PART I

THE PERFECT INVESTMENT

The goal in Part I of the book is to show how to identify the perfect investment, which we explain is one where a stock has been mispriced. We also show that the investor must identify a path for the mispricing to correct and be able to exploit the opportunity. To determine if a stock is mispriced, the analyst needs to calculate the stock's intrinsic value, which we cover in detail in the first four chapters of the book.

We define the value of an asset in Chapter 1 and show how it is valued using a discounted cash flow model. We use this approach to value a business in Chapter 2. Because assessing competitive advantage is critical to determining the value of growth, we discuss these topics in depth in Chapter 3. Finally, we use these tools in Chapter 4 to show how to think about a security's intrinsic value.

To determine if a genuine mispricing exists, we need to define the conditions under which a stock will be efficiently priced, which requires a detailed discussion of market efficiency. We begin in Chapter 5 with an explanation of Eugene Fama's efficient market hypothesis, which we show are the rules the market follows to set prices. We then discuss the wisdom of crowds in Chapter 6 and show it as the mechanism that implements the rules in the market. We then explore behavioral finance in Chapter 7 and show how the rules can become strained or broken when a systematic error skews the crowd's view.

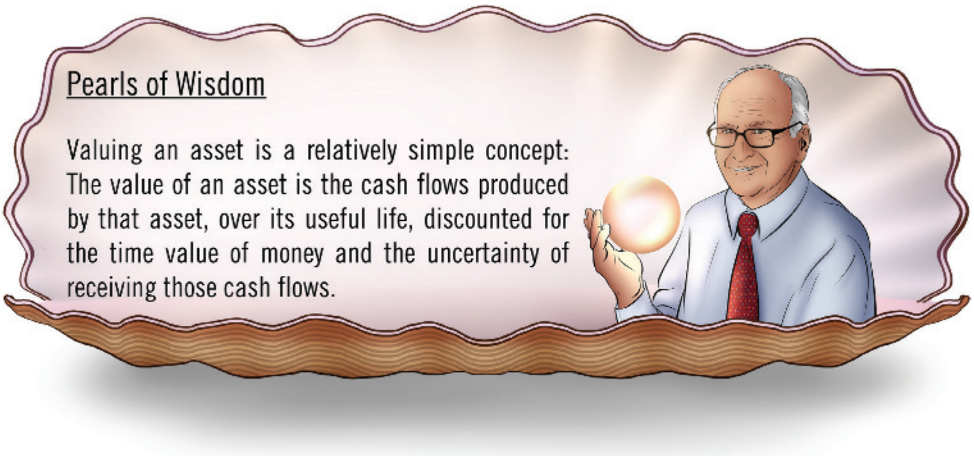
To establish if a mispricing is genuine, the investor must demonstrate that he has either an informational advantage, an analytical advantage, or a trading advantage. If the investor cannot identify specifically why other investors are wrong, show why he is right, and articulate what advantage he has, then it is unlikely he has identified a stock that is truly mispriced. We discuss these topics in Chapter 8 and then define a catalyst as any event that begins to close the gap between the stock price and your estimate of intrinsic value.

In Chapter 9 we show that risk and uncertainty are not the same thing and that the difference is often misunderstood. We then discuss the three components of investment return—the price you pay, your estimate of intrinsic value, and the estimated time horizon. It is the authors' experience that most investors spend the bulk of their time focusing on calculating their estimate of intrinsic value, while failing to estimate accurately an investment's time horizon. We feel this focus is a mistake as time is a critical factor in determining the investment's ultimate return. We then move the discussion to how through research an investor can significantly reduce risk by increasing the accuracy and precision of both the estimates of intrinsic value and the investment's time horizon.

By the end of Part I we will have shown how to vet the perfect investment.

CHAPTER 1

How to Value an Asset



Three Primary Components of Value

In this chapter, we discuss the three main components necessary to calculate the value of an asset: the cash flows, the uncertainty of receiving the cash flows, and the time value of money. We show these components in Figure 1.1.

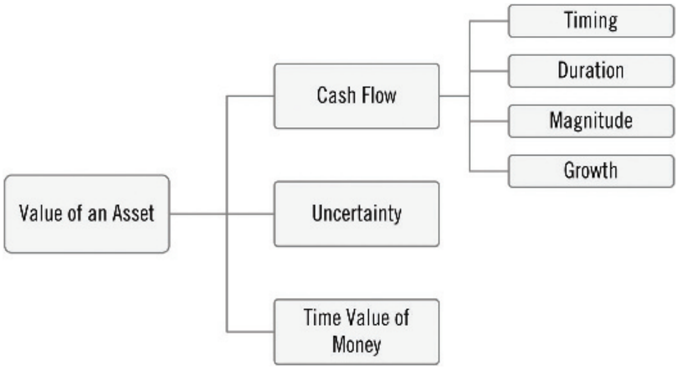


Figure 1.1 Primary Components to the Value of an Asset

Four Subcomponents of Cash Flow

The first part of the definition, "Cash flows produced by that asset, over its useful life," includes four subcomponents: **timing**, **duration**, **magnitude**, and **growth**, as shown in Figure 1.2.

