

Corporate Claims

Who Owns What?

How should projects be financed? You have already encountered the two basic financing choices that firms have: Current firm owners can accept new limited partners by issuing equity (stock). Or they can borrow money by issuing debt (bonds), either to public lenders or to private lenders (such as banks). However, there are also many other financial claims that firm owners can sell, most of which are hybrids between debt and equity. In addition, there are other claims that arise in the conduct of business, such as accounts payable, pension obligations, and income taxes due. The **capital structure** is the sum total of all claims on the assets of the firms. Together, the claims represent the rights that own all the firm's assets — in a sense, they *are* the firm.

In the first part of this chapter, you will learn about firms' basic choices. It explains that you should think of a claim as a bundle of cash flow rights and control rights. The cash flow rights describe how much money the claims holders are supposed to receive. The control rights describe what remedies claims holders have, especially when they do not receive the cash flows originally proposed to them.

In the second part of this chapter, you will see how Intel's capital structure changed. It will give you some intuition about how complex real-world capital structures can be and how they tend to evolve.

16.1 The Basic Building Blocks

The **corporate charter** is the document that lays down the basics of the firm. It specifies who formally holds decision power, how the firm can engage in further contracts, how the charter can be amended, and so on. The corporate charter also addresses how the firm may be governed in the future. Together with the legal and regulatory framework in which it operates — which is jurisdiction-dependent — the charter facilitates the creation of financial and nonfinancial claims, each with its own cash flow rights and control rights. It is this nexus of implicit and explicit contracts that defines the firm broadly, and its financial structure specifically. Our

The firm's charter sets up the governance of the firm.

interest in this chapter is this capital structure — the arrangement of the total of all the claims on the firm's assets. Of course, you have already encountered many features of financial claims, given how important they are and given that we are already more than two-thirds through the book.

Even real estate owners do not fully own properties. They have to accept certain obligations.

► [Mortgage and levered equity](#), § 6.3, Pg.131.

The most basic aspects of capital structure were first explained in the building example in Chapter 6. If you finance your building with a mortgage, you own only the residual unmortgaged part as levered equity. This means that you really do not fully own the building. Although you can make a lot of decisions about the building, there are others you cannot make. For example, your mortgage covenants prevent you from demolishing the building or from selling it and keeping all the money. To do either, you must first repay the mortgage. And, of course, as a property owner, you must also satisfy other claims that do not arise financially but instead arise in the context of real ownership. For example, you must pay your county property tax obligation, or the county can repossess your building. And through legal ownership, you also have to accept other obligations. For example, you cannot simply convert your building into a liquor store without obtaining zoning permission. In reality, any property owner is only part owner — the building is really owned by the (so-miscalled) property owner, plus the mortgage company, plus other claimants.

This is exactly how shareholders "own" corporations — only after other obligations are satisfied.
► [leverage, stock, etc.](#), § ??, Pg.??.

This is exactly how things work in the corporate context. The firm's assets are owned by multiple claimants. The basic building blocks of the firm's financial structure are **liabilities** (often called **leverage**) and **equity** (often called **stock**). To use our metaphor, the shareholders are the equivalent of the levered property owner (although with assured limited liability). They are usually in charge, but there are clear limits to what they are allowed to do. Such limits come from covenants that the shareholders accepted earlier — covenants that the firm took on when it borrowed money or when it acquired or operated its assets. For example, most corporate bond covenants prevent firms from destroying or not maintaining their assets, or from selling the assets and paying out the cash to shareholders. As already noted in the introduction, the set of all claims on the firm's future payoffs is called its capital structure.

► [Limited liability](#), § 6.4, Pg.134.

Claims are often classified into financial and nonfinancial ones:

Firms are owned by financial claims (e.g., debt and equity) and nonfinancial claims (e.g., Uncle Sam, pension obligations, and vendor credit).

► [SEC](#), Pg.175.

- Financial claims are debt and equity. They are often loosely called **securities**, the name indicating registration with the *Securities and Exchange Commission*. However, the term has become so common that it is now used much more liberally. For example, neither foreign securities nor privately placed securities are necessarily registered with the SEC.
- Nonfinancial claims are such obligations as corporate income taxes due, pension obligations, and accounts payable — i.e., not arising from borrowing funds from a lender.

By strict definition, to fully own the firm and be permitted to do whatever you wish, you must own *all claims* that the firm has issued. It is not enough for you to own only *all stock* or even all financial claims. In the most extreme perspective, you can never fully own any firm, because Uncle Sam always has some claim to future cash flows that you can never acquire.

Every meaningful claim has two important aspects:

Claims have two important features: cash flow rights and control rights.

Cash flow rights, which describe how firm-generated cash will be allocated.

Control rights, which allow the claim owners to enforce their cash flow rights. For example, creditors can force the firm into bankruptcy if the firm does not pay its obligations; and stockholders can appoint the corporate board, which in turn appoints management, which runs the firm.

Q 16.1. What is a control right? Give some examples.

Q 16.2. Is it ever possible for a private individual to fully own a firm?

Cash Flow Rights as Payoff Diagrams

Firm Value	Bond Value	Stock Value
\$0	\$0	\$0
\$50	\$50	\$0
\$100	\$100	\$0
\$150	\$150	\$0
\$200	\$200	\$0
\$250	\$200	\$50
\$300	\$200	\$100
\$350	\$200	\$150
⋮	⋮	⋮

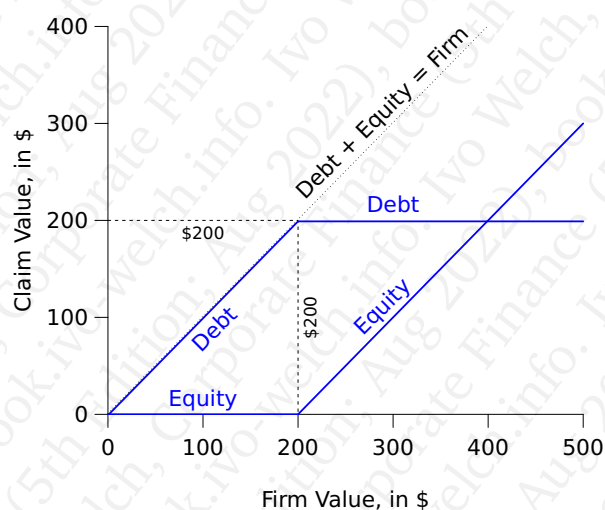


Figure 16.1: Sample Bond and Stock Payoff Table and Diagram (at Maturity). The bond in this example has a face value of \$200. Thus, at maturity, if the firm is worth less than \$200, the bond receives the entire firm value. If the firm is worth more than \$200, the bond receives \$200 and the levered equity receives the rest. If you own both claims, you own the firm, which is the black diagonal line.

You have already learned the main tool for the analysis of *cash flow rights* in Chapter 6 — payoff tables for contingent claims. Let's apply them in the corporate context. For example, consider a firm with a capital structure that consists of equity, a single bond that promises to pay \$200 next year, and no other claims. The value of the corporation is the total value promised to bondholders and shareholders. How much each claims holder receives depends on the value of the firm. Figure 16.1 is a **payoff diagram**. It shows that if the firm is worth \$100, bondholders receive \$100 and shareholders receive nothing. If the firm is worth \$200, bondholders receive \$200 and shareholders receive nothing. If the firm is worth \$300, bondholders receive \$200 and shareholders receive \$100. If the firm is worth \$400, bondholders receive

Cash flow rights define payoff diagrams, which plot the claims' payoffs as a function of the underlying firm value at one fixed point in time.

➤ [Contingent claims payoffs, Table 6.7, Pg.138.](#)

\$200 and shareholders receive \$200. And so on. This is the best way to think of the cash flow rights of bonds, stocks, and most other financial claims. Because you can refer to the future value of the firm (the base asset) as “the underlying **state**”, debt and equity are often called **state-contingent claims**: Their future values depend on the future state of the firm.

In a perfect market, the “firm terminates” aspect of the payoff diagram is not important.

Note that if the market is perfect, it is not important to the analysis whether the firm continues to exist after the bond comes due. You could imagine that the firm is then sold to new owners for its fair value. The proceeds are then distributed to stockholders and bondholders according to their claims. Of course, stockholders and bondholders could use these proceeds to repurchase the firm immediately if they so desire.

