Agency Costs and Capital Structure

REVIEW OF TRADEOFF THEORY OF CAPITAL STRUCTURE

In perfect capital markets, capital structure has no impact on the overall value of firms. If a firm chooses to alter its mix of debt and equity, the only impact is to change the risk and return of the various securities, not the risk of the overall firm. Stated differently, the value of the firm is determined by decision making on the left-hand side of the balance sheet; changes on the right-hand side of the balance sheet do not affect the value of its operating assets.

As discussed in an earlier lecture note, the U.S. tax system favors debt financing. That is, the treatment of interest as an expense generates tax shields, and as a result corporations employ debt in their capital structure. Consider the fictional firm, ALLEQUITY, renamed LEVER. The market-value balance sheet, before and after raising debt or repurchasing shares, is shown below:

ALLEQUITY				LEVER (APV)			
Assets-in-Place	1,000	Equity	1,000	Assets-in-Place	1,000	Debt	300
				Tax Shield	75	Equity	775
Total	1,000	Total	1,000	Total	1,075	Total	1,075

The market value of LEVER exceeds the market value of ALLEQUITY by $75 million, the present value of the interest tax shields. We can think of the interest tax shields as a separate project and have labeled them as such on the left-hand side of LEVER's balance sheet. Here, management increases the overall firm

value by a recapitalization which involved a repurchase of shares via debt financing. As noted in the balance sheets above, the value of the operating assets (underlying projects) remained fixed at $1 billion.

There are two ways in which corporate management can think of the interest tax shields. In the example above, we treated the interest tax shields as a standalone project. This method uses the APV (adjusted present value). The alternative method to calculate the interest tax shields is to use the WACC (weighted average cost of capital). The WACC approach captures the value of the tax shields by using the after-tax cost of debt in the WACC equation. By accounting for the after-tax cost of debt, the WACC is less than the unlevered cost of capital. The WACC also assumes that the leverage ratio for the firm stays constant, as discussed in the *Tradeoff Theory of Capital Structure* lecture note. Using the WACC, the balance sheet of LEVER is:

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LEVER (WACC)

Assets-in-Place	1,064	Debt	300
		Equity	764
Total	1,064	Total	1,064

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Thus, there is an explicit interaction between the financing and investment decision. The $1.064 billion value of LEVER in the WACC method versus $1.075 billion in the APV method is due to differences in the expected amount of debt outstanding through time, and due to differences in the discount rate used to value the tax shields. While it is fine to think of the WACC as the overall cost of capital for the firm, it is not a useful metric to use for valuing a project which would either alter the capital structure of the firm or would have different risk than the overall risk of the firm.

According to Proposition II of Modigliani and Miller, leverage increases the risk to equity, as leverage exacerbates the volatility of the residual cash flows to equity holders (due to the fixed payments to debtholders). Thus, bankruptcy is more likely to occur as leverage increases. A highly levered firm has a higher chance of financial distress and eventual bankruptcy than a firm with minimal leverage. In a world with perfect capital markets, financial distress is not costly, as the equity holders can turn the keys over to the bondholders with no disruption in the overall operation of the firm. It is an entirely different story in the real world, however. Financial distress can be quite costly, resulting in steep losses to the business due to the loss of customers, vendors, employees, etc. In the real world, financial distress impairs the value of the operating assets of the corporation.

Conceptually, we can think of the value of financial distress as an asset or separate project, albeit with a negative sign. As with any project, one computes the expected cash flows on a timeline and discounts the cash flows accordingly. Suppose that in the case of LEVER, the present value of financial distress is equal to -$25 million. In this case, the market-value balance sheet is:

LEVER (APV with PVFD)

Assets-in-Place	975	Debt	300
Tax Shield	75	Equity	750
Total	1,050	Total	1,050

As shown above, the PVFD is included in the value of the operating assets since the expected cash flows from the operating assets are lower once the possibility of financial distress exists and is factored in.[1] As described above, the trade-off theory of capital structure weighs the benefit of debt financing in shielding cash flows from taxes against the cost of direct and indirect financial distress.