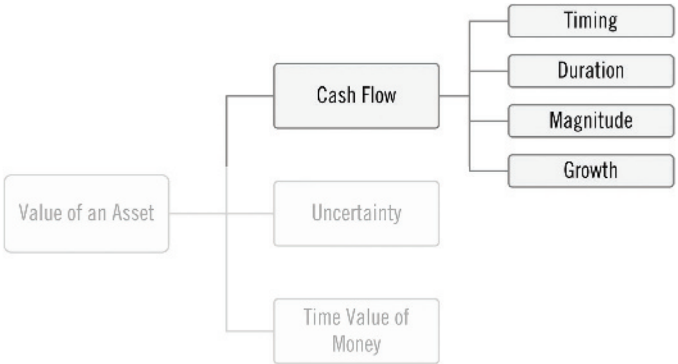


Figure 1.2 Four Cash Flow Subcomponents

The first subcomponent, **timing**, addresses the question, "When will we get the cash?" Will we get the cash flow next year or in five years? While the amount of the cash flow is the same in Figures 1.3A and B, the cash flow is received sooner in A than in B. All else being equal, getting cash sooner is better than getting it later.

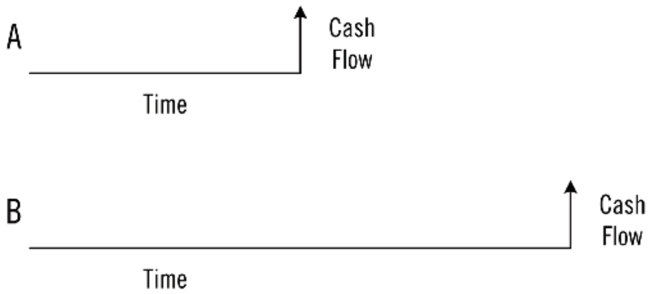


Figure 1.3 Getting Cash Sooner Is Preferable

The second subcomponent, **duration**, addresses the question, "How long will the cash flows last?" **Duration**[1] can be thought of as an asset's estimated useful life. For example, an annuity that pays each year for eight years is more valuable than one that pays for only four years, as shown in Figure 1.4. A longer duration of cash flows is better than a shorter one.

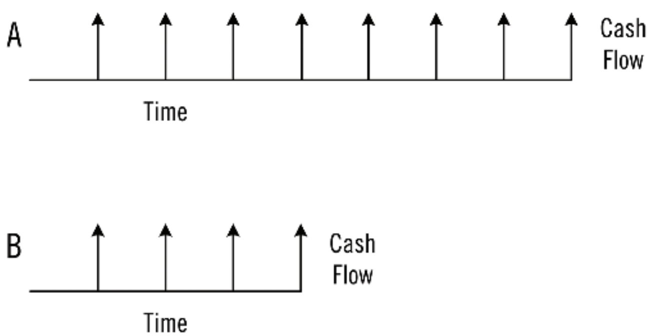


Figure 1.4 A Longer Duration of Cash Flows Is Preferable

The third subcomponent, **magnitude**, addresses the question, "How much cash will we get?" Figure 1.5 shows a stream of $4 payments versus a similar stream of $2 payments. It should be obvious that larger cash flows are better than smaller ones.

[1] The term *duration* is used to indicate how long the cash flows will last and should not be confused with the same term's use in discussing bond valuations.

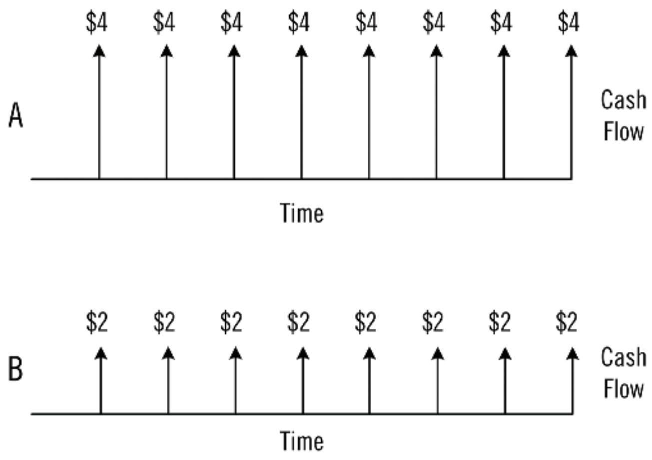


Figure 1.5 A Greater Magnitude in Cash Flows Is Preferable

The fourth subcomponent, **growth**, addresses the questions, "Will the cash flows grow over time?" or "How fast will the cash flow grow over time?" A growing stream of cash flow is preferable to one that is not growing (A versus B), as shown in Figure 1.6.