Nevertheless, payoff diagrams cannot illustrate time-varying aspects of claims. They only illustrate firm-value-varying aspects of claims.

Although payoff diagrams are very useful as conceptual aids, they do not convey all the information about a claim’s cash flow rights. They work best for contracts that have only one payment at one fixed point in time. Our example above showed how easy they make it to understand a zero-bond. Unfortunately, payoff diagrams are not good at illustrating features that are themselves a function of time or many different points in time. It would be more difficult to use the payoff diagram to fully describe a coupon bond, because coupon bonds have many different payment dates. Payoff diagrams are even less useful to illustrate the value of a claim that receives randomly timed future payoffs. Nevertheless, even in such cases, there is usually a link between the value of the firm and the value of the financial claim — so thinking of financial claims as contingent claims in the context of payoff diagrams often remains a useful, if not entirely accurate, conceptual tool.

Q 16.3. Write down a payoff table for a stock and a zero-bond with a promised payoff of \$300 million.

Q 16.4. For the previous question, what does the graph look like?

Q 16.5. Can you add payoff functions graphically in the payoff diagrams (if you own multiple claims), or do you first need to write down a revised payoff table? How? If so, what does the sum of all added claims look like?

Q 16.6. Can you draw a payoff diagram for a semiannual coupon bond with 15 remaining 10% coupon payments until maturity?

Q 16.7. To gain some practice with payoff diagrams, assume your medical insurance pays 90% of your medical expenses, subject to a \$500 deductible and an annual limit of \$10,000 payout. Write down your insurance payoff table and graph an insurance payoff diagram, as a function of your medical expenses. What is the slope of the line at each segment?

16.2 Liabilities

Firms' total liabilities are often classified into financial and nonfinancial claims.

Financial Claims (Debt)

You have already worked extensively with financial liabilities, such as bonds of all varieties in Part I. Still, let us review the rights of debt holders in the corporate context.

Bonds are loans to companies with specified obligations.

Cash flow rights: Bonds are just loans that promise specific payoffs at specific times in the future. The borrower (or issuer) receives cash upfront and contractually promises to pay cash in the future. The returned cash is commonly classified into interest payments (usually tax-deductible for the issuer) and repayment of principal. Most corporate bonds promise payments every 3 or 6 months and repay the remaining principal at **maturity**. In the event of liquidation, the law ("sort of") states that the **absolute priority rule** should be applied. Bonds are senior securities in the sense of priority, so their holders receive what they have been promised first, before more-junior claimants (such as equity) can receive anything. Different bonds from the same firm can themselves be classified into more-senior and less-senior claims, too. The more-senior bonds have first dibs when the firm's cash is distributed, and only after they are fully paid off do the junior bondholders receive anything.

► [Various bond features, § 6.2, Pg.123.](#)

Control rights: Unless the firm violates a bond covenant or is near financial distress (in which case, the law imparts managers with fiduciary responsibilities toward bondholders, too), bondholders typically do not have the right to participate in the decisions of the firm or the selection of its management. *But* if the firm misses a payment or violates a covenant that it has taken on to obtain the bond financing, then the bondholders have the right to force the firm into bankruptcy.

Bondholders have no control rights, unless the firm fails to pay what it promised or a bond covenant is violated.

Judge Lifland and Eastern Airlines' Creditors

The absolute priority rule is the theory. In practice, bankruptcy courts can and sometimes do violate the pre-agreed priority rules in the bankruptcy process. In turn, because corporate managers can choose where to file for bankruptcy, they usually do so in the court where they expect to fare best.

The most notorious example to this day was Bankruptcy Judge Burton Lifland, of the Southern District of New York. He was so infamous for violating creditors' rights that he attracted many deadbeats. But Eastern Airlines was Judge Lifland's crowning achievement: When it went bankrupt, it was fully solvent. Unsecured creditors would have likely been satisfied in full. Instead, Judge Lifland allowed Eastern to continue operating for 2 more years, partially on the basis that closing it would have disrupted Christmas travel. Eastern's ongoing operation evaporated about \$1.5 billion through operating losses and another \$100 million through legal fees. In the end, unsecured creditors received practically nothing of their \$2.3 billion claim.

Despite such occasional spectacular examples of drastic priority violations, more commonly they are mild. These days, creditors are aware of expected violations and accumulating legal fees, and they therefore take them into account when they buy bonds and stocks in the first place. Thus, the cost of legal wrangling primarily worsens corporations' borrowing terms upfront, and not the creditors' payoffs.

Cato.org

The U.S. Constitution has made bankruptcy a federal issue. The current *Federal Bankruptcy Code* allows for either corporate reorganization under **Chapter 11** or corporate liquidation under **Chapter 7**, named for their respective chapters. Both are supervised by a federal bankruptcy trustee under the supervision of a federal bankruptcy court. Either creditors or the firm itself can petition to enter bankruptcy.

In theory, bankruptcy allows bondholders to take over and thereby either keep the entire firm, or force it to pay what they were contractually promised. After the creditors' obligations are satisfied, any residual cash left over is paid to the more junior securities. In practice, the legal process is not as straightforward as it is often believed (and as it is more often the case in many European countries). In any case, no managers survive Chapter 7 liquidation (the firm is gone!), and few managers survive Chapter 11 reorganization bankruptcy. Not surprisingly, managers generally try to avoid missing bond payments like the plague.

In addition to bonds' universal right of repayment (through control in default), many borrowers grant their creditors additional control rights in the original lending agreement. These provisions are called **covenants**. For example, a loan agreement may specify that the firm must maintain a certain level of cash reserves (liquidity). If it does not, its loan can be declared to be in default, and it becomes due. If the firm then fails to repay, creditors can petition the courts to force the firm into bankruptcy.

Positive ("affirmative") **bond covenants** require the issuer (i.e., the borrower) to perform specific actions. Examples include requirements to maintain insurance, to furnish audited financial statements to the lender, to comply with applicable laws, or to maintain a minimum credit rating. Negative ("restrictive") covenants require the issuer not to undertake specific actions. The most common require the issuer to maintain certain financial ratios. For example, a clause may demand that the firm does not issue so much debt that its ratio of total debt to equity exceeds some maximum level; or that the firm not borrow so much that its interest payments exceed more than x percent of its cash flows. It is not uncommon for firms later to request a waiver for certain covenants and for creditors to grant it.

Bond features are not written in stone. Over time, firms have experimented and developed many variations and hybrids. Naturally, if any claim offers more features or protections that are of value to investors, then their buyers are willing to pay more for the claim upfront. In a perfect market, companies receive and investors pay the appropriate fair share (price), regardless of the features chosen by corporations offering claims for sale. The features described in this chapter are among those that have survived, evolved, and thrived over the years — those that increase value. Of course, corporations could issue claims that do not maximize value, even if they are fairly priced. For example, a claim might offer its owner the right to become CEO if it were to rain in Los Angeles next April 21. When sold, this claim would fetch an appropriate efficient and fair price in the market, but it would probably significantly lower the overall value of the firm.

You may sometimes see the term **par value**. Although it is usually a vacuous concept when it comes to equity, it has a meaning for bonds. Par is not really a value, but only a number that helps to quote coupon payment flow patterns. That is, coupon payout schedules at origination are described with reference to the bond's par value.

► [Bankruptcy](#),
§ 19.3, Pg.603.

► [Interest Coverage Ratio](#),
§ 15.7, Pg.483.

Firms can contract any claim features they wish. Perfect markets offer fair pricing, but this does not mean that every bond feature is equally smart.

Par value is meaningless for equity. For bonds, par value helps to calculate the coupon payment schedule.

(Issues that are sold below par are discount bonds; issues that are sold above par are premium bonds.) Principal and par value, and/or interest and coupon payment need not be identical, not even at the time of issue, much less later. But never think of par value as a real value.

► [Par value](#),
Pg.51.

► Convertible Bonds

A convertible bond is an example of how a bond can be more than plain vanilla. Convertible debt gives holders the right to convert this debt into equity at a predetermined price at predetermined dates. Thus, convertibles are hybrids with both debt and equity characteristics. Here is a simple example: A firm with 40 outstanding shares of equity has 20 outstanding convertible bonds that promise \$10 thousand each in January 2050. Each such bond can be converted, at the bondholder's discretion, into three new shares of stock. This means that if all bondholders convert, they will own 60% of the firm. The original shareholders will own only 40% *but without an obligation to repay the debt*. The cost to shareholders will therefore no longer be the money that the firm has to pay to creditors, but a loss in ownership. This lessening of ownership is called **dilution**.

