

Present Value Concepts

What is present value?

It is today's value of a payment (or payments) to be received in the future. It is the value today of a future payment or series of payments, discounted at the appropriate discount rate.

What determines this present value?

- a) the amount of the payment or payments, of course
- b) when in the future the payment(s) is to be made
- c) The earning power of money over that future period of time—the appropriate interest rate to use to discount the future dollar amounts.

Specifically: (other things constant)

- a) The greater the amount of the payment(s), the greater the present value.
- b) The more distant the future payment(s), the lower the present value.
- c) the higher the interest/discount rate, the lower the present value.

Present Value—viewed another way:

Present value answers the question of how much money would have to be set aside today—and invested (at the appropriate interest rate)—in order to accumulate the target (payment) amount by the payment date.

Hint: think of discounting for present value as merely the *reverse* of compounding.

Using Present Value Tables:

First question: Which table do I use?

Rule: If it is a one-time payment, use the “Present Value” or “Present Value of \$1” table.

If it is a series

of equal payments (an annuity), use the “Present Value

of an Annuity” or “Present Value of \$1 per period” table.

For an instrument such as a Treasury bond, the interest payments represent an annuity, so use the “Present Value of an Annuity” table to determine the present value of the stream of interest income. The return of the principal at maturity is a one-time payment, so use the “Present Value” table to calculate the value of that component. The value of the bond is the sum of the two. [Note: the coupon rate on the bond only tells us the amount of the interest payments. The appropriate interest rate to use for discounting purposes, the discount rate, depends on the market return on a security of the given risk, maturity, etc.]

Caution: What if payments are more frequent than annual? For example, Treasury bonds pay interest semi-annually. In that case you must adjust the number of periods and also the interest rate used to discount the future payments. So, a

20 year, \$100,000, 6% coupon rate bond will involve 40 payments of \$3,000 each. If your discount rate is 8% (on annual basis), then you must halve it and discount the semi-annual payments using a 4% rate.