

12.4: Explain the Pricing of Long-Term Liabilities

Issuing Bonds When the Contract and Market Rates Are the Same

If the stated rate and the market rate are both 5%, the bond will be issued at **par value**, which is the value assigned to stock in the company's charter, typically set at a very small arbitrary amount, which serves as legal capital; in our example, the part value is \$1,000. The purchaser will give the company \$1,000 today and will receive \$50 at the end of every year for 5 years. In 5 years, the purchaser will receive the maturity value of the \$1,000. The bond's quoted price is 100.00. That is, the bond will sell at 100% of the \$1,000 face value, which means the seller of the bond will receive (and the investor will pay) \$1,000.00. You will learn the calculations used to determine a bond's quoted price later; here, we will provide the quoted price for any calculations.

LINK TO LEARNING

The Securities and Exchange Commission website [Investor.gov](https://www.investor.gov/corporate-bonds) provides an explanation of corporate bonds to learn more.

Issuing Bonds at a Premium

The stated interest rate is not the only rate affecting bonds. There is also the market interest rate, also called the effective interest rate or bond yield. The amount of money that borrowers receive on the date the bonds are issued is influenced by the terms stated on the bond indenture *and* on the market interest rate, which is the rate of interest that investors can earn on similar investments. The market interest rate is influenced by many factors external to the business, such as the overall strength of the economy, the value of the U.S. dollar, and geopolitical factors.

This **market interest rate** is the rate determined by supply and demand, the current overall economic conditions, and the credit worthiness of the borrower, among other factors. Suppose that, while a company has been busy during the long process of getting its bonds approved and issued (it might take several months), the interest rate changed because circumstances in the market changed. At this point, the company cannot change the rate used to market the bond issue. Instead, the company might have to sell the bonds at a price that will be the equivalent of having a different stated rate (one that is equivalent to a market rate based on the company's financial characteristics at the time of the issuance (sale) of the bonds).

If the company offers 5% (the bond rate used to market the bond issue) and the market rate prior to issuance drops to 4%, the bonds will be in high demand. The company is scheduled to pay a higher interest rate than everyone else, so it can issue them for more than face value, or at a premium. In this example, where the stated interest rate is higher than the market interest rate, let's say the bond's quoted price is 104.46. That is, the bond will sell at 104.46% of the \$1,000 face value, which means the seller of the bond will receive and the investor will pay \$1,044.60.

Issuing Bonds at a Discount

Now let's consider a situation when the company's bonds prior to issuance are scheduled to pay 5% and the market rate jumps to 7% at issuance. No one will want to buy the bonds at 5% when they can earn more interest elsewhere. The company will have to sell the \$1,000 bond for less than \$1,000, or at a discount. In this example, where the stated interest rate is lower than the market interest rate, the bond's quoted price is 91.80. That is, the bond will sell at 91.80% of the \$1,000 face value, which means the seller of the bond will receive (and the investor will pay) \$918.00.

Sale of Bonds before Maturity

Let's look at bonds from the perspective of the issuer and the investor. As we previously discussed, bonds are often classified as long-term liabilities because the money is borrowed for long periods of time, up to 30 years in some cases. This provides the business with the money necessary to fund long-term projects and investments in the business. Due to unanticipated circumstances, the investors, on the other hand, may not want to wait up to 30 years to receive the maturity value of the bond. While the investor will receive periodic interest payments while the bond is held, investors may want to receive the current market value prior to the maturity date. Therefore, from the investor's perspective, one of the advantages of investing in bonds is that they are typically easy to sell in the secondary market should the investor need the money before the maturity date, which may be many years in the future. The **secondary market** is an organized market where previously issued stocks and bonds can be traded after they are issued.

If a bond sells on the secondary market after it has been issued, the terms of the bond (a particular interest rate, at a determined timeframe, and a given maturity value) do not change. If an investor buys a bond after it is issued or sells it before it matures, there

is the possibility that the investor will receive more or less for the bond than the amount the bond was originally sold for. This change in value may occur if the market interest rate differs from the stated interest rate.

CONTINUING APPLICATION

Debt Considerations for Grocery Stores

Every company faces internal decisions when it comes to borrowing funds for improvements and/or expansions. Consider the improvements your local grocery stores have made over the past couple of years. Just like any large retail business, if grocery stores don't invest in each property by adding services, upgrading the storefront, or even making more energy-efficient changes, the location can fall out of popularity.

Such investments require large amounts of capital infusion. The primary available investment funds for privately-owned grocery chains are bank loans or owners' capital. This limitation often restricts the expansions or upgrades such a company can do at any one time. Publicly-traded grocery chains can also borrow funds from a bank, but other options, like issuing bonds or more stock can also help fund development. Thus publicly-traded grocery chains have more options to fund improvements and can therefore expand their share of the market more easily, unlike their private smaller counterparts who must decide what improvement is the most critical.