Convertible bonds allow the bondholder to exchange the bond into something else, usually into equity.

If you own these 20 bonds, what would you do if the value of the firm's assets in January 2050 were \$200 thousand or less? Your 20 bonds would own the entire \$200 thousand that the firm is worth. It would not be in your interest to exchange your bonds for shares. But what would you do if the firm's value were \$1 million? You would make the following calculation: If you take advantage of the convertibility feature and exchange your 20 bonds for 60 shares, there will be 100 shares in total. Your shares will therefore own 60% of the firm, or \$600 thousand — a whole lot more than the \$200 thousand that you would receive if you did not convert. Therefore, you would definitely exercise your right to convert. Conversion makes sense only if the price is high.

When a convertible comes due, its holders can decide whether they want to remain as such or become shareholders at the previously agreed-upon terms.

What is the firm value at which you would be indifferent between converting and not converting? It is where 60% of the firm would be equal to \$200 thousand. This occurs when the firm value is equal to $\$200/0.6 \approx \333 thousand. To summarize:

Here is how to determine the firm value cutoff at which convertible bondholders prefer to convert.

- If the firm's value is below \$200 thousand, the convertible bonds get everything.
- Between \$200 and \$333 thousand, the convertible bonds receive \$200 thousand and the shareholders get the residual above \$200 thousand.
- And above \$333 thousand, both shareholders and bondholders benefit from higher values. The convertible bondholders own 60% of the firm's value; the shareholders own 40% of the firm's value.

The payoff diagram in Figure 16.2 shows the value of the claims.

Convertible bonds are popular, perhaps because they tend to align the interests of shareholders and bondholders. For example, if shareholders wanted to take a project that would help them but (accidentally or intentionally) hurt plain bondholders (e.g. a project with a high NPV but also a high chance of bankrupting the firm), the bondholders would usually try to fight the project. However, if the bonds were convertible, the bondholders could also profit from the resulting value increase and then not oppose such a project.

Preview: Why is the conversion feature useful?

► [Bondholder expropriation](#),
§ 19.5, Pg.615.

Firm	Convertible	Equity
\$0	\$0	\$0
\$100	\$100	\$0
\$150	\$150	\$0
\$200	\$200	\$0
\$250	\$200	\$50
\$300	\$200	\$100
\$333	\$200	\$133
\$350	\$210	\$140
\$400	\$240	\$160
\$450	\$270	\$180
⋮	⋮	⋮

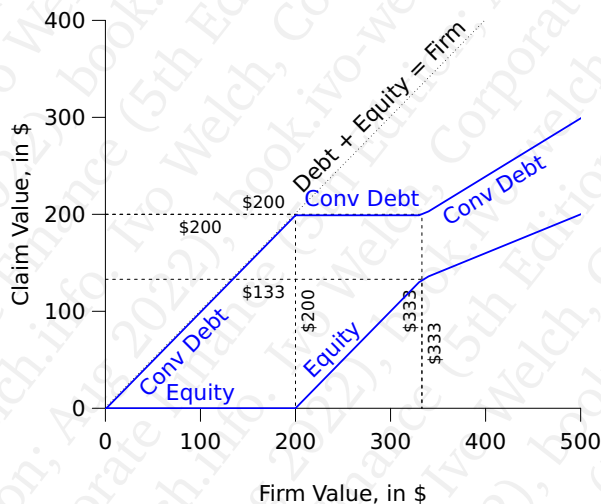


Figure 16.2: Sample Convertible Bond and Stock Payoff Table Diagram (at Maturity). The convertible debt is indifferent between converting and not converting if the firm value is \$333. The convertible's payoff slope beyond a firm value of \$333 is 0.6; the equity's payoff slope is 0.4.

Firm owners are willing to give up the right to convert, because this feature increases the cash that creditors pay them upfront.

One final question: Why would shareholders be willing to give bondholders this right to convert, which in effect deprives them of much upside? The answer must be that by doing so, bondholders are willing to pay more for the bond upfront. This means that the shareholders can negotiate for a lower interest rate. And indeed, you know that if financial markets are perfect, bondholders get what they pay for.

Are Convertibles Debt or Equity?

A good way to think of convertibles is that if their conversion price is so high that they are unlikely to be exercised ("deep out of the money"), they are more like debt. If they are very likely to be exercised ("far in the money"), they are more like equity. And if they are in between, they are hybrids.

In a 2002 survey in which CFOs were asked to describe why they issue convertible debt, the most frequent answers alluded to the fact that CFOs think of convertibles as "equity in disguise": 58% of the managers answered that it is an inexpensive way to issue "delayed" common stock; 50% answered that they did so because they considered their own stock currently undervalued, which again could be interpreted as managers thinking of convertibles as equity in disguise.

Graham and Harvey, Duke CFO Survey, 2002

► Other Corporate Bond Features

If the bond claim includes more rights, then its interest rate is usually lower (equivalently, the value of the bond is higher). The issuer can choose what specific rights to offer to buyers and what rights to reserve for the firm. Among the more common bond features are the following:

Bonds come in a thousand varieties — and then some. Here are some common features.

A **bond covenant** specifies that the firm will keep certain promises, or else it will be forced to repurchase (*redeem*) the bond. Among the more common covenants are restrictions on what the firm can do with its assets, how much in dividends it may pay to shareholders, how many and what kinds of other financial claims it may issue, what kinds of financial ratios (e.g., the debt-equity ratio) it needs to maintain, who the auditor is, what happens if the corporation defaults on any other bond, how much of its own bonds the firm will repurchase in each year, and so on. Interestingly, the use of covenants varies over time. In good times, when plenty of credit is chasing investment opportunities, lenders are often less strict in their demands for specific covenants.

Bond seniority specifies exactly which bonds receive first dibs in case of bankruptcy and liquidation. A **senior bond** will have to be satisfied in full before a **subordinated bond** (or **junior bond**) may receive any money. In turn, equity receives its funds only after even the most junior bonds' claims have been fully satisfied.

Collateral (or **security**) are specific corporate assets pledged to a specific bond in case of default. For example, mortgage bonds are collateralized by the value of the underlying real estate. If the issuer fails to pay, the bondholders may repossess the underlying real estate and use it to satisfy their claim. If the real estate is not enough to satisfy the claim of the **secured bond**, the remaining claim becomes an ordinary bond, waiting in line with other creditors for payment. A bond that is backed merely by “general credit” is called a **debenture** in the United States.

Convertibility, as you have seen, allows the bondholder to exchange the bond for shares.

Putability allows the bondholder to return the bond to the issuer, in exchange for a pre-agreed payment. This is like convertibility, except that the conversion is into cash, not into equity.

Callability allows the issuer (the firm) to “call in” the outstanding bond at a prespecified price. For example, a callable bond contract may state that the firm can redeem the bond by paying back principal plus 10% rate of interest in May 2020. Usually, callable bonds do not allow a call in the first 5 years. Callability is often present with convertibility, so that the call can be used to force bondholders to convert: The corporation calls the bonds, and the holder of the bond finds that it is in her interest to convert the bond into equity rather than to accept repayment.

While a convertible bond gives bondholders extra rights, callable bonds give the firm extra rights. Therefore, when a bond contains a call feature, it is less valuable than an otherwise identical bond without that feature. This means that issuers of bonds receive less money when they include a call feature. Put differently, the corporation must pay a higher interest rate upfront if it reserves a call feature. In effect, every mortgage in the United States is a

callable bond, because the seller of the bond (the homeowner) can just pay back the remaining loan balance (the **principal**) and be absolved of all further obligations. Naturally, homeowners pay for this privilege with a higher interest rate upfront.

The call feature is a good example of where payoff diagrams do not capture the whole situation. The value of the callable bond is often more a function of the prevailing interest rate than it is a function of the firm value. Corporations tend to call bonds when the economy-wide interest rate has dropped so that replacement bonds have become much cheaper. (Similarly, homeowners tend to repay their mortgages and refinance when the mortgage interest rate has dropped.) But because the bond interest rate is not a one-to-one function of the firm value in the future, the payoff diagram against the firm value at a fixed point in time would not tell the whole story.