Eq. 1 $V_{LEVER} = V_{ALLEQUITY} + PVTS - PVFD$

The trade-off theory suggests there is an optimal capital structure for each firm, and management therefore dynamically or at least periodically adjusts the capital structure toward the optimal level. Stated differently, if the incremental cash flows from increasing leverage, accounting for both tax shields and financial distress costs, are positive, the CFO should increase the leverage ratio. And if the incremental cash flows from additional leverage are negative, the CFO should issue new equity and/or retire debt.

Distinguishing financial distress from economic distress is important.[2] For example, an all-equity firm can realize economic distress due to poor operating margins and may be forced to exit the business and shut down. Consider BlackBerry LTD, which invented the smartphone. In 2008, Blackberry reached an equity market capitalization of nearly $80 billion, had zero debt, and strong cash flows. Blackberry's market capitalization subsequently dropped to less than $3 billion, and revenues plummeted from nearly $20 billion in 2011 to less than $1 billion in 2023. BlackBerry became economically distressed due to not making a profit in the past eight years. But it was not financially distressed during much of that time since it didn't have leverage until recently. Its demise was due in large part to the subsequent innovation of Apple's iPhone.

In contrast, financial distress occurs when a leveraged firm is forced to recapitalize due to its over levered capital structure; apart from that, its operating margins may be more than sufficient to continue as a viable firm. In other words, when financial distress occurs, the firm's operating performance will be lower than the operating performance of firms without leverage. The present value of financial distress can be viewed as the cost of leverage. That is, the incremental possibility of the firm experiencing financial distress imposes a reduction in the value of the firm's operating assets. The recognition of financial

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[1] Alternatively, the balance sheet could display the assets-in-place as $1 billion, assuming no debt financing. In addition, it would include the present value of financial distress at -$25 million as a separate line item, as well as the $75 million of tax shields.

[2] See the influential work by Andrade, Gregor and Steven Kaplan, "How Costly is Financial (not Economic) Distress? Evidence From Highly Leveraged Transactions That Became Distressed," *Journal of Finance* (October 1998).

distress costs results in the trade-off theory; the tax shields are quite valuable but must be weighed against the expected value of financial distress, and the resulting destruction of value on the left-hand side of the balance sheet.

AGENCY COSTS OF ISSUING EQUITY

Does management always act on behalf of the shareholders of the firm? In the case of a sole proprietorship, this assumption isn't an issue since a single person owns 100% of the firm. Even if the manager-owner intentionally engages in actions which do not maximize the value of the firm, she is doing so on her own behalf to maximize utility. That is, if the owner-manager chooses to put unqualified friends and family on the payroll, she incurs the full costs of these actions.

The separation of ownership (shareholders) and managerial control in a firm often results in conflicts between owners and management. Beginning with Jensen and Meckling (1976), academics and practitioners have referred to these potential conflicts as agency problems, or agency costs.[3] Specifically, shareholders, e.g., principals, hire managers, e.g., agents, to act on their behalf. But since managers don't bear the full costs of their actions, they may be inclined to put their personal interests ahead of the interests of shareholders. These personal interests can range from perquisites on the job to reducing overall work effort.

As part of a broad theory of the firm, Jensen and Meckling showed that as the owner-manager sells shares in the firm, he or she will bear the expected agency costs. New shareholders who are rational will assume some amount of agency costs and likely will expend resources to monitor the manager, but it is the owner-manager who will be the residual claimant and largely bear the brunt of the agency costs. Indeed, the manager will take various actions to bond himself not to engage in agency costs, but these bonding actions are not free. And as the firm continues to sell more and more shares to diffuse shareholders, the agency costs will increase, and thus the bonding and monitoring efforts will also increase to offset. These bonding and monitoring efforts include audits, establishing budgets and control systems, creating independent boards, setting up shareholder-based compensation systems, etc.[4] It is important to note that while these monitoring efforts are costly to implement, they are not without their flaws and even associated auditing costs. For example, the internal auditor and external auditor may

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[3] Jensen, Michael, and William Meckling, "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure," *Journal of Financial Economics*, 1976. This paper is one of the most cited papers in all of economics and finance and will likely earn Michael Jensen (Meckling is deceased) a Nobel Prize in Economics in the near future. Jensen was a Ph.D. student at Chicago Booth during the late 1960s and subsequently spent his academic career at Rochester and at HBS. See "Masters of Finance: Michael Jensen" on *YouTube* for his discussion on the Jensen and Meckling paper. See especially minutes 9:52-25:15 of the 29:47-minute presentation where Jensen describes the negative reaction the paper received initially in academia.