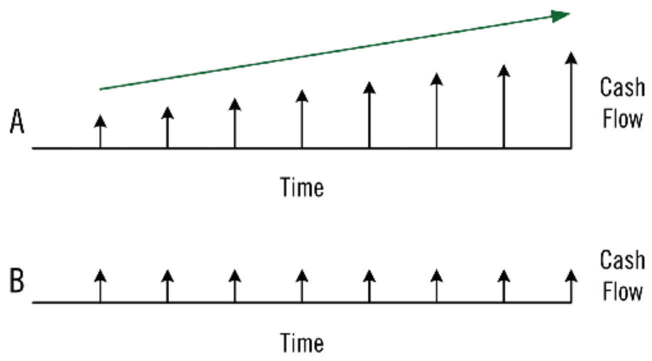


Figure 1.6 Growing Cash Flows Are Preferable

When starting at the same level, a stream of cash flows with a faster growth rate is preferable to one with a slower growth rate (A versus B), as shown in Figure 1.7.

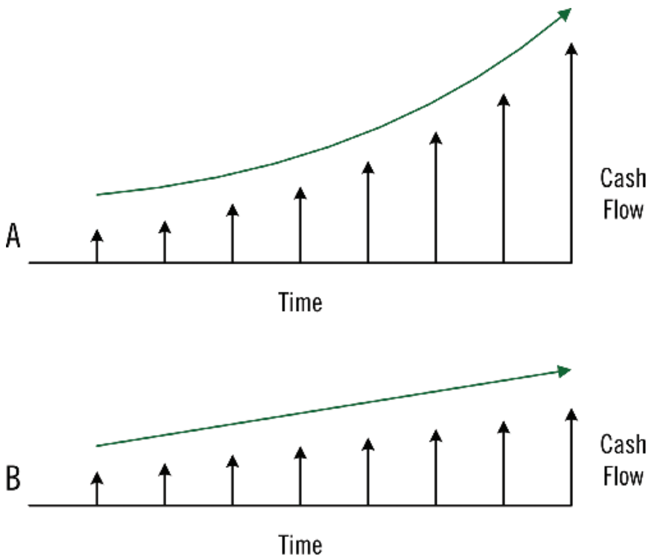


Figure 1.7 Faster Growing Cash Flows Are Preferable

A stable cash flow is preferable to one with a negative growth rate or losses, as shown in Figure 1.8. (Note: Arrows pointing down in B represent cash *outflows* reflecting losses.)

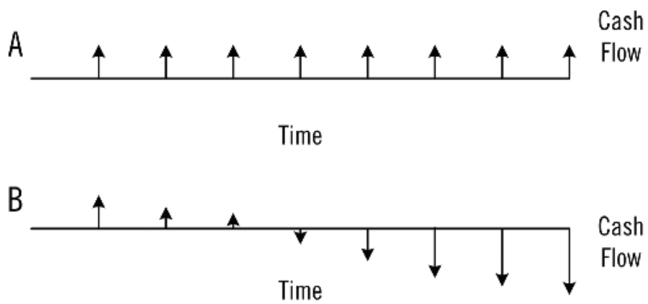


Figure 1.8 Stable Cash Flows Are Preferable to Negative or Declining Cash Flows

It is important to note that it is necessary to make estimates for *all* four subcomponents—**timing**, **duration**, **magnitude**, and **growth**—to calculate the asset's future cash flow.

Uncertainty

The second part of the definition states that the cash flows need to be "discounted for . . . the uncertainty of receiving those cash flows." There was no uncertainty to the cash flows up to this point in the discussion as we assumed that they were *known* and guaranteed (similar to the coupon payments from a U.S. Treasury Bond). However, an asset's cash flows will be dependent on events that will happen in the future, and because the future is inherently uncertain, we must take **uncertainty** into account when addressing the question, "How certain are the future cash flows?"

It is important to note that *uncertainty* will have an impact on all four cash flow subcomponents and, in turn, affect the asset's value, as shown in Figure 1.9.