A **sinking fund** is a provision that the firm will repurchase a specified fraction (no more and no less) of the principal before maturity. Unlike the call feature, there is no optionality here. Thus, in one sense, it helps the purchaser by assuring that the firm pays back the money along the way.

Other bond characteristics.

CFOs must also make decisions on the following corporate bond features. You already learned about them in Part I, because these features are shared by noncorporate bonds:

Bond maturity is the time to final payback. Indeed, borrowing may be very short-term (as short as overnight!), or very long-term (as long as forever). Bonds of different maturities may have different names. For example, **commercial paper** is short-term debt, often guaranteed by a bank's credit line (see below), and therefore is almost risk-free to the lender. (To participate in this market, firms must have an investment-grade credit rating.) On the corporate balance sheet, **funded debt** is the term for debt that has a maturity of more than one year. **Unfunded debt** has a maturity of less than one year.

Again, payoff diagrams do not do bond maturity full justice. The reason is that maturity can sometimes be like "super-seniority." That is, a subordinated bond may be repaid before the more senior bonds come due, and, once paid, the money paid to the subordinated bond can often not be reclaimed to satisfy the senior creditor's higher-priority claims.

Bond duration is a measure of how soon payments are made.

Coupon bond versus zero-bond: Zero-bonds pay a fixed amount of money only at a final date. Coupon bonds make (interest) payments on a regular schedule, typically (but not always) twice a year, and the principal is repaid as a **balloon payment** at the end.

A **unit** is a bundle of multiple types of financial claims that are sold together. For example, one common type of unit bundles a bond with a warrant. (A **warrant** is a right to buy equity shares that the firm will then issue, for a prespecified price at prespecified times in the future.) The purchaser can keep both types of claims or unbundle them and sell them separately.

Fixed-rate debt versus floating-rate debt: Fixed-rate bonds usually promise to pay a predetermined interest rate over the life of the bond. Floating-rate bonds offer a spread relative to some other interest rate, usually to *LIBOR* or to the

► [Duration](#),
§ 5.1, Pg.84.

► [Zero and coupon bonds](#),
§ 5.3, Pg.100.

► [Units](#),
§ 19.5, Pg.619.

prime rate (explained in a bond glossary in the companion). Highly reputable companies can typically borrow at interest rates that are close to LIBOR. Riskier companies typically pay interest rates that are about 100-300 basis points (1-3%) above LIBOR. The interest rate on floating-rate debt is also often **capped** or **collared** — that is, the interest rate will never exceed a predetermined ceiling.

There is no limit to the imagination as far as bond features are concerned. For example, a long time ago, the Russian carmaker Avtovaz issued Lada bonds, which allowed the holders to convert their bonds into Lada cars. Other bonds have had their payoffs linked to the price of commodities (such as oil), exchange rates, or other financial claims.

Here is an example of a less common bond feature.

► Concentrated Bank Debt or Diffuse Public Bonds?

Another important dimension along which loans differ is whether there is a relationship between the lender and the issuer. Firms can raise funds with a debt issue to the public, in which there is typically no relationship between the borrower and the many diffuse lenders, or with a private debt issue (e.g., a **bank loan**), in which there is often only one lender. The advantage of borrowing from the bank is that a single lender may get to know the firm, monitor it so that it acts appropriately in the future, and thereby grant better terms. The disadvantage is that there is less competition among banks for extending loans than there is among public bondholders. Bank loans can also take the form of a **credit line**. Credit lines are like instant debt, permitting borrowers to draw down money (and pay higher interest) only upon need. (Borrowers typically agree to pay a low interest rate even on the unused part of the credit line.)

A public bond is usually owned by many diffuse creditors. A bank loan is usually owned by one (or just a few) banks. A bank loan can take the form of a credit line or of negotiated debt.

The opposite of a credit line is **negotiated debt**, in which both the bank and the firm commit to a fixed loan. Just as the lines between debt and equity are often blurry, so are the lines between bank loans, private debt, and public debt. There is now a large market for loans extended by syndicates of banks, in which multiple lenders can share the risk of a loan. According to Thomson Reuters, syndicated loans accounted for about **\$7 trillion** in new loans in 2021. On the other hand, many individual banks now routinely resell loans that they have made to firms. Then there are also vulture investors who buy dispersed public debt in order to monitor the actions of the company, behaving much like a bank — as one fully coordinated lender.

Q 16.8. A firm is financed with a senior bond that promises to pay \$100, a junior bond that promises to pay \$200 (of lower seniority but of equal maturity to the senior bond), and equity. Write down the payoff table and then draw the payoff diagrams when the two bonds are due.

Q 16.9. A convertible zero-bond that promises \$10,000 can be converted into 50 shares of equity at its maturity date. If there are 2,000 such bonds and 300,000 shares outstanding, write down the payoff table. Show how the payoff diagram for both bondholders and equity holders looks like.

Q 16.10. Write down all bond features (variations) that you remember.

Nonfinancial Liabilities

For nonfinancial liabilities, cash flow and control rights can be weak or strong.

A nonfinancial liability with strong control rights: income tax obligations.

A nonfinancial liability with weak control rights: a customer who bought a warranty from the firm.

Although our book's focus is primarily on financial claims, most of the discussion also applies to nonfinancial claims. However, nonfinancial liabilities can vary widely in terms of both cash flow and control rights. They can have rights that are weaker or stronger than those of financial claims.

For example, Uncle Sam has cash flow rights that are specified in the tax code (i.e., computed according to tax laws and IRS rules). By law, corporate income tax obligations have priority before any other claim. The control rights that enforce this claim are similarly very powerful and even include criminal sanctions. If you evade corporate taxes, you can go to jail.

On the other hand, your suppliers have fairly weak cash flow rights. They are supposed to be paid for the goods they have delivered to you. However, the cost of legally enforcing modest financial claims in the United States often exceeds the value of the claims. Thus, the best control right of your suppliers may be the threat to stop doing business with your firm if you do not pay. The same poor control rights often apply to customers, who may have bought your products with a warranty. The customers may or may not have legal rights, but the enforcement costs are so high that these rights may not be worth the paper they are written on.

16.3 Equity (Stock)

► Levered equity,
§ 6.4, Pg.134.

Stock = Equity. (Ordinary = Common.)

Shareholders usually have last dibs (i.e., money only after other obligations have been paid) but enjoy unlimited upside.

Stock is another name for equity, which you have already encountered in earlier chapters. If not further qualified, it refers to the most common flavor, which is called just this — **common stock** (or sometimes *ordinary stock*). Common stock, ordinary equity, and common equity are all the same thing. The terms *stockholders* and *shareholders* are just abbreviations for **stock shareholders**.

Cash flow rights: Stock receives whatever is left over *after* all liabilities have been honored. Thus, the bad news is that equity typically has the lowest priority in bankruptcy. If the firm does poorly, shareholders may get nothing. The good news is that the equity gets all the rest — potentially unlimited upside for the common equity. If shareholders are lucky, they receive dividend payments and capital appreciation.

Dividends have to be paid from *after-tax* earnings. Any paid-out dividends are thus taxed “at the source.” Sometimes, other companies own these dividend-paying shares. The intent of the tax code is to reduce a second round of tax for corporate owners on dividend income that was already taxed once at a source company. Thus, the **corporate dividend exclusion rule** has historically allowed corporations to pay a reduced tax rate on their dividend receipts. (However, this rule is subject to IRS qualifications — it can depend on whether the source firm was fully subject to income tax payments, on the type of firm paying the dividend, on the contractual ability of the issuer to call back the equity, and on the recipient's percent ownership.) In contrast to corporate investors, individual investors were historically subject to being taxed a second time at the full dividend personal income tax rate. This is called the **double taxation of dividends**, though it was reduced by a tax change in 2003. (Similar arrangements have long been the norm in many other countries, such as in the United Kingdom.) [Since 2013](#), the qualified dividend tax rate has stood at 20% for individuals in the top income tax bracket and 15% for everybody else.

Control rights: Unlike creditors, shareholders cannot force the firm into bankruptcy if it refuses to pay dividends. Instead, shareholders' main control right is their right to elect the **corporate board**. The board is legally the principal of the firm and owns the control rights over the company itself. (The legal details to accomplish this delegation of power vary by corporate charter, by state, and by country.) The corporate board in turn appoints the managers, to whom they further delegate many, if not most, day-to-day control rights.