[4] In a subsequent influential response to Jensen and Meckling, Fama argued that the managerial labor market serves to mitigate some of the agency problems for firms with managers whom are not the owners. Specifically, if a manager chooses to maximize non-pecuniary attributes on the job and otherwise not maximize shareholder value, the labor market will penalize the manager when she seeks her next job. See Fama, Eugene, "Agency Problems and the Theory of the Firm," *Journal of Political Economy* (1980).

overspend on auditing budgets and oversight, and often cause considerable friction with various business units during the auditing process. Seemingly independent board members, while perhaps free of specific conflicts, often have their own agendas other than of maximizing shareholder wealth.

Before the seminal work by Jensen and Meckling, the academic literature largely ignored agency costs. And indeed, the initial response to Jensen and Meckling's work was negative when they presented their paper, as it upset the status quo in a significant way. Since the publication of the Jensen and Meckling paper, the agency cost theory literature has exploded, and it continues to be a vibrant area of academic research and practitioner research, extending well beyond corporate finance where it originated. In effect, its influence has been to force the world of profit maximization described in textbooks to be more adaptable and in line with the real world, where sometimes managers lie, steal, and cheat.

Jensen and Meckling suggest that one route to avoid the agency costs associated with issuing equity is for the owner to raise all external funds via debt. Indeed, they proposed the leveraged buyout (or LBO) years before the LBO structure became part of many U.S. corporations.

CREDIT AGREEMENTS AND DEBT INDENTURES

There are two primary forms of debt financing: bank loans and debentures. A bank loan is a private agreement between the corporation and the lender, traditionally a bank or syndicate of banks, although lenders have extended loans to many non-banks in recent years. A bank loan avoids various costs of registration. On the other hand, it is generally illiquid since it is not publicly traded on a listed exchange. Bank loans typically take one of two forms: either a term loan with a stated maturity, or a revolving line of credit, which is like a credit card for an individual. Jumbo bank loans tend to be syndicated to multiple lenders, with the lead bank arranging the loan and serving as the underwriter. As bank loans are private contracts between the borrowers and lenders, they can be made to fit any situation. They usually have restrictive covenants, some of which are occasionally broken and thus the borrower is required to cure via additional cash payments, pledging additional assets, etc. These loans tend to be shorter in term than traditional public bonds and are most often secured by specific assets. By having security on various assets, the lender has substantive leverage over the borrower, as it can take steps to seize the secured assets in case the borrower defaults.

Publicly-traded bonds or debentures are debt securities issued by large corporations. Like an equity issue, a corporate bond will have a prospectus, or offering memorandum, which spells out many of the details of the security issue. But the governance of a debt security is far different from the governance of an equity security, a point which tends not to be explicitly made in corporate finance textbooks (but is explicitly made in corporate law textbooks). In the case of equity, the shareholders elect a board of directors to monitor management on their behalf. The board of directors is charged with hiring and replacing management, setting the compensation for management, approving significant managerial decisions, etc., all on behalf of the shareholders. With public debentures, there is no board which acts on behalf of the holders. Rather there is an indenture, a formal contract between the company and the bond trustee which serves to protect the interests of the bondholders.

While an indenture will name a trustee, typically a bank, for the indenture to represent the bondholders, trustees rarely exert any power unilaterally. Instead, if bondholders have a concern with various issues as they pertain to their bonds, the bondholders will direct the trustee to take specific actions. Generally, before the trustee agrees to take any steps on behalf of the bondholders, the bondholders must first agree to indemnify the trustee against a negative response from the issuer or other party which threatens the value of the bondholders' rights to receive their payments.

