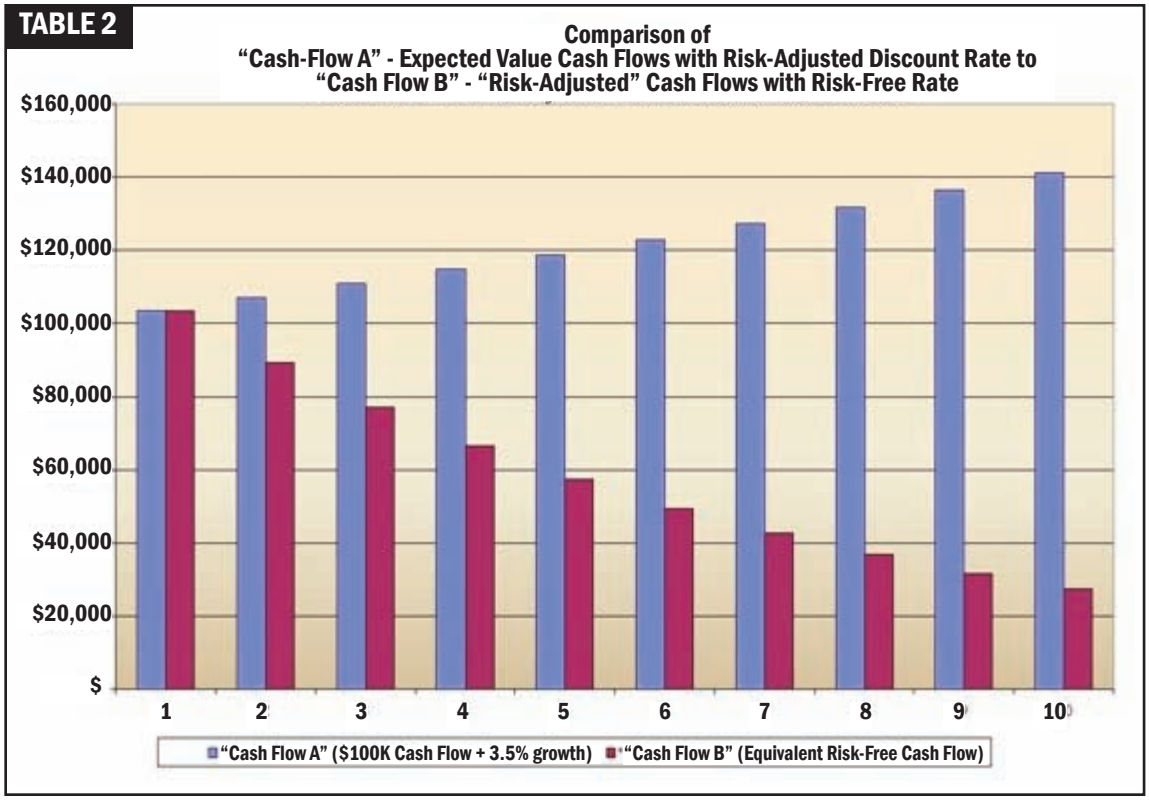
TABLE 1 **Comparison of Risk-Adjusted and Risk-Free Cash Flows**

"Cash Flow A" (Expected Value Cash Flow with Risk-Adjusted Discount Rate)			"Cash Flow B" (Risk-Adjusted Cash Flow with Risk-Free Discount Rate)		
Time Period	Expected Future Cash Flow	Present Value at 20%	Time Period	***Calculated Future Cash Flow***	Present Value at 4.5%
[0]	[100,000]		[0]	[100,000]	
Future:			Future:		
1	$ 103,500	$ 86,250	1	***$ 103,500***	$ 99,043
2	107,123	74,391	2	***89,296***	81,771
3	110,872	64,162	3	***77,041***	67,511
4	114,752	55,340	4	***66,468***	55,738
5	118,769	47,730	5	***57,346***	46,017
6	122,926	41,168	6	***49,476***	37,992
7	127,228	35,507	7	***42,686***	31,367
8	131,681	30,625	8	***36,828***	25,897
9	136,290	26,414	9	***31,774***	21,381
10	141,060	22,782	10	***27,413***	17,652
Total Present Value		$ 484,368	Total Present Value		$ 484,369

ture amount of "Cash Flow A" assumes an arbitrary annual growth rate of 3½ percent. The present value of Cash Flow A is calculated by discounting the future projection at 20 percent, an assumed risk-adjusted discount rate.[10] The present value of Cash Flow A is $484,368. Table 1 also presents "Cash Flow B," a cash flow that has been *calculated* or "solved for" to yield an equal present value to Cash Flow A, but assuming a risk-free discount rate of 4½ percent

Table 1 shows that the *calculated* future amounts of Cash Flow B, with a present value exactly equal to that of Cash Flow A, are dramatically lower in absolute dollars than the absolute dollars of Cash Flow A. Table 2 at right depicts the significant difference in the two cash flows (in absolute future value dollars).

