Understanding the Issues

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Financial Accounting Standards Board
Serving the investing public through transparent information resulting from high-quality financial reporting standards, developed in an independent, private sector, open due process.

Introduction

The FASB recognizes its responsibility of keeping its constituents well-informed and believes this is particularly important when new ideas have been introduced. With the May 2001 issue of *Status Report,* we are pleased to launch a new feature, *Understanding the Issues,* that is intended to illuminate and simplify important subjects on which the FASB has published material.

To kick off the initial series of *Understanding the Issues,* we have focused on enhancing the constituent's understanding of measurement issues relating to Concepts Statement 7. This is the first in a series of four related articles on Concepts Statement 7. As a starting point, the authors of this article have focused on expected cash flows of an enterprise.

We welcome your feedback on this article.

Expected Cash Flows

By Edward W. Trott, FASB Member, and Wayne S. Upton, FASB Senior Project Manager

Edward W. Trott

Introduction

In February 2000, the Board issued FASB Concepts Statement No. 7, *Using Cash Flow Information and Present Value in Accounting Measurements.* Since then, the Board has incorporated the ideas from Concepts Statement 7 in Exposure Drafts on impairment of long-lived assets and asset removal obligations. Respondents to those Exposure Drafts have raised concerns about several elements of those drafts that carried forward ideas from Concepts Statement 7.

FASB pronouncements usually provoke some controversy, and Concepts Statements are no exception. The principle objections raised in recent Exposure Drafts are largely the same objections raised when the Board was deliberating Concepts Statement 7. They focus on three areas:

- Use of the *expected-cash-flow approach* in developing present value measurements
- Use of *fair value* as the objective for measurements on initial recognition and subsequent fresh-start measurements that employ present value
- Inclusion of the *entity's credit standing* in the measurement of its liabilities.

Concepts Statement 7 is a departure from previous parts of the Board's conceptual framework. This Concepts Statement focuses on measurement with greater specificity than its predecessors. For the first time, it articulates a single objective for measurements on initial recognition and for subsequent fresh-start measurements, although that objective is limited to measurements that employ present value. It introduces techniques and ideas that have not been a common part of the accountant's toolkit, at least not explicitly. However, the principles articulated in Concepts Statement 7 carry forward ideas that first appeared in accounting literature in the early 1970s. The new techniques and ideas implement, at a very basic level, principles of economics and finance that date back to the 1950s and before.

Wayne S. Upton

The Board recognizes its responsibility to maintain a continuing dialogue with constituents, especially when it introduces new ideas. To judge by the comment letters, many have interpreted Concepts Statement 7 as far more complex and difficult than the Board intended. Others may not have understood (or may not have accepted) the rationale behind the

Board's conclusions. With that in mind, the Board and staff are preparing a series of articles to communicate both its rationale and expectations for applications of Concepts Statement 7. This is the first in that series, and addresses the expected-cash-flow approach.

This article has two sections. The first expands on *why* the Board turned to the expected-cash-flow approach for complex present value measurements. The second describes *how* the Board envisions application of the expected-cash-flow approach in common measurement situations. The two sections are largely independent of one another, and the reader who is more interested in the application of expected cash flows may want to turn directly to the second section.

Section 1—Best Estimates Versus Expected Values

Prior to Concepts Statement 7, many accounting pronouncements used the term *best estimate* to describe the target for estimated cash flows. The term was never defined, but its contexts seem to suggest that an accounting *best estimate* is:

- Unbiased
- In a range of possible outcomes, the most likely amount
- A single amount or point estimate.

Few other professions follow the accounting practice of equating *best estimate* and *most likely.* Statisticians, actuaries, scientists and engineers tend to avoid the term *best estimate*. When they use it, they do so to describe the *expected value*—the probability-weighted average. But accountants have grown used to the *most-likely* meaning for best estimate. In responding to a recent Exposure Draft, one respondent offered the following observation:

> By requiring the probability-weighted expected-cash-flow approach, the results will not likely represent the actual amounts that will be realized.