In 1939, Congress passed the Trust Indenture Act (TIA) to protect bondholder rights. It specifically ensures that minority bondholders are not coerced into giving up their rights to payment. One influential paragraph from the TIA, Section 316(b), is often copied word for word into various bond indentures just to make it crystal clear as to the rights of the bondholders -- specifically, the rights of minority bondholders from the actions of the majority bondholders, often acting in conjunction with the company. Section 316(b) states:

> ***"Notwithstanding any other provision of the indenture to be qualified, the right of any holder of any indenture security to receive payment of the principal of and interest on any such indenture security, on or after the respective due dates expressed in such indenture security, or to institute suit for the enforcement of any such payment on or after such respective dates, shall not be impaired or affected without the consent of such holder...."***

While bond indentures provide specific restrictions of various actions by managers via covenants, which address asset sales, dividends, share repurchases, mergers, and other events which could negatively hamper the bondholders' ability to be repaid, disputes arise quite frequently, particularly when the firm is in financial distress. Indeed, while stockholders, especially minority stockholders, can rely on a board of directors to protect their economic interest, bondholders are often forced to take legal action against management in disputes over major decisions which impair the value of the securities held by debtholders. And in some cases, disputes can set management against bondholders. In addition, management and majority bondholders could agree to the stripping of covenants, etc. from the indenture, which could benefit management and majority stockholders, who may hold other securities of the issuer, but impair the ability of the minority bondholders to receive payment.

OPTIONS AND CAPITAL STRUCTURE

An option is a contract which gives the buyer the right to buy or sell an underlying asset at a specified strike price on or before a set date. The seller must sell or buy the underlying asset if the buyer chooses to exercise the option. Interestingly, we can view the capital structure of a corporation as options on the

assets of the corporation.[5] Consider Hewlett Packard Enterprise, whose capital structure consists of $12.9 billion of debt and $21.3 billion of equity as of July 2023. Shareholders of Hewlett Packard have limited liability. That is, if Hewlett Packard fails to repay its interest and principal on the debt, the debtholders have no rights to go after other assets owned by the shareholders. In other words, shareholders of a publicly-traded corporation don't sign personal guarantees to obtain debt financing for the corporation. By having the option to default, and in effect give the keys of the company to the debtholders, the shareholders own a call option on the assets of the corporation.

Figure 1 illustrates the concept of equity as a call option on the assets of a corporation, using Hewlett Packard as an example. For simplicity, assume that all of Hewlett Packard's debt will mature soon. The horizontal axis reflects the total enterprise value of Hewlett Packard, and the vertical axis represents the asset and equity value of Hewlett Packard at the time of the debt maturity. If the value of Hewlett Packard is $12.9 billion or less when the debt matures, the management team will file Chapter 11 and turn the keys over to the debtholders, leaving shareholders with zero value. And if the value of Hewlett Packard exceeds $12.9 billion, the management team will refinance the debt, and the shareholders will have a value equivalent to the difference between the firm value and the $12.9 billion of debt. That is, the strike price on the assets of the corporation is equal to the $12.9 billion of the total debt. As shown, this payoff diagram to equity looks just like the payoff diagram of a call option, hence the logic of shareholder equity as a call option on the assets of the firm.