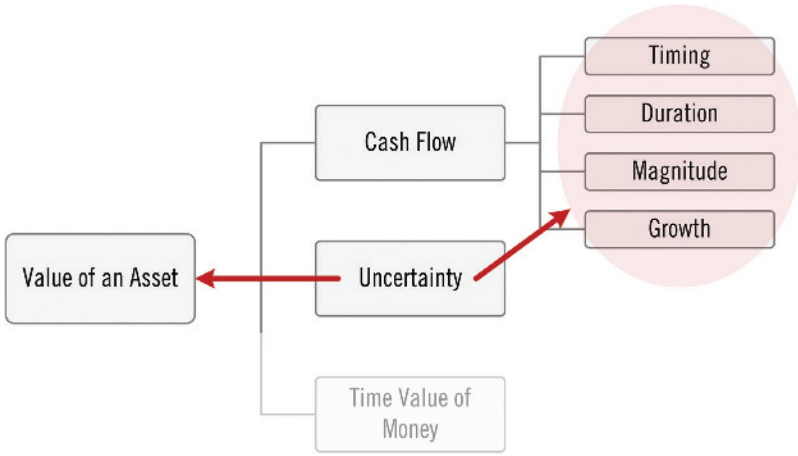
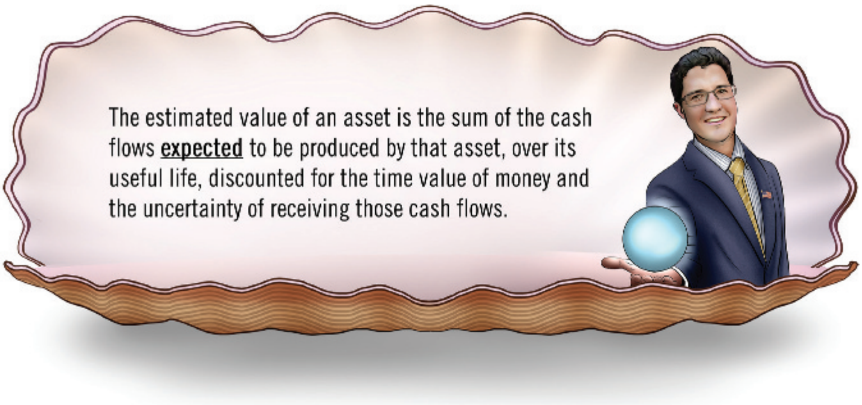


Figure 1.9 Uncertainty in the Four Cash Flow Subcomponents Affects the Value of an Asset

Even the most predictable cash flows have some degree of uncertainty to them, however. Therefore, we need to think of any cash flow we calculate as an *estimate* of the *expected* cash flow rather than a guaranteed amount.

Before we proceed further we need to alter slightly the definition of an asset's value to reflect this observation:



Rather than thinking about future cash flows as single-point estimates, as shown in Figure 1.10, it is more appropriate to think about a *range of cash flow estimates,* around a single-point estimate.

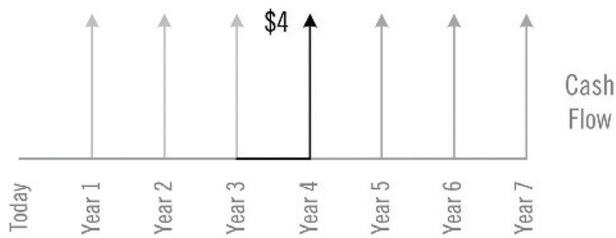


Figure 1.10 Single-Point Cash Flow Estimate

For instance, while we *expect* the cash flow to equal $4 in this example, we need to recognize that there is a possibility that the actual cash flow will be greater or less than $4, within a *forecasted range* of $2 to $6, as shown in Figure 1.11.

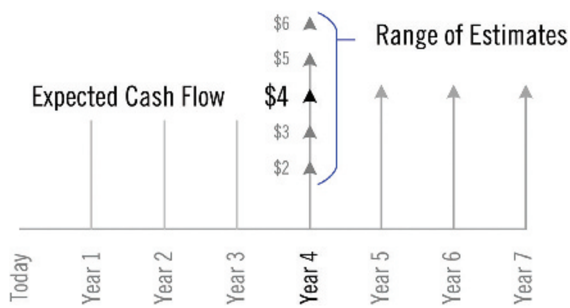


Figure 1.11 Range of Cash Flow Estimates

Another way of depicting the full range of possible estimates is to think of it as a **distribution** of potential cash flow estimates spreading out, in both directions, around a single-point estimate, as shown in Figure 1.12. The graph shows the range of possible outcomes, with values closest to the single-point estimate representing the outcomes with higher probabilities of being the true cash flow received, while cash flow estimates in the tails of the distribution represent outcomes that have lower probabilities of occurring.

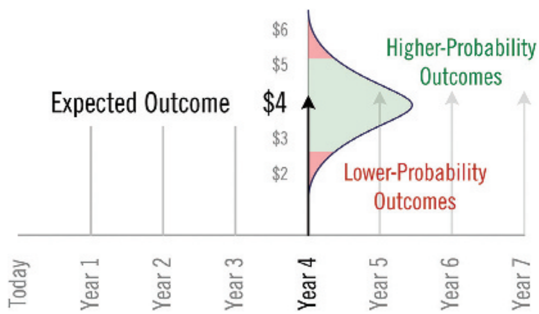


Figure 1.12 Distribution of Cash Flow Estimates

It is hard to predict the future. The charts in Figure 1.13 show how the distributions of possible outcomes widen and the expected point estimates become less predictable as uncertainty increases the further we forecast cash flows into the future. We use the increasingly blurry $100 bill to provide a visual representation of this reality.

(Note: We rotated the diagram to create a 3D image so that the probability distribution of the estimate can be seen on the z-axis, while time remains on the x-axis and estimated cash flows on the y-axis.)