Fundamentals of Interest Calculation

Since interest is paid on long-term liabilities, we now need to examine the process of calculating interest. Interest can be calculated in several ways, some more common than others. For our purposes, we will explore interest calculations using the simple method and the compounded method. Regardless of the method involved, there are three components that we need when calculating interest:

1. Amount of money borrowed (called the principal).
2. Interest rate for the time frame of the loan. Note that interest rates are usually stated in annual terms (e.g., 8% per year). If the timeframe is excluded, an annual rate should be assumed. Pay particular attention to how often the interest is to be paid because this will affect the rate used in the calculation:

$$\text{Interest rate} = \text{Annual rate} / \text{Payments per period}$$

For example, if the rate on a bond is 6% per year but the interest is paid semi-annually, the rate used in the interest calculation should be 3% because the interest applies to a 6-month timeframe ($6\% \div 2$). Similarly, if the rate on a bond is 8% per year but the interest is paid quarterly, the rate used in the interest calculation should be 2% ($8\% \div 4$).

3. Time period for which we are calculating the interest.

Let's explore simple interest first. We use the following formula to calculate interest in dollars:

$$\text{Interest in \$} = \text{Principal} \times \text{Interest Rate} \times \text{Time}$$

Principal is the amount of money invested or borrowed, *interest rate* is the interest rate paid or earned, and *time* is the length of time the principal is borrowed or invested. Consider a bank deposit of \$100 that remains in the account for 3 years, earning 6% per year with the bank paying simple interest. In this calculation, the interest rate is 6% a year, paid once at the end of the year. Using the interest rate formula from above, the interest rate remains 6% ($6\% \div 1$). Using 6% interest per year earned on a \$100 principal provides the following results in the first three years (Figure 12.4.1):

- Year 1: The \$100 in the bank earns 6% interest, and at the end of the year, the bank pays \$6.00 in interest, making the amount in the bank account \$106 (\$100 principal + \$6 interest).
- Year 2: Assuming we do not withdraw the interest, the \$106 in the bank earns 6% interest on the principal (\$100), and at the end of the year, the bank pays \$6 in interest, making the total amount \$112.
- Year 3: Again, assuming we do not withdraw the interest, \$112 in the bank earns 6% interest on the principal (\$100), and at the end of the year, the bank pays \$6 in interest, making the total amount \$118.

Year	1	2	3
Initial investment	\$ 100.00	\$ 100.00	\$ 100.00
Annual interest rate, 6%	0.06	0.06	0.06
Interest earned	\$ 6.00	\$ 6.00	\$ 6.00
Add amount to date	\$100.00	\$106.00	\$112.00
= Total cash	\$106.00	\$112.00	\$118.00

Figure 12.4.1: Simple Interest. Simple interest earns money only on the principal. (attribution: Copyright Rice University, OpenStax, under CC BY-NC-SA 4.0 license)

With simple interest, the amount paid is always based on the principal, not on any interest earned.

Another method commonly used for calculating interest involves compound interest. **Compound interest** means that the interest earned also earns interest. Figure 12.4.2 shows the same deposit with compounded interest.

Year	1	2	3
Initial investment	\$100.00	\$106.00	\$112.36
Annual interest rate, 6%	0.06	0.06	0.06
Interest earned	\$ 6.00	\$ 6.36	\$ 6.74
Add amount to date	\$100.00	\$106.00	\$112.36
= Total cash	\$106.00	\$112.36	\$119.10

Figure 12.4.2: Compound Interest. Compound interest earns money on the principal plus interest earned in a previous period. (attribution: Copyright Rice University, OpenStax, under CC BY-NC-SA 4.0 license)

In this case, investing \$100 today in a bank that pays 6% per year for 3 years with compound interest will produce \$119.10 at the end of the three years, instead of \$118.00, which was earned with simple interest.

At this point, we need to provide an assumption we make in this chapter. Since financial institutions typically cannot deal in fractions of a cent, in calculations such as the above, we will round the final answer to the nearest cent, if necessary. For example, the final cash total at the end of the third year in the above example would be \$119.1016. However, we rounded the answer to the nearest cent for convenience. In the case of a car or home loan, the rounding can lead to a higher or lower adjustment in your final payment. For example, you might finance a car loan by borrowing \$20,000 for 48 months with monthly payments of \$469.70 for the first 47 months and \$469.74 for the final payment.

LINK TO LEARNING

Go to the [Securities and Exchange Commission website](#) for an explanation of [US Savings Bonds](#) to learn more.

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