Shareholders elect the corporate board, which appoints and supervises management.

In addition to this contracted right, managers also have a legal **fiduciary responsibility** to shareholders, except if the firm is in financial distress, in which case this responsibility extends to both creditors and shareholders. There is some disagreement about whether dispersed shareholders in large, publicly traded corporations possess an effective control over the board (and in turn over the management) in real life, or whether it is more the other way around. The conflict between shareholders and managers is the focus of a companion chapter on corporate governance.

About one-tenth of the companies trading publicly in the United States seem to have multiple equity classes that differ in the number of votes each share carries. (Sometimes, they receive different amounts of dividends, too.) For example, when Rupert Murdoch bought the Dow Jones company (publisher of the Wall Street Journal) in 2007, he had to contend with the Bancroft founding family that owned only 24.7% of the total number of shares but controlled 64.2% of the votes.

Nowadays in the United States, most firms have only one flavor of common equity.

In sum, although not perfectly correct, you can usually think of the equity holders as the corporate owners, though limited in power and protected by limited liability. There are also two other less common types of equity claims. They no longer play an important role in most large publicly traded firms, but they still have some use in small privately held companies. (Venture capitalists often use them.)

Generalizations.

Preferred equity is a claim with both debt and equity characteristics. Unlike ordinary equity, where dividends are declared annually at the discretion of management, preferred equity's dividends are specified at issuance (for example, \$2.25 per calendar quarter per share). The preferred dividends are also usually higher than common dividends. In addition, the preferred equity covenants usually state that their dividend payments have priority over any dividend payments to common stock.

Preferred equity has some equity and some debt characteristics.

As equity, preferred is junior to any liabilities. However, the preferred covenants usually specify a higher priority relative to common equity in case of bankruptcy. Preferred equity also lacks the ability of creditors to force the firm into bankruptcy if the firm fails to pay the preferred dividends.

Preferred equity is often retired on a fixed schedule — even though many preferred equities have no formal maturity. Many preferred shares are **redeemable** (allowing the issuer to buy them back); and if this is the case, investors receiving these dividends must treat them as interest income for tax purposes. As with common stock, some preferred stock is traded on public stock exchanges.

Naturally, many other features can be explicitly added by covenant. Indeed, the only context in which preferred equity is still commonly used nowadays is as **convertible preferred** in the context of nonpublic venture capital financing. These claims typically have covenants that provide explicitly for voting rights. The holders of such claims are usually themselves corporations — venture

capitalists — who can write off the claims if the firm fails, or convert them into common equity if the firm succeeds.

We don't have time to cover warrants and options in detail here.

Warrants and options give their owners the right to purchase stock in the future at a predetermined price. For warrants, the shares that the firm will provide upon exercise are newly issued (and thus dilutive). Options and warrants are usually even more junior than common equity. They are often of value only if the firm experiences extraordinarily good times. In publicly traded corporations, they rarely have control rights — except for the right of the owner to convert them into equity. For more information on warrants and options, refer to the companion chapter on options.

Q 16.11. Do shareholders enjoy limited liability?

Q 16.12. What is / was the double taxation of dividends?

Q 16.13. In what sense is preferred equity like bonds? In what sense is preferred equity like stocks?

16.4 Understanding Intel's Capital Structure

Get your feet wet.

You now have the conceptual understanding of how to think about different financial claims — their cash flow rights and control rights. In the real world, capital structure is highly complex. Perhaps the best way to understand what it *really* looks like is to examine the real-world capital structure of one company. Let's do Intel again.

Table 16.3 shows Intel's 2013-2015 balance sheets — you can download the complete historical financials from Intel's corporate website. I just added the “change” lines in *italic* to the table to make it easier to see quickly what was happening. The top part of the table shows how the liabilities evolved; the bottom part shows how the equity evolved.

Intel's Liabilities

Intel had four nonzero liability components.

First look at the constituents of Intel's liabilities. A glance at Table 16.3 tells you that there are four main categories of liabilities: long-term debt, short-term (or current) liabilities, other liabilities, and deferred long-term liabilities (mostly pension-related and many of them being non-U.S.-related). Other firms may have two more components: minority interest (which adjusts for firms not owning some consolidated subsidiaries 100% and is often treated like equity) and negative goodwill (related to an accounting discount at which Intel might have bought other companies). These two items rarely play large roles (except in companies that have been involved in large M&A activities), and they did not play any role in the case of Intel.

More detail about a firm's capital structure usually has to be teased out of the financial footnotes.

If you want to learn more details about what all these claims are, you have to dive further into the **financial footnotes** accompanying Intel's financial statements. These usually explain what the liabilities really are — and the footnotes are usually ten times longer than the financial statements themselves. It is not important here that you understand every little detail — Intel is just one company, and other firms' financials will look somewhat different. Your goal should be to understand the basics and be able to look up and interpret information when you need it.

Liabilities	2013	<i>Change</i>	2014	<i>Change</i>	2015
Long-Term Debt	\$13.2	-\$0.9	\$12.1	+\$7.9	\$20.0
Short-Term Liabilities	\$13.6	\$2.4	\$16.0	-\$0.3	\$15.7
<i>incl. Short-Term Financial Debt</i>	\$0.3	\$1.3	\$1.6	+\$1.0	\$2.6
Other Liabilities	\$3.0	+\$0.3	\$3.3	-\$0.5	\$2.8
Deferred LT Liabilities	\$4.4	-\$0.6	\$3.8	-\$1.3	\$2.5
No minority interest or negative goodwill					
Total Liabilities	\$34.1	<i>+\$1.0</i>	\$35.1	<i>+\$6.0</i>	\$41.1
Financial Debt	\$13.5	\$0.2	\$13.7	+\$8.9	\$22.6
Equity	2013	<i>Change</i>	2014	<i>Change</i>	2015
Shareholders' Equity (Book Value)	\$58.3	-\$2.4	\$55.9	+\$5.2	\$61.1
Market Value of Equity	\$101.9	+\$27.0	\$128.9	+\$43.4	\$172.3
Asset Side	2013	<i>Change</i>	2014	<i>Change</i>	2015
Cash	\$5.7	-\$3.1	\$2.6	+\$12.8	\$15.4

Table 16.3: Debt, Equity, and Cash for Intel, 2013-2015 (in billions of dollars). NB: We are omitting short-term investments and trading assets of about \$10 billion on the asset side.

► Long-Term Financial Debt

Issued	Nominal	Type	Maturity	Stated	Amount
Q4-2015	\$915	senior	Dec 2045	4.7%	\$908
Q4-2015	A\$800	senior	Dec 2019	3.25%	\$181
		senior	Dec 2022	4.0%	\$397
Q3-2015	\$1,000	senior	Aug 2045	4.90%	\$1,009
Q3-2015	\$7,000	senior	Jul 2022	2.45%	\$1,748
		senior	Jul 2022	3.10%	\$996
		senior	Jul 2025	3.70%	\$2,247
		senior	Jul 2045	4.90%	\$1,998
2012	\$6,200	senior	Dec 2017	1.35%	\$2,999
		senior	Dec 2022	2.70%	\$1,492
		senior	Dec 2032	4.00%	\$744
		senior	Dec 2042	4.25%	\$924
2011	\$5,000	senior	Oct 2016	1.95%	\$1,499
		senior	Oct 2021	3.30%	\$1,997
		senior	Oct 2041	4.80%	\$1,490
2009	\$2,000	jnr conv	Aug 2039	3.25%	\$1,103
2005	\$1,600	jnr conv	Dec 2035	2.95%	\$975
					\$22,707
			less current part of long-term debt		(\$2,602)
			less issuing costs		(\$69)
			Net of issuing costs		\$20,036

Table 16.4: Intel's long-term financial debt (dollars in millions) in Dec 2015. Not reported, Intel had about \$26 billion in notional currency and interest hedges. These (likely) offset any currency fluctuations of some obligations issued in Australian dollars and then accounted for as if they were US liabilities. The stated interest rate is always the coupon rate, not the YTM. Intel's footnotes further provide an estimate of the fair value of the debt (unlike the book value amount on the balance sheet), which was about \$20.9 billion and thus just a little higher than the booked obligations.

Intel's long-term debt consisted of many different securities.