The accounting notion of best estimate as a measure of the most likely amount follows naturally from APB Opinion No. 21, *Interest on Receivables and Payables,* which refers to "contractual rights to receive money or contractual obligations to pay money on fixed or determinable dates." The relationship between interest rate, price and contractual cash flows is straightforward, easy to understand, and easy to apply—at least for simple financial instruments. It's not surprising that accountants would try to extend the simple mechanics of lending and borrowing to other cash-flow-based measurements. Unfortunately, the simple relationships begin to break down as the measurement problem becomes more complex. Contractual cash flows usually represent the maximum possible amount—few loans ever pay more than the contractual principal and interest. In contrast, other assets and liabilities don't have contractual cash flows or a fixed schedule of payment dates.

Opinion 21 was issued in 1971. In the years that followed, many accountants came to see "contractual rights to receive money or contractual obligations to pay money on fixed or determinable dates" as the necessary condition for any accounting measurement that employed present value. Absent specific accounting pronouncements to the contrary, many concluded that Opinion 21 prohibited any use of present value in other areas. As a result, many measurements, especially measurements of liabilities, were presented as the undiscounted sum of estimated future cash flows; the effects of time value were ignored.

Few accountants would argue that the undiscounted sum of future cash flows represents the economic value of an asset or liability, especially if the cash flows occur several years in the future. An undiscounted best estimate is not a valuation, it is a prognostication—management's best guess at the outcome of an admittedly uncertain future. Management's best guess is not unimportant. It can be a tool that senior managers, directors and investors use to set goals and objectives. As experience unfolds and provides a basis for comparison, previous best estimates provide information about how well management understood and anticipated a particular situation. Beyond that, in today's litigious and competitive environment, it's natural to expect managers to favor measurements that are unlikely to be "wrong." A few pennies of earnings can translate into millions in market capitalization. Why wouldn't a manager seek out the measurement that is least likely to be wrong?

One of the objectives of financial reporting is to help "investors, creditors, and others assess the amounts, timing, and uncertainty of prospective net cash inflows to the related enterprise." Some suggest that management's best estimate of undiscounted cash flows is the best way to communicate information about prospective cash inflows. But that measurement doesn't really satisfy the financial reporting objective very well. The undiscounted best estimate is a picture of the end of an asset or liability—the expectation of its ultimate proceeds or settlement—not its current value or the value when acquired or incurred. Presenting the undiscounted best estimate in the balance sheet tells nothing about the timing and uncertainty of the future cash flows, so its usefulness in meeting the objective is very limited. The only way to communicate information about "amount, timing, and uncertainty" in the carrying amount of an asset or liability is to incorporate all three in its measurement, and that requires a discounted approach. The result no longer represents the best estimate, but a valuation of the underlying asset or liability. The name says it all—present *value*. Whether the target is fair value, as stipulated in Concepts Statement 7, or some other amount like value-in-use or entity-specific value, the amount reported has become a valuation. It no longer represents the same idea of "management's best estimate."

Problems with the Traditional Approach to Present Value

Accounting pronouncements that require present value in initial and fresh-start measurements tend to fall into two groups. Some, like Statements 87 (pensions) and 106 (other postretirement benefits), specify cash flow and interest rate assumptions in some detail. Others provide general guidance and require that estimated cash flows be discounted using "a rate commensurate with the risk involved," although that rate is usually mentioned in the context of fair value.

The Board has long recognized that present values can be changed by altering either cash flows or discount rates. Still, the Board's early deliberations took the traditional path of developing a best estimate of cash flows and then selecting an appropriate interest rate. Over time, the Board found that a focus on finding the "right" interest rate was unproductive. Any positive interest rate would make the discounted number smaller than the undiscounted best estimate, but there had to be more to present value than that. Moreover, it became clear that intuitions built on contractual cash flows and interest rates don't always work when applied to assets and liabilities that don't have contractual amounts and payment dates.