TABLE 2



This example shows the relative difference in future cash flows resulting from a change in the discount rate from a risk-adjusted rate (20 percent) to a risk-free rate (4½ percent). When the analyst proposes to "factor the risk into the cash flow projection," the analyst would have to adjust the risky expected cash flows (blue bars) to the risk-adjusted cash flows (red bars) to maintain financial equivalency. It is the authors' experience that very few analysts make the required significant adjustments to "remove the risk" from the cash flows. As a result, many analysts overestimate the discounted value using the risk-adjusted cash flow (expected cash flow) approach.

There is a direct mathematical relationship between the expected cash flows and the risk-adjusted discount rate. Simply stated, that relationship is a net discount rate.[11] Any adjustment to the expected cash flow must be offset with an equivalent change in the discount rate. In order to factor the risk into the cash flow projection, the analyst must begin with the "unadjusted" cash flow projection (the statistical expected value cash flow), and then quantify the change in the projected cash flow due to the removal of the risk. To maintain financial equilibrium, the risk-adjusted discount rate must be adjusted by the change in the growth rate of the projection.

Financially, both the risk-adjusted discount rate approach ("capital markets approach") and the risk-adjusted cash flow approach ("expected cash flow approach") are the same calculation. However, when making the necessary adjustments to remove risk from the future projections, the financial analyst must be mindful of the potential significant reduction in future cash flows that are absolutely required. It is not appropriate to just be a "little more conservative" in a future projection and then reduce the risk dramatically. The two variables are directly connected. The magnitude of the required adjustment is far more than intuition may suggest.

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 hypothetical profits or cash flows that would have existed "but for" the defendant's action, minus the actual profits that did exist after the defendant's action. The basis of the calculation is primarily factual, though the computation may involve significant judgment regarding the probability that certain circumstances will prevail in the future (or would have prevailed in the future, sitting at the time of the alleged wrongful act) or would have prevailed in the past, but for the actions of the defendant to the extent those circumstances may have been influenced by such actions. The financial analyst should have a logical, defensible position supporting the assumptions regarding anticipated revenues as well as the costs associated with those revenues. To be technically correct, the projected future losses should be stated at the statistical expected value, the probabilistic average of all possible outcomes.

Numerous methods are advanced in valuation literature to estimate the risk-adjusted discount rate that is appropriate for a future stream of income or cash flows produced by a business entity. All methods necessarily require some subjective judgment on the part of the expert. The result of the proper application of the methodologies for determining a discount rate is the required rate of return to assign to an uncertain future expected value cash flow (or profit stream) produced by that business entity. In the final analysis, the discount rate is financially tied to the expected

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value cash flows and any variation in either variable must be directly accounted for in the other variable. It is not appropriate to make a subjective adjustment to one of the factors without making a mathematically equal adjustment to the other factor.

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1 AICPA Practice Aid, *Discount Rates, Risk, and Uncertainty in Economic Damages Calculations,* (2012: New York, N.Y.), p. 7, emphasis in original.

2 Brinig, B.P., "Achieving Reasonable Certainty in Quantifying Lost Profits Damages," *Dunn on Damages,* Issue 2, Spring 2011, p. 7.

3 Damodaron, Aswath, *Damodaron on Valuation* (Hoboken, NJ: John Wiley & Sons, Inc., 2006), p. 27.

4 *InvestorWords.com.*

5 As a matter of public policy (but not economics), courts have generally recognized that risk-free rates are appropriate for discounting personal earnings losses to present value in the case of personal injury and wrongful death litigation. In making this policy decision, the courts do not consider financial risk; they are simply awarding the plaintiff an amount of money which could be invested, risk-free, to replace the (admittedly not risk-free) stream of income that was lost. Courts have often, but not uniformly, created special rules that simplify the discounting of future lost earnings in the case of individuals, which simply cannot be compared to and should not be applied in the case of business lost profits, even though the two calculations are economically analogous. See Lloyd, footnoted subsequently, p. 23.

6 Damodaron, p. 27.

7 Lloyd, Robert M., "Discounting Lost Profits in Business Litigation: What Every Lawyer and Judge Needs to Know," *Tennessee Journal of Business Law,* Vol. 9, No. 1, Fall 2007, p. 32, citations omitted.

8 AICPA Practice Aid 06-04, *Calculating Lost Profits* (2006: New York, N.Y), p. 38. Other alternatives are also possible.

9 Pratt, S.P. and Niculita, A., *Valuing a Business: The Analysis and Appraisal of Closely Held Companies,* 5th ed. (New York: McGraw Hill, 2008); Pratt, S.P., *Cost of Capital: Estimation and Applications* (New York: John Wiley & Sons, Inc., 2009); Mercer, Z.C. and Harms, T.W., *Business Valuation: An Integrated Theory,* 2nd ed. (New York: John Wiley & Sons, Inc., 2008).

10 End-of-year convention is used for simplicity.

11 Net discount rate = [(1 + r) / (1 + g) – 1] where r = the discount rate and g = the growth rate.