Table 16.4 shows how Intel's long-term financial debt was structured. There were many debt securities, coming due on different dates. In 2015, Intel issued a lot of debt to finance the pending acquisition of Altera (another chipmaker) and placed the raised funds into cash and short-term holdings. It paid about 1.85% above equivalent-maturity Treasuries at this issue time. Not shown, in 2013 and 2014, Intel happened not to have had expiring debt, did not repurchase any outstanding debt, and did not issue new debt.

Different denominations

Almost all of Intel's debt was denominated in U.S. dollars. However, Intel also had \$26 billion in currency contracts, so outsiders could not know with certainty how exchange rate movements would affect Intel's net liabilities. In the footnotes, Intel disclosed that it had \$17 billion worth of Chinese yuan, Euro, Israeli shekel,

Japanese yen, and other swaps. Other firms often issue bonds in different currencies to match their liabilities to expected product revenues or net income. Intel seems to prefer currency hedges instead of foreign currency bonds.

One of Intel's bonds has 25 years to maturity. This isn't unusually long: other firms (like IBM) have even issued bonds with 100 years to maturity! We could dive more into details and, e.g., compare the YTM on these bonds to determine exactly how the bonds are trading relative to par, but it's not important information, so we can skip it.

Different maturities

Intel's convertible junior bonds are more interesting. At the year of issue (2005 and 2009), the conversion feature reduced the interest paid by about 3.5% per annum. In exchange, Intel granted its buyers an option (requiring many pages of description) that will, in essence, make it worthwhile for creditors to convert into stock if Intel performs well. Depending on the prevailing stock price, Intel sometimes reclassifies its convertible obligations as short-term debt, long-term debt, or even equity.

Convertibles

► Short-Term Financial Debt

Intel also had \$2.6 billion in short-term debt, almost all of which was the current portion of previously issued long-term debt. This is somewhat unusual, in that most firms issue some commercial paper or notes in order to pay lower interest rates to gain higher earnings (at the risk of being vulnerable to a short-term credit crunch like that in the Great Recession of 2008-9).

Intel's short-term debt

A company also has to watch its debt maturities. The financial footnotes outline

Maturity structure

Year	2016	2017	2018	2019	2020	2021-
Amount	\$1,500	\$3,000	\$0	\$181	\$1,750	\$17,845

Smaller firms tend to rely much more on bank debt, and prior to 2016, Intel also kept some lines of credit open, but again much less than other firms tend to do.

Intel's bank debt — really almost none

► Non-Financial Obligations

Liabilities consist not only of financial obligations (here mostly long-term debt coming due), but also of such items as accounts payable, taxes, compensation and benefits, deferred income, and a variety of other obligations that Intel has incurred. In Intel's case, most current liabilities were accounts payable. This is a common situation. Note also how Intel has reduced its accounts payable from 2014 to 2015, finding it cheaper to issue (long-term) debt than to borrow funding from its suppliers by paying later.

Accounts Payable

It used to be the case that pension obligations were the largest part of corporate obligations. However, over the decades, U.S. companies have moved from **defined-benefit** to **defined-contribution** plans. This shift has eliminated pension liabilities (with their responsibilities and potential conflicts of interest tempting the managers to raid pension set-aside assets after they have appreciated) from their balance sheets. Intel did have just a little in defined-benefit plans left over, much of it for employees in foreign countries where defined-benefit plans are still common. Note that firms do not need to fund *all* of their future defined-benefit pension obligations, and indeed many firms fail to do so. Some firms, however, are more conservative and may even overfund such plans. (In the past, some of these firms have then found themselves

Pension Obligations

the target of an external takeover attempt, in which the acquirer attempted to gain control of the excess pension assets in order to finance the acquisition itself.) The financial aspects of pensions are complex, and the financial footnotes of most large multinational companies contain dozens of pages of information about them.

Other liabilities

Many other firms also have more environmental liabilities and executive bonuses accrued. Instead of the latter, Intel opted to give its employees relatively more in stock options. Thus, the financial report footnotes contain many pages detailing who got and gets how much and when.

► Shifting Liabilities

"Free Money" by rolling over short-term debt with lower interest rates? I don't think so.

We have not yet discussed how firms decide on the duration and maturity of their liabilities as a function of the prevailing Treasury and credit yield curve. The empirical evidence suggests that before the Great Recession of 2008-9, managers tended to believe that lower interest rates were better than higher interest rates. Thus, they thought they could create value by shifting aggressively from long-term debt into short-term financing as a yield-curve play. This strategy raised their immediate earnings (and executive bonuses) — but then led many firms into dire straits when they found themselves in a position of needing to raise money in the depth of the 2008-9 Great Recession. Intel apparently has decided that it is wise to finance itself with relatively longer-term debt. (However, this is not 100% clear, either, because we do not know what their net exposure after hedging is.)

Why was Intel so cash-rich?

Are you surprised that Intel had \$39.5 billion in cash and short-term investments? That is a remarkably high number — indeed, at this moment, it was as much as Intel's entire property, plant, and equipment, and Intel was then the leading semiconductor fabricator in the world today. Semiconductor plants are notoriously capital-intensive. Looking at Intel, you might conclude that it has become part semiconductor company, part financial-holdings company. This is somewhat misleading. Intel had just bought Altera for \$16.7 billion at the end of 2015, and was building a large cash position to pay for it in early 2016. This cash hoard would soon shrink again.

► Net Interest Costs

With so much cash, Intel earned more interest than it paid.

► [Intel's Cash Flow Statement](#), Table 14.4, Pg.421.

The footnotes explain that Intel paid about \$186 million in interest — which was a weighted interest rate of about 1% on \$22 billion of debt. The net interest described on the income statement was only \$105 million, because Intel also had a lot of cash and short-term investments. The Net Borrowings on the cash-flow statement show that Intel raised about \$9.0 billion in 2015 in total. ([Morningstar Quicktake](#) provides interesting historical issuing costs for Intel and many other firms.)

Intel's Equity

Common equity: Intel did not change its number of shares by very much.

Table 16.5 shows the evolution of Intel's equity. Like most publicly traded firms, Intel had no preferred debt. Interestingly, Intel's option and warrant obligations were relatively small compared to many tech startups. Its employees were compensated more with salaries and bonuses than stock options. As to common equity, Intel had 10 billion shares authorized, but only half issued. It did not hold many repurchased shares. (They are called **treasury shares** — the first letter is not capitalized!) Many other companies tend to repurchase more shares to fund their employee stock option

Equity	2013	Change	2014	Change	2015
Options and Warrants	\$0		\$0.9		\$0.9
Preferred	\$0		\$0		\$0
Common	\$21.5		\$21.8		\$23.4
Retained Earnings	\$35.5		\$33.4		\$37.6
Treasury Stock	\$0		\$0		\$0
Capital Surplus	\$0		\$0		\$0
Other	\$1.2		\$0.7		0.0
Book Equity	\$58.3		\$55.9		\$61.1
		-\$2.4		+\$5.2	
Number of Shares Outstanding	#4,944		#4,967		#4,748
		+#23		-#19	
Book Price/Share	\$10.36/s		\$11.73/s		\$11.77/s
		-\$1.37/s		+\$0.04/s	
Market Price/Share	\$20.62/s		\$25.96/s		\$36.29/s
		+\$5.34/s		+\$10.33/s	
Market Value of Equity	\$101.9		\$128.9		\$172.3
		\$27.0		+\$43.4	

Table 16.5: Intel's Equity and Some Other Information (dollars in billions, # shares in millions).

plans (**ESOP**). If you had purchased the 4.7 billion outstanding shares in 2015, you would have owned all of Intel's equity. The cash flow statement also tells you that Intel used \$1.8 billion of its cash to repurchase shares, which explains the decline in the number of shares from 4,967 to 4,748. Intel purchased between 16 and 35 million shares per quarter, ramping up when the stock price fell and slowing down when it increased. Looking at Table 16.5, it should be obvious that repurchases were dwarfed by the changes in market cap that came about through changes in Intel's stock price. (Similar value changes also affected other firms and especially tech firms in 2015.)