Moving the reference point from contractual to estimated cash flows disrupts the conventional relationships that apply to contractual cash flows. What is the "rate commensurate with the risk" when actual cash flows may be higher or lower than the best estimate? Is the rate higher or lower than risk free? By how much? Does the answer change if the item is a liability rather than an asset? What are the proper cash flows and interest rate when *timing* is uncertain? The traditional approach doesn't provide ready answers to those questions. In a sense, the drafters of Opinion 21 had it right. *If* a single best-estimate of future cash flows and a single interest rate are the only tools for computing present value, then the technique cannot reasonably be applied to a broader range of measurement problems.

The Board thus faced a dilemma. Management's best estimate of future cash flows incorporates just one piece of information—future amount. The best estimate is not unimportant, but rational economic decisions consider amount, timing and uncertainty. Financial reporting would be more relevant if cash-flow-based measurements incorporated all three factors, but the traditional approach is not suitable to the task. This led the Board to dig deeper and explore the notion of expected cash flows.

Even for simple loans, focusing on contractual cash flows confuses available information with important information. Contractual cash flows are easy to determine, but there is a reason why the market demands a different interest rate for U.S. government obligations than for lower quality obligations. U.S. government obligations have no default risk. The contractual, best-estimate and expected cash flows are the same (or so close that the difference doesn't matter much). Other obligations carry the chance of default, and the cash from those that do repay must be enough to cover the cost of defaulters and still provide a return. Even for a single loan, the expected cash flows are the key. The contractual amounts, while obviously important, are built up from expectations about defaults. Unfortunately, the market's view of expected cash flows cannot be directly observed. We can draw inferences about traded instruments, but we can't see the expected cash flows directly. That lack of transparency doesn't obviate the underlying economic reality.

As work proceeded, the Board found that an expected-cash-flow approach offered a superior conceptual structure for complex measurement problems. This was especially true when timing was uncertain. Remember, the restrictive language in Opinion 21 reads, "contractual rights to receive money or contractual obligations to pay money *on fixed or determinable dates*" (emphasis added). Diagram that sentence, and you find that "fixed or determinable" modifies "dates." Again, the authors of Opinion 21 had it right, given their limited toolkit. A single interest rate can capture the uncertainty in amount. Determining an interest rate that captures timing uncertainty, ex ante, is difficult, if not impossible in many situations.

Paragraph 46 of Concepts Statement 7 includes a simple illustration of timing uncertainty—a $1,000 payment that might be received in one, two or three years. Depending on the date chosen, the present value is somewhere between $852 (the amount in three years) and $952 (the amount in one year). In the paragraph 46 example, the expected present value, which incorporates the timing uncertainty, is $892.

In that example, the expected present value of $892 is fairly close to the most likely (two years) present value of $903. This might lead some to wonder whether the effort to compute expected present value was worthwhile. Others might question whether the difference ($11) implies a level of precision that does not exist. Those are valid concerns. However, as illustrated in the next section, the most likely timing and amount are not always good proxies for the expected timing and amount. Even intuitions about what is "best" and "worst" may not hold up in the face of uncertain timing.

All of this does not suggest that the traditional approach is *never* acceptable. Markets for some financial instruments use interest rates as a means to communicate prices. In such cases, the present value computation is trivial. In other cases, managers may be able to identify market-comparable assets. If the timing and amount of cash flows of the asset in question are highly correlated to those of an asset identified in the marketplace, and that correlation is expected to continue under differing economic circumstances, then the traditional method (a single set of estimated cash flows and a discount rate commensurate with the risk involved) is usually a reasonable approach. Unfortunately, the really difficult measurement situations are those in which market-comparable assets and liabilities do not exist.