Figure 1

Hewlett Packard Asset Value
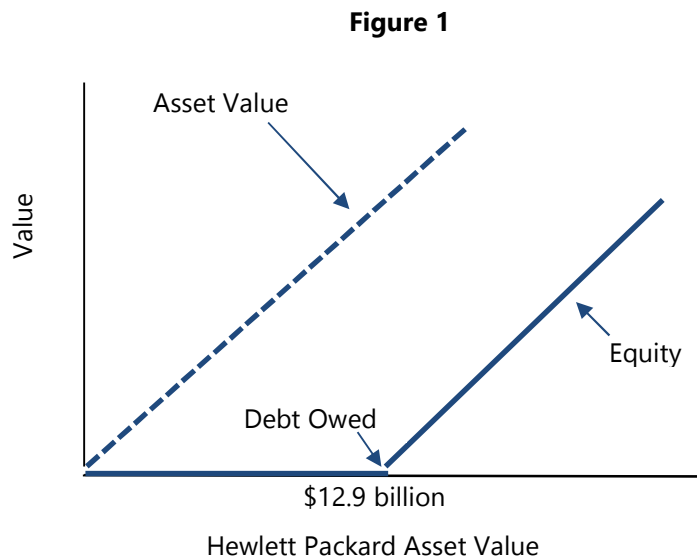
From the perspective of the debtholders, we can think of the debtholders as owning the corporation and selling a call option on the firm's assets to the shareholders. If the value of Hewlett Packard exceeds the

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[5] The notion of viewing the capital structure of a corporation as options of the assets of the corporation originated with the famous Black and Scholes (1973) and Merton (1974) papers, particularly the latter where Merton produced a structural model where corporate debt is a risk-free bond minus a put option written on the corporation's assets where the face value of the debt is the strike price. See Black, Fischer and Myron Scholes, "The Pricing of Options and Corporate Liabilities," *Journal of Political Economy* (1973) and Merton, Robert, "On the Pricing of Corporate Debt: The Risk Structure of Interest Rates," *Journal of Finance* (1974).

$12.9 billion of the total debt on the maturity date, then the shareholders will exercise their call option on the assets of Hewlett Packard, and thus require the debtholders to give up ownership of the firm. And if the value of Hewlett Packard is less than the $12.9 billion strike price, the calls held by the shareholder expire (and are thus worthless), management declares bankruptcy, and the debtholders take control of the assets. Figure 2 displays this payoff from the viewpoint of the Hewlett Packard debtholders.

Figure 2

Hewlett Packard Asset Value
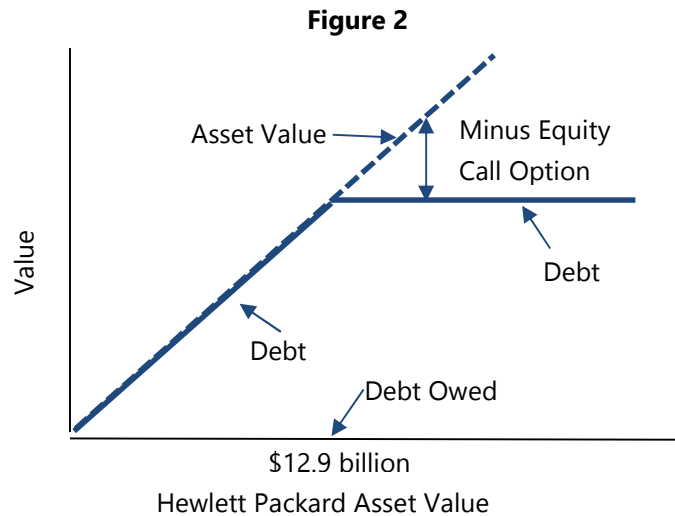
There is an alternative way to think about the claims held by the debtholders. Recall the put-call parity relationship:

Eq. 2   Call + PV (Strike Price of Option) = Put + Stock

Since a portfolio consisting of a stock and a put yields the same payoff as a portfolio consisting of a call and the present value of the option's strike price, the two portfolios must have the same value.[6] In the context of the corporation, we can rewrite Eq. 2 as:

Eq. 3   Call + PV (Face Value of Debt) = Put + Asset Value

Thus, all we are doing with the familiar put-call parity equation as in Eq. 2 is to replace the strike price of the option with the face value of the debt and replace the stock value with the asset value of the corporation. And as we discussed above, the debtholders own the assets and have sold a call option on the assets to the shareholders:
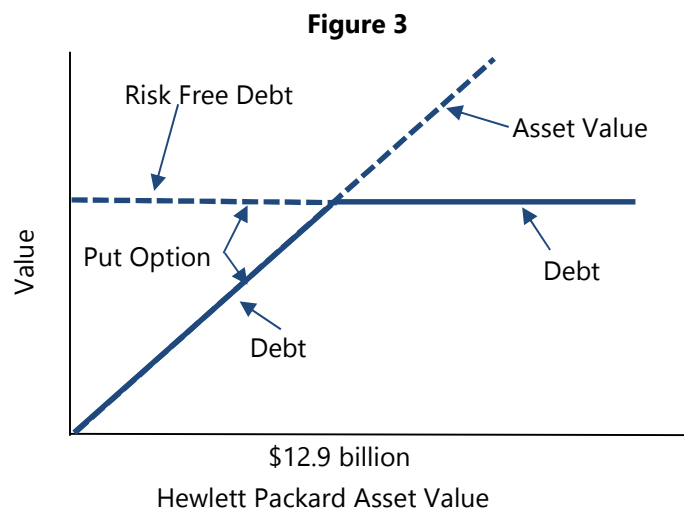
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[6] Hans Stoll, former Ph.D. student at Chicago Booth was the first academic to describe put-call parity in the era of modern finance. Stoll, Hans, "The Relationship Between Put and Call Option Prices, *Journal of Finance* (December 1969).

Eq. 4   Debtholder Value = Asset Value – Call

Given put-call parity, it therefore holds that:

Eq.5   Debtholder Value = PV(Face Value of Debt) – Put

That is, due to put-call parity, the debtholder value is equal to the present value of the face value of the
debt, minus a put option which gives the shareholders the right to "put" the assets back to the
debtholders and default. Put differently, debtholders own a risk-free bond and are short a put option, with
a strike price equal to the face value of the debt. Thus, when a firm files bankruptcy, the shareholders
exercise their rights to put the assets of the firm back to the debtholders. As mentioned above,
shareholders of corporations have limited liability and thus can turn the keys over to the debtholders
without recourse. Figure 3 displays this payoff to the debtholders below:

Figure 3

Value

Risk Free Debt

Asset Value

Put Option

Debt

Debt

$12.9 billion
Hewlett Packard Asset Value

As shown, Figure 3 displays the identical payoff to the debtholders as in Figure 2; only the interpretation is
different. While in Figure 2, the debtholders have sold the upside of the corporation to the equity holders,
Figure 3 characterizes the transaction as the debtholders owning a risk-free bond, while selling a put
option to the equity holders. Indeed, a debtholder could purchase a put option and therefore insulate
itself from credit risk. This type of put option is referred to as a credit default swap, for which the holder
pays a periodic premium and would receive a substantial payment from the seller if the firm were to
default.

THE AGENCY COST OF LEVERAGE: MAXIMIZE FIRM VALUE OR SHAREHOLDER WEALTH?

In the *Tradeoff Theory of Capital Structure* lecture note, the entire value created by the increase in
leverage due to the interest-tax shields accrued solely to the shareholders. That is, the existing
bondholders and new bondholders do not participate in the +NPV generated by the leveraged

recapitalization. Thus, the maximization of shareholder wealth is consistent with maximizing firm value, and if the existing debt is risk-free, then the change in shareholder wealth is equivalent to the change in firm value. Consider LEVER's market-value balance sheet below.

LEVER MARKET-VALUE BALANCE SHEET

Cash	20	Debt	25
Assets-In-Place	120	Equity	115
Total Assets	140	Total Debt & Equity	140

Suppose LEVER considers a new project called PROJECT which requires an investment of 10 and has a +NPV of 5. Given the NPV is positive, management will proceed with PROJECT and use some of its existing cash for financing. As shown below, the entire NPV of 5 accrues to the shareholders. Likewise, LEVER can finance PROJECT via a new debt issue or a new equity issue of 10; in both cases, the NPV of 5 will still accrue to the current shareholders.