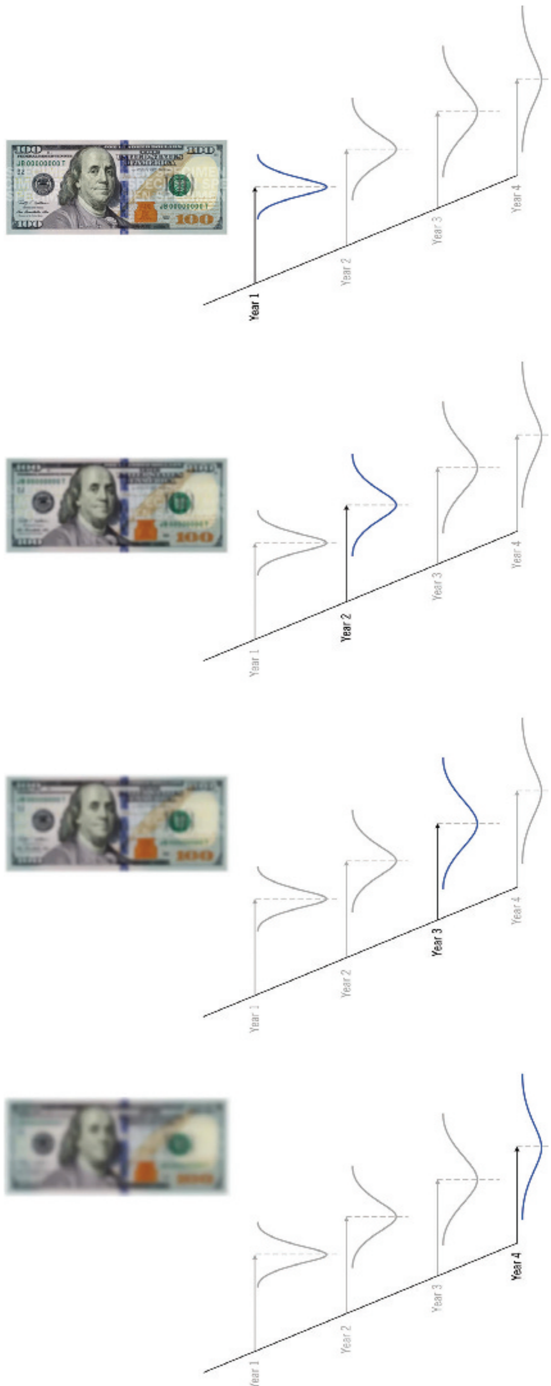


Figure 1.13 Cash Flow Estimates Become Less Certain in the Future

Figure 1.14 combines the individual cash flow distributions from Figure 1.13 into a single chart, showing how the uncertainty of estimating cash flow increases as we look further into the future.

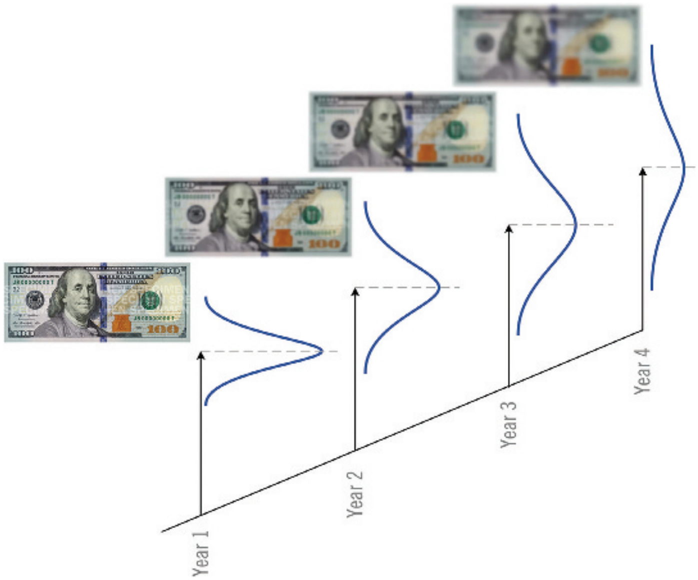


Figure 1.14 The Range of Cash Flows Estimates Widens in the Future

The Time Value of Money

The final component of the definition of an asset's value states that its cash flows must be "discounted for the time value of money." Discounting for time is a straightforward concept: A dollar today is worth more than a dollar in the future, or thought of another way, "A bird in the hand is worth two in the bush."[2] The value of cash flows today is referred to as their **present value**.

It is often easier for most people to understand the concept of **present value** after a discussion of **future value**, which is based on **compounding**. For example, with a 6% annual rate of return, $100 today increases in value to $106.00 in one year and $112.36 in two years, as shown in Figure 1.15.

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[2] As finance professors, we have always been intrigued by this comment. For a "bird in hand" to be "worth two in the bush" suggests either a very high discount rate or great uncertainty that there are, in fact, two birds in the bush. It might also reflect the fact that birds are very difficult to catch with your hands. So maybe the high discount rate is appropriate.