Section 2—Application

Thousands of Scenarios

Some respondents concede the conceptual value of the expected-cash-flow approach but argue that it is too impractical and costly for use in real-world situations. Perhaps they envision the supercomputer models used to predict hurricanes, explore for oil or evaluate high-stakes derivative transactions. Those are all examples of expected value-based models, but the Board didn't envision anything nearly that grand. Most accounting measurements don't lend themselves to that kind of modeling. Instead, the Board was looking at two sets of principles: the elements of economic value and the practical principles of present value.

The elements of economic value (paragraphs 23 and 39) are:

a. An estimate of the future cash flow, or in more complex cases, series of future cash flows at different times
b. Expectations about possible variations in the amount or timing of those cash flows
c. The time value of money, represented by the risk-free rate of interest
d. The price for bearing the uncertainty inherent in the asset or liability
e. Other, sometimes unidentifiable, factors including illiquidity and market imperfections.

The practical principles, stated simply, are:

a. Don't leave anything out. (But see item e.)
b. Use consistent assumptions and don't count the same thing twice.
c. Keep your finger off the scale.
d. Aim for the average of a range, rather than a single most-likely, minimum or maximum amount.
e. Don't make up what you don't know.

Peeling the Onion—Working from Best Estimate to Expected Present Value

To see how the Board envisioned the process, let's consider a case study in liability measurement. Managers are faced with a liability that must be measured. There is no market information about prices for this or comparable obligations. Management estimates that the most likely payment will be $1,000,000 in ten years. Now we start to ask questions:

Question 1: Do the estimated cash flows include the effect of inflation?

Most accounting estimates use *nominal* amounts; the estimate includes the effect of inflation. The focus here is on Practical Principle (b)—Use consistent assumptions. If the estimated cash flows do not include inflation, if instead they are *real* amounts, then the discount rate should not include inflation. Nominal cash flows are discounted at a nominal rate, and real cash flows at a real rate.

From here on, we will assume that all estimates are nominal amounts. Assuming a five percent risk-free discount rate and a flat yield curve, the present value of the most likely payment is about $614,000. That amount includes two of the three pieces described earlier. It has the amount and the timing, but nothing of the uncertainty.

Question 2: Does management have a picture of the best-case and worst-case scenarios?

Few business decision makers would act on a single projection of most likely cash flows. Instead, they look at the range of possibilities and ask:

- What is the most likely outcome that we can expect?
- How bad can things be, if conditions go against us (the worst case, minimum for an asset or maximum for a liability)?
- How good can things be, if everything goes our way (the best case, maximum for an asset or minimum for a liability)?

To carry on the process, management estimates that the best (minimum) case is a payment to settle the liability of $500,000 in five years. The worst (maximum) case is a payment of $5,000,000 in 25 years. But wait a minute. Why isn't the ability to defer the payment for 25 years the "best" case? Wouldn't intuition suggest that, in liabilities, paying later is better than paying sooner?

This is an example of how intuition sometimes looks in the wrong direction. We need to compare present values here, and the present value of $500,000 in five years at five percent is about $392,000. The present value of $5,000,000 in 25 years at five percent[1] is about $1,476,500. If they had the choice, managers would rather pay the $500,000 in five years, all other things being equal.

Question 3: Are the timings and amounts independent of each other?

The focus here is on Practical Principle (a)—Don't leave anything out. Is there a chance that the company may have to pay $5,000,000 in five years or that it might pay $500,000 in 25 years? If the amounts are independent of timing, this measurement is a little more complicated than it looked initially. We'll pass over that possibility and assume that the amounts and timing are connected. If the payment is in five years, it will be $500,000. If in ten years, it will be $1,000,000, and so on.