LEVER MARKET-VALUE BALANCE SHEET (WITH PROJECT)

Cash	10	Debt	25
Assets-In-Place	120	Equity	120
Project	15		
Total Assets	145	Total Liabilities & Equity	145

Even when debt is risky, shareholder wealth maximization is often consistent with maximizing firm value, But the shareholders and debtholders share the benefits or costs associated with an investment or transaction. In the example above, if the debt is risky, then the benefits of PROJECT's +NPV can accrue not only to the shareholders but also to the debtholders, though the bulk of the value increase will accrue to the shareholders, since the leverage ratio of LEVER is modest. When debt is risky, debtholders can benefit from +NPV projects, as the value creation for the firm can reduce the credit spread for the debt, due to a reduction in the probability of subsequent bankruptcy.

When a firm is near or in financial distress, the incentives between debtholders and shareholders tend to quickly diverge. If this occurs, management may take actions which benefit shareholders at the expense of the bondholders. Suppose that LEVER's market-value balance sheet is:

LEVER MARKET-VALUE BALANCE SHEET (IN FINANCIAL DISTRESS)

Cash	30	Debt	60
Assets-In-Place	50	Equity	20
Total Assets	80	Total Liabilities & Equity	80

While LEVER's market value of debt is 60, the face value (or book value) of LEVER's debt is 120 and matures in one year. Thus, LEVER is in financial distress since the market value of its debt is trading at half the face value. Suppose that instead of having one year left until maturity, LEVER's debt matures tomorrow. Assuming no transactions costs associating with liquidating the firm, the debt will be worth close to 80 and the equity is at zero. In both cases, the debt is underwater. The market value of LEVER is the same, but the debt and equity values are quite different in the two scenarios (with one day to maturity versus one year to maturity). This example illustrates the logic of equity as a call option on the assets of the firm, and the influence of volatility on the value of the option. Given the strike price of the option is 120, the asset value is only 80, and with only one day before expiration, the option has roughly zero value. But with one year to go, there is a higher probability of LEVER realizing positive outcomes, and thus the equity has option value of 20.[7] And since the debtholders are counterparties to the equity option of 20, the market value of the debt is 20 less than the debt's face value.

To better illustrate the conflict between the debtholders and the equity holders of LEVER, assume management has two mutually exclusive investment projects, LOW and HIGH, shown below. Assume that the assets-in-place are low risk and will yield future payments in one year which are not very different from the current value of 50. To simplify, assume that both the LOW and HIGH projects are undertaken in two possible states of the world, good and bad.
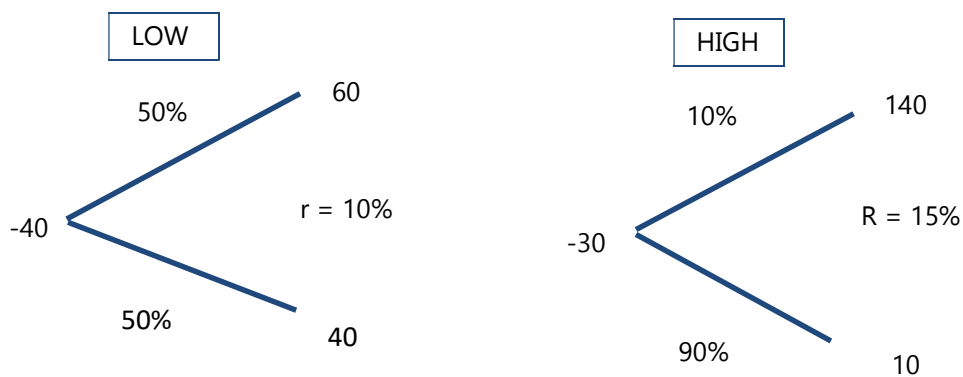
LOW requires an upfront investment of 40 and will either pay off 60 or 40, with 50% probability each in one year, coinciding with the maturity of LEVER's debt. If we assume a cost of capital of 10% for LOW, the NPV is +5.45:

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[7] While the numerical estimates above are intuitive, they are made up rather than generated from a structural model. Alternatively, if you know the market value of equity, the expected volatility of equity, the face amount of debt outstanding, and the maturity date on the debt, you can use a Merton structural model to calculate the asset volatility, market value of the debt, and the credit spread on the debt. However, this model involves a lot of complexities and is beyond the scope of this course. Moreover, the Merton model does a less than stellar job at pricing corporate securities. But it is still a seminal contribution to corporate finance. However, the substantive point in the discussion above is that the equity value of the distressed firm is far greater, the further off the maturity date of the debt is.