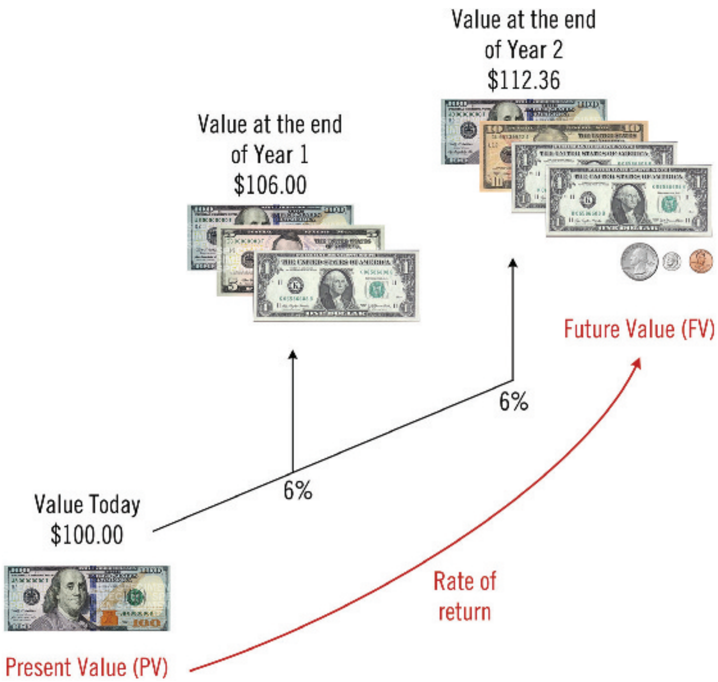

Figure 1.15 Future Value of $100

The value of $100 in one year is calculated by compounding the initial value by 6%, as shown in the following computation:

Future value at end of year 1 = $100.00 * (1 + 6%) = $106.00

The value at the end of the second year is calculated the same way, by compounding the value at the end of the first year by the same 6% for the second year:

Future value at the end of year 2 = $106.00 * (1 + 6%) = $112.36

Alternatively, the value at the end of year 2 can be calculated by compounding the initial cash flow by two periods of 6% interest, as shown in the following calculation:

Future value at the end of year 2 = $100.00 * (1 + 6%) * (1 + 6%) = $112.36

The following formulas can be used to calculate the future value of any amount of money:

$$\text{Future value at the end of year 1} = \$_1 = \$_0 * (1 + i)$$

$$\text{Future value at the end of year 2} = \$_2 = \$_1 * (1 + i)$$

Or, alternatively:

$$\text{Future value at the end of year 2} = \$_2 = \$_0 * (1 + i) * (1 + i)$$

Which is the equivalent of (using simpler notation):

$$\text{Future value at the end of year 2} = \$_2 = \$_0 (1 + i)^2$$

Where:

$\$_0$ equals the value of cash today
$\$_1$ equals the value of cash in one year
$\$_2$ equals the value of cash in two years
i represents the return on investment

To calculate the **present value** of a future \$100 payment, we need to **discount** it to find its value in today's dollars, which is essentially compounding in reverse. For simplicity, we use the same 6% rate and show that a cash payment of \$100 one year from now discounted at 6% is worth \$94.34 today, as shown in Figure 1.16.

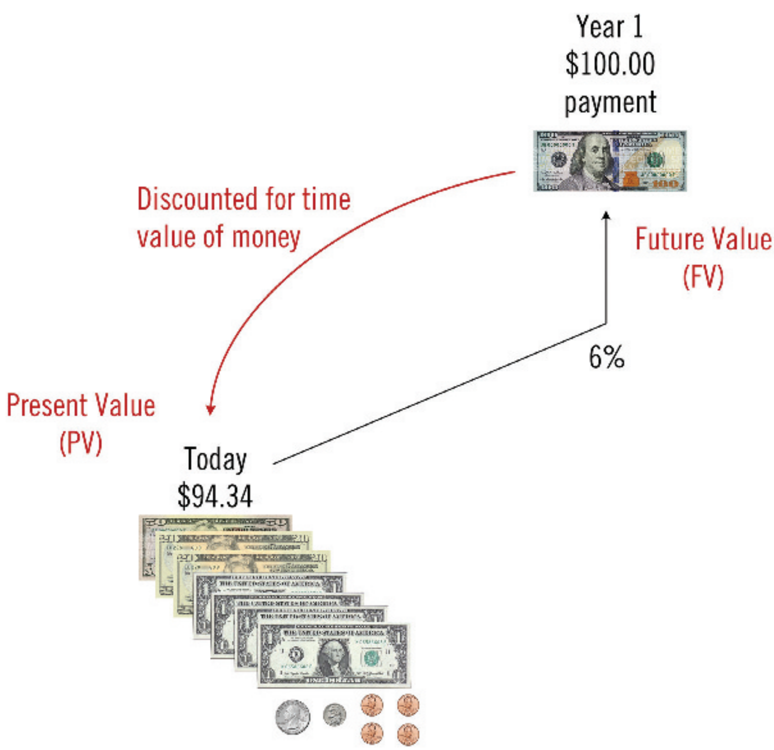

Figure 1.16 Present Value of \$100 One Year in the Future

The formula for discounting future payments is similar to the one used to calculate the future value of cash, with the components in the formula rearranged:

$$\text{Present Value (PV)} = \frac{\$_1}{(1+i)^1} + \frac{\$_2}{(1+i)^2}$$

Therefore, the present value of $100 at a 6% discount rate is calculated as follows:

$$\text{Present Value (PV)} = \frac{\$100.00}{(1+6\%)^1}$$

$$\text{PV} = \frac{\$100.00}{1.06} = \$94.34$$

It should be straightforward to show that a cash payment of $100 two years from now discounted at 6% is worth $89.00 today, as shown in Figure 1.17.

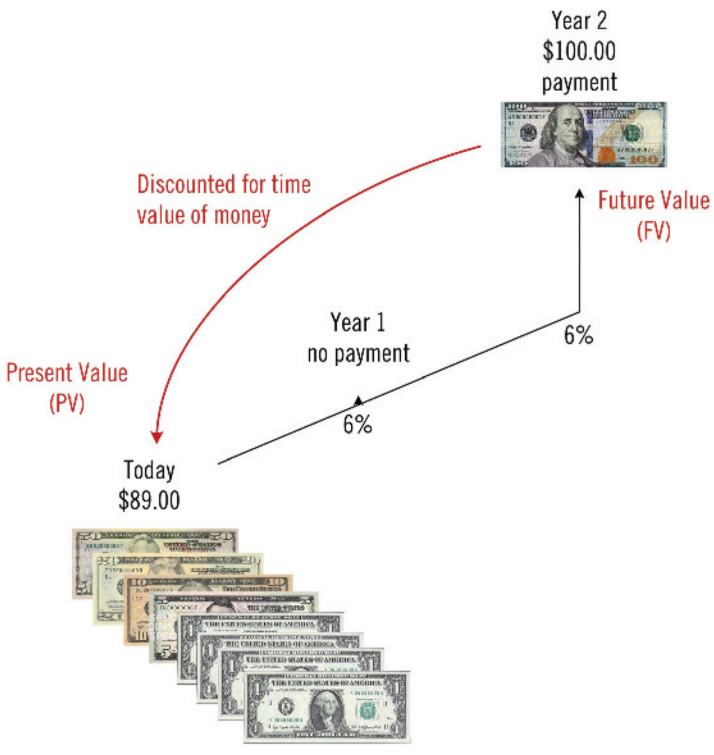

Figure 1.17 Present Value of $100 Two Years in the Future

Using the same formula from above:

$$\text{Present Value (PV)} = \frac{\$100.00}{(1+6\%)^2}$$

$$\text{PV} = \frac{\$100.00}{1.124} = \$89.00$$

Alternatively, if we assume that there is a $100 payment in year 2, but no payment in year 1, then we can use the slightly more complicated formula to show that the present value of the two payments at a 6% discount rate also equals $89.00, as the following calculation shows:

$$\text{Present Value (PV)} = \frac{\$_1}{(1+i)^1} + \frac{\$_2}{(1+i)^2}$$

$$\text{Present Value (PV)} = \frac{\$0.00}{(1+6\%)^1} + \frac{\$100.00}{(1+6\%)^2}$$

$$\text{Present Value (PV)} = \frac{\$0.00}{1.06} + \frac{\$100.00}{1.124}$$

$$\text{PV} = \$0.00 + \$89.00 = \$89.00$$

To calculate the present value of a stream of future cash payments, we need to discount each expected payment separately, as we did with the two-period stream of payments. We use a stream of four annual payments as an example in Figure 1.18.