Observations on the Evolution of Intel's Capital Structure

You now understand how Intel's capital structure changed from 2013 to 2015. The liabilities increased by 20% from 2013 to 2015 (\$34 to \$41 billion), almost all due to long-term obligations to fund the impending Altera acquisition. However, even this 20% change is much smaller than the 70% change from \$102 to \$172 billion in the market value of its equity. Indeed, capital structure doesn't usually come about primarily through a deliberate managerial thought process ("this is how much we want"), but through underlying changes in the value of the firm. When the firm value (and thus primarily the stock price) increases, the leverage ratio goes down; when the stock price decreases, the leverage ratio goes up. This does not mean that firms are just passive observers — they can and do make changes, though equity

Where did Intel's big capital structure changes come from?

issuing activity is rare among established companies. But these deliberate changes are for many firms almost by necessity smaller than what they are subjected to by the changes in their values.

This suggests that a useful perspective is to think about capital structure changes as being driven by three factors:

1. Claims that are for the most part outside the day-to-day control of the CFO — such as accounts payable.
2. Claims whose value is mostly determined by the performance of the company and the financial markets — such as common equity.
3. Claims that are for the most part under the day-to-day control of the CFO — such as the firm's financial claims. The obvious examples are (bank) debt and short-term notes. These are most interesting for us financiers, because they are often the primary source of marginal capital to fund new projects.

► Leverage Ratios

Let's compute the summary measures of leverage to characterize how indebted Intel was.

1. Total-liabilities-to-total-assets ratio: In 2015, $\$41/\$103 \approx 40\%$ of Intel's total *book-value-based* assets were financed with liabilities. However, although in common use (perhaps because it is on the same financial statement), book assets clearly undervalue the assets in Intel's case. The market value of assets was $\$103.1 + \$172.3 - \$61.1 \approx \214.3 billion. Thus, Intel's 2015 market-based liabilities-to-total-assets ratio was under 20%.

2. Financial-debt-to-capital ratio: Financial debt consists of long-term debt and debt in current liabilities, \$22.6 billion for Intel. Financial capital consists of financial debt plus equity, \$83.7 billion. Thus, Intel's financial debt ratio is 27%.

These are just summary statistics. No single statistic can convey a full picture of a complex capital structure. Depending on the context, you may find one or the other (or both) measures to be more suitable for your needs. Section 15.7 had a more detailed discussion of these and other measures of leverage. However, even without more details, it seems pretty obvious that Intel is on solid financial footing. It is unlikely to suffer financial distress anytime soon.

Q 16.14. List some of the bigger categories that can go into the firm's capital structure.

Q 16.15. To take control of a firm, do you need to purchase all *outstanding* or all *issued* shares?

Q 16.16. From year to year, does the value of debt or equity tend to move around more?

It is sometimes useful to think about the components of the capital structure as how easily they can be used as sources of funding.

► [Leverage Ratios](#), § 15.7, Pg.483.
Total-liabilities-to-assets and financial-debt-to-capital are two good summary statistics that measure leverage.

► [Warning about BV-Equity](#), § 14.7, Pg.445.

► [How to measure leverage](#), § 15.7, Pg.483.

Summary

This chapter covered the following major points:

- In the real world, firms are financed by a set of different financial claims. The same firm may have senior debt, junior debt (perhaps with a conversion feature), equity, and warrants. The right way to think about all these claims often involves the “magic” of the payoff table and the payoff diagram: If the firm ends up being worth very little, only the senior debt is paid. If the firm is worth a little more, both the senior and the junior debt are paid. If the firm is worth even more, the equity becomes valuable and, finally, so do the warrant and/or the conversion feature.
- The two most basic building blocks of capital structure are debt and equity. These differ in their cash flow rights and in their control rights:
 - Debt has first rights to the distribution of cash flows. It is “senior.” It can force the firm into bankruptcy if payments are not made.
 - Equity gets only what is left over after debt has been satisfied. It is “junior.” It is in control of the firm, unless the firm finds itself in financial distress.
- Payoff tables and payoff diagrams are often good ways to describe the cash flow rights of debt and equity. They are state-contingent claims, where the firm value is the state. But the plots are not perfect in summarizing all the important information about claims. They ignore factors that can influence security value other than the firm value at one point in time, such as the time pattern of multiple payouts, control rights, or economy-wide interest rates.
- Convertible bonds allow their owners to convert their bonds into shares. They can therefore often be considered as part debt, part equity.
- Preferred equity cannot force bankruptcy, but it receives its dividends before common equity does.
- Corporate borrowing comes in thousands of varieties. For example, it can be plain, convertible, callable, fixed-rate or floating-rate, short-term or long-term, and so on. Debt can also have detailed covenants of many kinds.
- The lines between different financial instruments are blurry. Issuers regularly introduce new kinds of securities that carry features traditionally associated only with either debt or equity. Nothing is written in stone. Debt and equity (or bank, private, and public debt) are nowadays better considered to be concepts rather than sharp categories.
- Equity is less colorful than debt. For many companies, it consists of only one class of common equity.

Looking at Intel, you learned the following:

- Capital structure changes are influenced by factors under management’s immediate control (primarily financial claims, such as debt issuing and share repurchasing), factors related to operations (primarily nonfinancial liabilities, such as pension obligations and working capital), and factors beyond the management’s immediate control (such as discount rate changes and stock returns).
- The big liability categories are long-term debt, short-term liabilities, and the catch-all category called “other” long-term liabilities. (Minority interest and negative goodwill are usually less important.)
- Financial debt is the sum of long-term debt plus the financial debt component of short-term liabilities.
- The financial footnotes give a lot of detail about firms’ liabilities. Financial debt can contain many different types of borrowing simultaneously — bonds, notes, foreign credit, hybrid securities, credit-line related borrowing, bank debt, and so on. Short-term liabilities can contain financial debt, tax obligations soon due, accounts payable, compensation-related liabilities, and other items. Nonfinancial liabilities contain accounts payable and (usually) a large amount of specified or

unspecified other liabilities. These other liabilities can contain such items as deferred taxes and deferred income, executive compensation, retirement-related items, disability benefits, environmental liabilities, and the like.

- Firms can, and often do, take the term structure of interest rates into account when they issue or retire debt. This means that their current capital structures are often history (interest-rate) related. After the Great Re-

cession of 2008-9, firms have been tilting away from lower-interest shorter-term towards higher-interest longer-term financial debt.

- The total-liabilities-to-assets ratio and the financial-debt-to-financial-capital ratio are two reasonable summary measures of indebtedness. Their value can be quite different, not only from one another but also depending on whether the equity component is measured in book or market value. The latter is preferable.

Keywords

absolute priority rule p.5; balloon payment p.10; bank loan p.11; bond covenant p.9; bond duration p.10; bond maturity p.10; bond seniority p.9; callability p.9; capital structure p.1; capped p.11; chapter 11 p.6; chapter 7 p.6; collared p.11; collateral p.9; commercial paper p.10; common stock p.12; convertibility p.9; convertible preferred p.13; corporate board p.13; corporate charter p.1; corporate dividend exclusion rule p.12; coupon bond p.10; covenant p.6; credit line p.11; debenture p.9; defined-benefit p.17; defined-contribution p.17; dilution p.7; double taxation of dividends p.12; equity p.2; esop p.19; fiduciary responsibility p.13; financial footnote p.14; fixed-rate debt p.10; floating-rate debt p.10; funded debt p.10; junior bond p.9; leverage p.2; liabilities p.2; maturity p.5; negotiated debt p.11; par value p.6; payoff diagram p.3; preferred equity p.13; principal p.10; putability p.9; redeemable p.13; secured bond p.9; securities p.2; security p.9; senior bond p.9; sinking fund p.10; state-contingent claim p.4; state p.4; stock shareholder p.12; stock p.2; subordinated bond p.9; treasury share p.18; unfunded debt p.10; unit p.10; warrant p.10; zero-bond p.10;

Answers

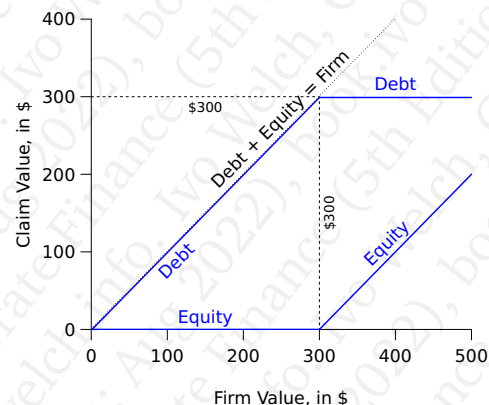
AQ 16.1 A control right is the right to influence decisions, e.g. by changing management and/or the board.