Now we have the raw material for a first try at measuring expected present value. Statisticians call this a case with a *triangular distribution*. We have estimates of the minimum (best), most likely and maximum (worst) present values. If we stop now, and sometimes this is as far as we can go, the expected present value is about $827,000, as illustrated below:

Example 1

Computation of Expected Present Value
Unknown Probabilities

Present Values at 5%

	Years	Amount	PV
Best case	5	$ 500,000	$ 391,763
Most likely	10	1,000,000	613,913
Worst case	25	5,000,000	1,476,514
			$ 2,482,190
		divided by 3 equals	$ 827,397

[1]For simplicity, these illustrations assume a flat yield curve.

But wait a minute. How can the most likely amount carry the same weight as the best and worst cases? How can it be the most likely?

It is counterintuitive. The most likely case should carry more weight, but in this scenario, managers don't know how much more. Rather than violate Practical Principle (e)—Don't make up what you don't know—we use an approximation to find the expected present value.

Is $827,000 a better accounting measurement than the most likely present value ($614,000) or the undiscounted best estimate ($1,000,000)? If management has no more information, especially about relative probabilities, then we've taken the measurement as far as it can go. The $827,000 result incorporates all of the available information about amount, timing and uncertainty. The other amounts ($614,000 and $1,000,000) excluded information about uncertainty and timing respectively.

Question 4: Does management have any estimate of relative likelihood?

Notice that we didn't say *probabilities*. Many managers and accountants are loath to associate numerical probabilities with what are, admittedly, very subjective estimates. This isn't like describing the odds on bets at a roulette wheel or a state lottery. Still, it is human nature to quantify. It would not be unusual for a manager to say: The most likely case is about twice as likely as the best case, and the worst case is only a third as likely as the best case.

Those estimates translate into probabilities of thirty, sixty and ten percent for the minimum, most likely and maximum cases respectively. This is the kind of situation the Board had in mind as it developed Concepts Statement 7. No, the probabilities aren't very precise and the judgments are subjective. They always will be in this sort of situation, but we now have a measurement that incorporates all of management's understanding of amount, timing and uncertainty. We didn't make up any information such as Practical Principle (e) that wasn't already available. Adding the probabilities, even though they are rough, changed the answer considerably from the even rougher approximation computed in Example 1. We have met the objective of an expected present value by incorporating the additional information that was available.

Example 2

Computing Expected Present Value
Cash Flows and Interest Rates Are Related

Present Values at 5%

Timing	PV	Probability	Extension
5 years	$ 391,763	30.00%	$ 117,529
10 years	613,913	60.00	368,348
25 years	1,476,514	10.00	147,651
			$ 633,528

Variations on the Theme

In Example 2, the expected present value and best estimate of present value were very close—about $633,500 and $614,000 respectively. But what if the estimates were a little different? For example, what if managers conclude that the best case is about one-third as likely as the most-likely case, the worst case is about as likely as the best and the timing and amount are related to one another. That translates to probabilities of twenty, sixty and twenty percent. Intuition suggests that the most likely and expected amounts should be about the same, but that intuition is wrong. Now the expected cash flow is about $742,000—a significant difference from the best estimate of about $614,000.

Example 3

Computing Expected Present Value
Cash Flows and Interest Rates Are Related

Present Values at 5%

Timing	PV	Probability	Extension
5 years	$ 391,763	20.00%	$ 78,353
10 years	613,913	60.00	368,348
25 years	1,476,514	20.00	295,303
			$ 742,004

Could we achieve the same result with an adjustment to the interest rate? The computation isn't difficult, especially now that we know the answer. The interest rate that reduces $1,000,000 in ten years (the most likely case) to $742,000 today is about three percent, well below the risk-free rate of five percent. Could a manager or accountant demonstrate that three percent is the "rate commensurate with the risk" without going through the exercise portrayed above, or something like it? No, not without a market-comparable asset or liability.

Let's try one more situation. What if managers say that the most likely case is about twice as likely as the worst case, and the best case is only one-third as likely as the worst case. Now the probabilities have reversed to ten, sixty and thirty percent for the best, most likely and worst cases respectively. The expected cash flow is now about $850,500—over one-third higher than the most likely estimate.

