

3.3: Present Value

The flip side of Future Value is Present Value. Future value tells us how much a certain amount of money will be worth at some future date assuming a certain rate of return. However, what if we know how much we are supposed to get at some point in the future and want to know what it is worth to us today? Now we must find the Present Value. Assume we are offered an opportunity to receive \$200 at the end of two years (call it investment A). How much is this opportunity worth to us today assuming we could earn 8% by placing our money in a savings account (that has risk similar to investment A)? To answer this, we must ask how much we would need to place in a savings account today in order to have \$200 at the end of the two years.

$$\begin{aligned}
 FV &= PV(1+k)^n \\
 200 &= PV(1.08)^2 \\
 \frac{200}{(1.08)^2} &= PV \\
 \$171.47 &= PV
 \end{aligned}$$

If we had \$171.47 today and placed it in a savings account earning 8%, we would have \$200 in two years (the same as through investment A). Assuming that investment A had the same degree of risk as our savings account, then we would buy investment A if it was available for less than \$171.47 and put our money in the savings account if investment A cost more than \$171.47. We could say that the present value of investment A is \$171.47.

Solving for Present Value

We have three ways to solve for the PV: formula, financial table, and financial calculator.

Method 1: Using a Formula to Find the PV

The first is directly with a formula. Under this method, we use the following formula:

$$PV = \frac{FV}{(1+k)^n}$$

where

FV is the future value (in year n) that we plan to receive

PV is the present value (how much it is worth to us today)

k is the rate of return we can earn elsewhere (also referred to as the compound rate, required return, or discount rate)

n is the number of years which we will have to wait before receiving the money.

Method 2: Using a Table to Find the PV

The second method is to use [financial tables](#) and will not be covered in this text.

Method 3: Using a Financial Calculator to Find the PV

The third method is to use the financial calculator (or spreadsheet). Each financial calculator follows the same basic ideas, but the specifics are different for each brand of calculator. The steps below are for the HP10BII, TI-BAIL+ and TI-83/84.

Calculator Steps to Compute PV

HP10BII	TI-BAIL+	TI-83/84

HP10BII	TI-BAII+	TI-83/84
Step 1: Enter N Step 2: Enter I/YR Step 3: Enter 0 for PMT Step 4: Enter FV Step 5: Press the PV key	Step 1: Enter N Step 2: Enter I/YR Step 3: Enter 0 for PMT Step 4: Enter FV Step 5: Press the CPT key Step 6: Press the PV key	Go to APPS⇒Finance⇒ TVM_Solver Step 1: Enter N Step 2: Enter I/YR Step 3: Enter 0 for PMT Step 4: Enter FV Step 5: Move to PV line and press the ALPHA SOLVE key

Note: The order of steps 1-4 is not important. The PV answer will appear as a negative number, ignore the negative sign for now.

✓ Example 3.3.2: Finding PV Using the Financial Calculator

Find the Present Value of \$5000 received 15 years from today with a 9.5% discount rate.

Solution

Step 1: 15 N
 Step 2: 9.5 I/YR
 Step 3: 0 PMT
 Step 4: 5000 FV
 Step 5: PV⇒

You should get a solution of \$1281.62

In other words, if we are offered the opportunity to receive \$5000 at the end of 15 years that is equivalent to receiving \$1281.62 today.

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