AQ 16.2 Individuals can never really fully own a firm. The IRS and community have inalienable property rights over every firm in existence.

AQ 16.3 The payoff table for the \$300 million zero-bond is as follows (in millions of dollars):

Firm Value	Bond Value	Stock Value
\$0	\$0	\$0
\$100	\$100	\$0
\$200	\$200	\$0
\$300	\$300	\$0
\$350	\$300	\$50
\$400	\$300	\$100
⋮	⋮	⋮

AQ 16.4



The bond is a diagonal line until firm value is \$300, and then a horizontal line. The stock is a horizontal line at \$0 until \$300, and then a diagonal line.

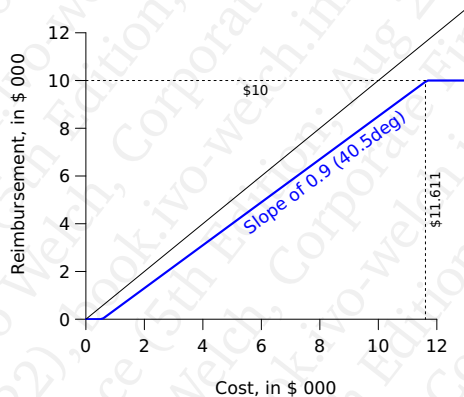
AQ 16.5 Yes, you can graphically add up payoffs from the diagrams. It is basically stacking up lines. The sum total must be one diagonal line (i.e., slope of 1) — it is the value of the firm. Perhaps this is easiest to see if you draw it all, and then convince yourself that you can stack!

AQ 16.6 No, you cannot draw a good payoff diagram for a coupon bond with so many remaining payments — at least not without making a lot of extra assumptions. Payoff diagrams only work well for a security’s value at one given point in time.

AQ 16.7 For the medical insurance reimbursement example, consider another example. If you submit annual claims of \$750, you first have to pay the deductible of \$500 yourself. On the remaining \$250, you get a reimbursement of 90%, that is, $90\% \cdot \$250 = \225 . Doing this for more medical claims,

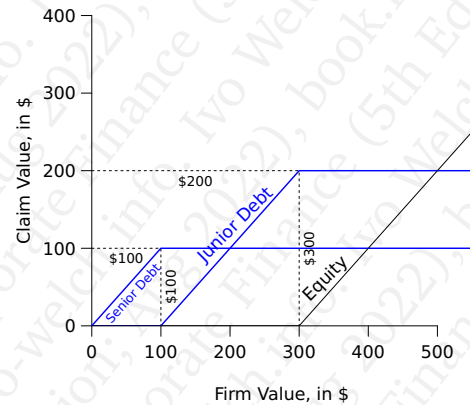
Medical Cost	Insurance Payout	Medical Cost	Insurance Payout
\$0	\$0	∴	∴
\$250	\$0	\$11,500	\$9,900
\$500	\$0	\$11,600	\$9,990
\$750	\$225	\$11,611	\$10,000
\$1,000	\$450	\$11,700	\$10,000
\$2,000	\$1,350	\$12,000	\$10,000
\$3,000	\$2,250	\$13,000	\$10,000
∴	∴	∴	∴

The “slope” is zero until \$500 is reached, then 90% until \$11,611.11 is reached (where the payout is $[\$11,611.11 - \$500] \cdot 0.9 = \$10,000$), and then zero again.



AQ 16.8 For the \$100 senior bond, the \$200 junior bond, and equity:

Firm	Senior	Junior	Equity
\$0	\$0	\$0	\$0
\$50	\$50	\$0	\$0
\$100	\$100	\$0	\$0
\$150	\$100	\$50	\$0
\$200	\$100	\$100	\$0
\$250	\$100	\$150	\$0
\$300	\$100	\$200	\$0
\$350	\$100	\$200	\$50
\$400	\$100	\$200	\$100
\$450	\$100	\$200	\$150
∴	∴	∴	∴



AQ 16.9 For the 2,000 convertible \$10,000 zero-bonds that can be converted into 50 shares of equity each (with 300,000 shares outstanding): If the firm is worth less than $2,000 \cdot \$10,000 = \20 million, the bondholders own the entire firm and shareholders receive nothing. If the bonds convert, they will be equivalent to one-quarter of all shares. At \$80 million, bondholders are indifferent between converting and not converting, because $\$20,000,000 / 0.25 = \$80,000,000$. The payoff diagram for the debt is therefore a diagonal line (i.e., slope of 1) until \$20 million, then a horizontal line until \$80 million, and a line with a slope of 0.25 beyond \$80 million. For equity, the line is horizontal until \$20 million, then diagonal (i.e., slope of 1) until \$80 million, and a line with a slope of 0.75 beyond \$80 million.

AQ 16.10 The various bond features are fully described in Section 16.2. Here is a short description: Most bonds make interest payments on a regular basis (e.g., semiannually or annually) and repay the principal of the bond at maturity. The interest rate (or coupon rate) may be either fixed or floating with some benchmark rate, (e.g., the prime rate). Bonds also come with covenants that are other requirements that a firm must abide by, such as a minimum level of liquidity, a maximum amount of debt, and/or a sinking fund requirement. Some bonds may be designated as

senior to other bonds issued by the firm, which gives their holders a prior claim over the junior bond investors. Some bonds may also be collateralized, in which case the bond is backed by one or more of the firm's assets. In addition, a bond may be convertible, callable, or puttable.

AQ 16.11 Shareholders indeed enjoy limited liability, which is the fact that they can only lose their actual investment. They do not forfeit their personal possessions if the corporate managers act badly.

AQ 16.12 Corporations paid income tax on their earnings, and the post-corporate tax distributed dividends were taxed again at the private level.

AQ 16.13 Preferred equity is like a bond in that it does not participate in the upside, and in that it is usually de facto senior to common equity. This applies both in bankruptcy and in respect to the dividends: Common shares do not get their dividends until preferred shareholders have received theirs. Preferred equity is like a stock in that its

payments are not tax-deductible by the issuer, and in that preferred shareholders have no ability to force the firm into bankruptcy if their dividends are not paid.

AQ 16.14 Liabilities consist of long-term debt (bonds and notes), short-term debt (financial, taxes, payables, etc.), pension debt, and other debt. Equity consists of common and preferred stock, and for many (tech) firms also of options and warrants.

AQ 16.15 You cannot purchase all issued shares, because the firm holds treasury shares, which are a component of all issued shares. Instead, you need to purchase all outstanding shares. This gives you indirect control over the treasury shares, which the firm already holds itself.

AQ 16.16 The value of equity moves around a lot more, primarily because it is a "levered value," which is more sensitive to changes in the value of the underlying firm. In contrast, debt changes drastically primarily when a firm issues or retires debt.

End of Chapter Problems

Q 16.17. What is a cash flow right? How does it differ from a control right?

Q 16.18. Write down the payoff table and graph the payoff diagram for an insurance contract with a deductible of \$100,000, a coverage of 80% of the loss, and a maximum payout of \$1,000,000.

Q 16.19. Draw a payoff diagram for a stock and a bond, where the bond promises to pay off \$500 in one year.

Q 16.20. What can payoff diagrams illustrate well? Where do they fail?

Q 16.21. What are the main mechanisms through which creditors can increase the likelihood of being repaid? Give some examples.

Q 16.22. A convertible zero-bond that promises \$20,000 can be converted into 100 shares of equity at its maturity date. If there are 8,000 such bonds and 1,200,000 shares outstanding, what would the payoff table and diagram for both bondholders and stockholders look like?

Q 16.23. Write down all bond features (variations) that you remember.

Q 16.24. What is the main control mechanism through which shareholders increase the likelihood of ever receiving cash?

Q 16.25. What are the main control rights for common equity, preferred equity, and debt?

Q 16.26. Is common stock or preferred stock more common? Does the name "preferred" mean it is better to own preferred stock than common stock?

Q 16.27. What are financial notes?

Q 16.28. What are the main categories of long-term liabilities?

Q 16.29. What is commercial paper?

Q 16.30. What tends to be the most important short-term liability?

Q 16.31. Explain how Intel's capital structure changed from 2013 to 2015. Do you see similar changes for Microsoft over the last few years?