

Chapter 6

Economic Concepts: Behind The Accounting Numbers



Cash Flow

An asset's "economic value" is determined by the "cash flows" it generates. A business asset's "economic value" (i.e., the value associated with its business cash flows) is separate and distinct from the "consumption value" (i.e., the stream of personal value) used in our private lives.

Our discussion will only consider an asset's "economic value" (e.g., the future benefits, or, cash flows, generated by the acquisition of a business asset).



Cash Flow

Cash flows are influenced by:

Timing – A dollar today is worth more than a dollar tomorrow, since it allows for immediate consumption or investment. This is also known as the time value of money concept.

Uncertainty – When cash flows extend into the future, no one can be certain that the cash amounts will end up being what they are currently estimated to be (e.g., a current account receivable of \$1,000 may only yield \$800 due to future events.)



Cash Flow Concepts

Interest – The price paid for the ability to transfer cash across time periods.

Compound interest – The interest on previously earned interest.



Cash Flow Concepts

Future value -- The value of an investment's value at some point in the future periods.

Present value – The starting amount that will produce a given ending amount at some specified date in the future at a given interest rate.



Future Value

Future Value is defined as:

$$FV = D \times (1 + i)^t$$

Where:

FV = future value;

D = dollars invested;

i = interest rate (in percentage) per period

t = the number of periods.



Future Value Example

If Rhody has \$10,000 to invest at 8% for 2 years, what is the amount of interest income Rhody would earn for the 2 years?



Future Value Example

Rhody would earn \$1,664 of interest over the two years.

$$FV = D \times (1 + i)^t$$

$$FV = \$10,000 \times (1 + .08)^2$$

$$FV = \$10,000 \times (1 + .08) \times (1 + .08)$$

$$FV = \$10,000 + \$800 + \$800 + \$64$$

Rhody would earn \$800 interest each year on its investment and \$64 interest on the \$800 of interest it earned in year 1 (i.e., interest on the interest).



Present Value

Present Value is defined as:

$$PV = FV \times 1/(1 + i)^t$$

Where:

PV = present value;

FV = future value;

i = interest rate (in percentage) per period;

t = the number of periods.

NOTE: The portion of the formula in red is referred to as the discount factor.



Present Value Example

If Rhody wants to have \$16,350 at the end of the year and can earn 9% on its investment, how much money does it need to invest today to have that amount (i.e., \$16,350) at the end of the year?



Present Value Example

Rhody would need to invest \$15,000.

$$PV = FV \times 1/(1 + i)^t$$

$$PV = \$16,350 \times 1/(1 + .09)^1$$

$$PV = \$16,350 \times .9174$$

$$PV = \$15,000$$



Expected Value and Cash Flows

Expected Value – A simple approach to compute economic value under uncertainty. The expected value of a cash flow is a weighted average, or the cash flow amount multiplied by the probability of that amount.



Expected Value Formula

Thus, expected value equals
 $(Cflow1 \times P(Cflow1)) + (Cflow2 \times P(Cflow2))$

Where:

Cflow1 = Cash flow1

Cflow2 = Cash flow2

P = Probability



Impact of Expected Value on Accounting Information

A change in expected value is impacted by information. Similarly, accounting adjustments are driven by information. For instance, placing a value on a warranty liability requires estimating the chance that products will break down within their warranty period. Likewise, estimating the liability for health care benefits requires estimating the probabilities that retirees will enjoy varying life spans as well as the likelihood of having to supply various types of medical services and their costs, offset by the assets invested to cover these costs.



Impact of Expected Value on Accounting Information

From the asset side. GAAP requires that if a company's discounted future cash flow from a fixed asset is less than its book value the company must write down (i.e., reduce the value of the asset). This is referred to as asset impairment, which we will discuss in more detail in Chapter 11.



Expected Value Example

Assume Rhody makes an investment in the beginning of 2004 and that there is a 40% chance that the investment will return \$1,000 and a 60% probability that the investment will pay \$1,500. The expected value of the investment is:

$$(.4 \times \$1,000) + (.6 \times \$1,500) = \$1,300$$



Discounted Expected Cash Flow

If we combine the concepts of present value and expected value we can determine a company's **discounted expected cash flows** from an investment.

The longer a company has to wait for a return on an investment at a fixed interest rate (i.e., 7%) the lower its expected cash flow (i.e., time value of money). In addition, waiting to receive the return adds uncertainty that can cause changes in our original expectations of the amount we will earn from the investment.



Example Discounted Expected Cash Flow

Recall the example where Rhody has a 40% chance that an investment will pay \$1,000 and a 60% probability that the investment will pay \$1,500. The expected value of the investment is \$1,300 $(.4 \times \$1,000) + (.6 \times \$1,500)$. Now assume Rhody has to wait 3 full years (i.e., 2004, 2005, 2006) for that return and that the interest rate (i.e., discount rate) is 8%. What amount will Rhody receive from the investment?



Example Discounted Expected Cash Flow

Because of the time value of money (i.e., in today's dollars), Rhody will only receive \$1,032 from its investment.

$$PV = FV \times 1/(1 + i)^t$$

$$PV = \$1,300 \times 1/(1 + .08)^3$$

$$PV = \$1,300 \times .7938$$

$$PV = \$1,032$$



Example Discounted Expected Cash Flow

Now assume at the end of 2004, changes in the economy cause you to be more optimistic about your expected return on the investment. Now, you think there is only a 20% chance that an investment will pay \$1,000 and an 80% probability that the investment will pay \$1,500. What amount will Rhody receive from the investment?



Example Discounted Expected Cash Flow

The first thing we need to do is recalculate the expected cash flow

$$(.2 \times \$1,000) + (.8 \times \$1,500) = \$1,400$$

Now we need to recalculate the effect of the time value of money on the new expected cash flow:

$$PV = FV \times 1/(1 + i)^t$$

$$PV = \$1,400 \times 1/(1 + .08)^2$$

$$PV = \$1,400 \times .8573$$

$$PV = \$1,200$$



Example Discounted Expected Cash Flow

Rhody now expects to receive \$1,200.

The change of \$168 (\$1,200 - \$1,032) consists of two pieces. One change is that the time the company will need to wait for the cash is one year less (i.e., from three years to two years). The other change is the expected value from the investment has changed to \$1,400 (.2 x \$1,000) + (.8 x \$1,500).



Explanation of Changes In Cash Flow

The changes in the the computation of discounted expected value is a function of two components **Timing** (changes in the time value of money) and **Uncertainty** (changes in expected value from the investment).

The change in the interest component is referred to as **normal economic earnings**, resulting from interest This change can only be positive.

Abnormal economic earnings, resulting from changes in probabilities or new information can either be positive or negative.



Example Discounted Expected Cash Flow

Discounted expected cash flow 2004 -	\$1,200
Discounted expected cash flow 2003 -	<u>1,032</u>
Total increase	\$ 168
Interest effect increase (\$1,032 x .08)	<u>83</u>
Probability change increase	<u>\$ 85</u>



What's Next?

In the next chapter, we will compare such economic values to the book values shown in the accounts. This will allow us to better understand the information in financial reports and, better evaluate alternative accounting methods that yield differing book values.

Two key ratios we will cover are

- the market-to-book ratio
- return on equity