Example 4

Computing Expected Present Value
Cash Flows and Interest Rates Are Related

Present Values at 5%

Timing	PV	Probability	Extension
5 years	$ 391,763	10.00%	$ 39,176
10 years	613,913	60.00	368,348
25 years	1,476,514	30.00	442,954
			$ 850,478

The interest rate that reduces $1,000,000 in ten years (the most likely case) to $850,500 today is about 1.6 percent.

What do the examples tell us? Several things:

1. The expected present value may, or may not, be close to the best estimate. It depends on the way possibilities are distributed in both time and amount. There is a fundamental principle in accounting that predates the Concepts Statements. Accounting should not make things that are different appear to be the same, and it should not make things that are the same appear to be different. The economic values of obligations described in Examples 2, 3 and 4 are very different from one another. Examples 3 and 4 are very different from management's best estimate.
2. Managers can compute expected present value without undue effort and extraordinarily complex models. It's hard to imagine a business today that doesn't own at least one personal computer, and its hard to imagine a PC that doesn't have a simple spreadsheet program. With those tools, the computations involved are simple.
3. In many cases, expected present value can be computed using information that is already part of existing estimates.
4. Expected present value does not lead to "artificial precision," as some have suggested. It may, however, challenge preconceived notions about the relationship between cash flows and interest rates.
5. Expected present value should not be harder to audit than traditional present value computations. Indeed, it may help to identify inconsistent assumptions that would not have been readily apparent in a traditional computation.

How Hard to Look

Anyone who has ever developed a cash flow estimate knows that you can refine assumptions, and refine and refine again almost without end. Often, the last several refinements do little to improve the precision, or even change the amount of the final result. At the end of the day, it's still an estimate. On the other hand, sometimes you can't know that the last refinement wasn't necessary until you take the effort to make the refinement.

Some suggest that moving from most-likely to expected cash flows seems to aggravate this conundrum. For example, suppose managers say that there is an outside chance, maybe one percent, that this liability might cost as much as $10 million in 25 years. It might cost even more. How does one tell when to quit looking for the ends of the range between best and worst case?

Unfortunately, there is no easy answer to that question. There wasn't an easy answer before, but Concepts Statement 7 does make the question more obvious. If managers can develop reasonable probabilities (relative likelihood), then the problem is somewhat less severe. The $10 million possibility would change Example 2 by about $15,000—probably not enough to alter the recorded amount. As in other accounting problems, the amount of additional time spent refining an estimate should be governed by:

1. The cost of additional refinements balanced against
2. An expectation about whether the refinement produces a commensurate improvement in the quality of the answer.

Concluding Observations

In a March 1972 article, Paul Pacter observed:

> Accounting Principles Board Opinion No. 21, "Interest on Receivables and Payables," has suffered from what the public relations people would call a bad press.[2]

Viewed from a 2001 perspective, its hard to recall just how controversial Opinion 21 was. Critics accused the APB of creating "pro-forma accounting" and "imputing interest." Today, even the most naïve consumer knows that a "one-year interest free" payment plan is not free at all. Opinion 21 is part of the accountant's toolkit.

In the 1972 article, Paul argued that Opinion 21 was an extension of existing historical-cost principles, and that it placed the economic substance of a transaction over its form. Concepts Statement 7 is very much an evolution from Opinion 21, not a radical new direction. (Indeed, the Board considered amending Opinion 21 to make it fully consistent with Concepts Statement 7, but decided not to amend any existing pronouncements at this time.) As we've explained in this article, and as we'll expand in the three that follow, the objective is to help "investors, creditors and others assess the amounts, timing, and uncertainty of prospective net cash inflows to the related enterprise."

The views expressed in this article are those of the authors. Official positions of the FASB are determined only after extensive due process and deliberations.

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[2] "A Synopsis of APB Opinion No. 21," *Journal of Accountancy* (March 1972): 57-67.