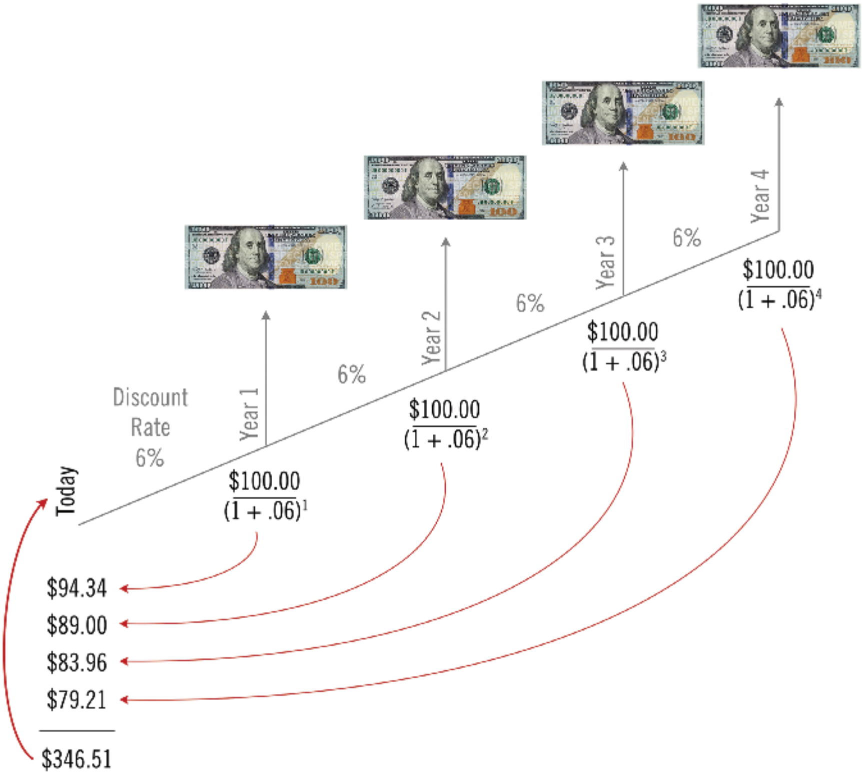

Figure 1.18 Present Value of a Stream of $100s

The calculation is the same, only with more years represented:

$$\text{Present Value (PV)} = \frac{\$_1}{(1+i)^1} + \frac{\$_2}{(1+i)^2} + \frac{\$_3}{(1+i)^3} + \frac{\$_4}{(1+i)^4}$$

$$\text{PV} = \frac{\$100.00}{(1+6\%)^1} + \frac{\$100.00}{(1+6\%)^2} + \frac{\$100.00}{(1+6\%)^3} + \frac{\$100.00}{(1+6\%)^4}$$

$$PV = \frac{\$100.00}{1.06} + \frac{\$100.00}{1.124} + \frac{\$100.00}{1.19} + \frac{\$100.00}{1.26}$$

$$PV = \$94.34 + \$89.00 + \$83.96 + \$79.21 = \$346.51$$

We use future cash *payments* throughout the compounding and discounting examples to simplify the discussion. It should be easy to see that the future payments can be replaced with the asset's future cash flows and that the present value formula for four years of cash flow is the following:

$$\text{Present Value (PV)} = \frac{CF_1}{(1+i)^1} + \frac{CF_2}{(1+i)^2} + \frac{CF_3}{(1+i)^3} + \frac{CF_4}{(1+i)^4}$$

Where:

CF_1 equals cash flow in year 1
CF_2 equals cash flow in year 2
CF_3 equals cash flow in year 3
CF_4 equals cash flow in year 4
i represents the discount return

Some people argue that the **timing** of cash flow and the **time value of money** are the same thing. Although we agree, we believe there is significant value in discussing the concepts separately to show the different roles they play when evaluating future cash flows.[3] **Timing** is *when* you get the money, for example, next year or in five years. The time value of money is *the rate used to discount* the cash flows in the future back to today's value, which is their **present value**.

Now that we have established the framework for valuing an asset, we increase the complexity in the next chapter, and use these tools to value a simple business: the proverbial lemonade stand.

[3] Two individuals we respect—Michael Mauboussin and Judd Kahn—argued that there is no need to separate the two concepts, as the time value of money captures the timing of cash flows. Although we agree intellectually with their point of view, we think it easier to comprehend the importance when they are separated.

Zoe will not operate her lemonade stand alone, as she will receive help from legendary investor Bill Ackman, who is an expert on the finances of lemonade stands.[4]

Gems:

- Valuing an asset is a relatively simple concept: The **value of an asset** is the sum of cash flows produced by that asset, over its useful life, discounted for the time value of money and the uncertainty of receiving those cash flows.
- Regarding cash flows:
  - Getting cash sooner is better than getting it later.
  - A longer duration of cash flows is better than a shorter one.
  - Larger cash flows are better than smaller ones.
  - A stream of cash flows with a faster growth rate is preferable to one with a slower growth rate.

[4]You can Google "Bill Ackman lemonade stand" to find the Floating University's excellent video: "William Ackman: Everything You Need to Know about Finance and Investing in under an Hour."

    - A growing stream of cash flows is preferable to one that is not growing.
    - A stable stream of cash flows is preferable to one with a negative growth rate or losses.
- **Uncertainty** will have an impact on all four cash flow subcomponents and, in turn, affect the asset's value.
- The definition of the value of an asset must be altered to account for the inherent uncertainty of future cash flows: The *estimated* value of an asset is the sum of the cash flows *expected* to be produced by that asset, over its useful life, discounted for the time value of money and the uncertainty of receiving those cash flows.
    - It is hard to predict the future as uncertainty increases the further we forecast cash flows into the future.
    - An asset's cash flows must be "discounted for the time value of money." Discounting for time is a straightforward concept: A dollar today is worth more than a dollar in the future, or thought of another way, "A bird in the hand is worth two in the bush." The value of cash flows today is referred to as their **present value**.