$$NPV = +\ 5.45 = -\ 40 + \frac{\left[60\ \times\ 0.50 + 40\ \times\ 0.50\right]}{1.10}$$

Given LOW has +NPV, the recommendation would be for management to invest in LOW. However, given LEVER is in financial distress, it is unlikely that it will be able to raise debt to finance LOW. As a result, it must issue new equity of 10 to supplement the cash position of 30 to invest 40. The problem is that equity investors will refuse to invest in LEVER to partially finance this +NPV project, as the funds will be used to pay off the debtholders in one year when the debt matures (unless the assets-in-place has a huge upside outcome). For example, if the assets-in place ends up at 55 in one year, the firm will be worth either 95 or 115 (that is, 55 + 40 or 55 + 60) and in both cases, the debtholders end up with the entire amount. Meanwhile, the original equity of 20 plus the new equity of 10, drops to a zero value. This phenomenon is referred to as the *underinvestment problem* for firms in financial distress. It was originally formulated by Myers (1977).[8]

Assume HIGH has a cost of capital of 15%. HIGH has a NPV of -10, that is:

$$NPV = -\ 10 = -\ 30 + \frac{\left[140\ \times\ 0.10 + 10\ \times\ 0.90\right]}{1.15}$$

Thus, the HIGH project has negative NPV and high volatility. If the good state of the world occurs with the investment in HIGH, the payoff is 140 and there are sufficient funds to pay off LEVER's debt, with substantial value left over for the equity holders. In the bad state of the world, equity receives zero and debt recovers far less than its face value. But the equity holders would have also received no payoff if management had opted for the LOW project. And likewise, shareholders would have received no payoff had management passed on both projects and simply liquidated the cash and assets-in-place when the debt matured.

Table 1 displays the payoffs to debt and equity at maturity for the debt in the above analysis. The payoffs are displayed if Project LOW is accepted, Project HIGH is accepted, or if management passes on both projects. We assume the assets-in-place are worth 55 when the debt matures. And if management passes on both projects, the excess cash earns a return of zero. These payoffs illustrate how shareholders benefit from risk-increasing decisions when the firm is in financial distress. In this example, the only chance for shareholders to receive any distribution is for management to roll the dice.

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[8] Myers, Stewart, "Determinants of Corporate Borrowing," *Journal of Financial Economics*, 1977.

Table 1: Payoffs at Debt Maturity

	Debt	Equity
LOW — 60	115	0
LOW — 40	105	0
HIGH — 140	120	75
HIGH — 10	65	0
PASS	85	0

In treating debt and equity as options on a portfolio of assets, it is logical that management, acting on behalf of equity holders, acts to move forward with a wealth-destroying project for the corporation, but one that is wealth increasing for the shareholders who wish to maximize the value of their call option (and thus prefer the higher volatility project even if it is expected to generate a loss). This issue is often referred to as the asset substitution dilemma and was introduced in Jensen and Meckling's seminal work discussed in the beginning of this lecture note.

BEYOND FINANCE THEORY: AGENCY COSTS IN THE REAL WORLD

In the absence of agency costs, there is no need for auditors, independent board members, incentive compensation plans, lengthy loan contracts and indentures, proxy battles, activist investors, etc. A huge amount of time and effort is spent in attempting to contain, monitor and curtail agency costs in corporations on all levels. In my experience, it seems that most of the time and energy at high management levels of large corporations go into monitoring and bonding with respect to agency costs. And at the board level, especially across board committees focused on risk, human resources, audits, independent corporate governance, etc., the primary focus is often to curtail agency costs.

In reality, agency costs increase rapidly with financial distress. The overly simplified examples of asset substitution and debt overhang discussed above are rampant in actual practice, and perhaps even more extreme. In practice, we have experienced situations of companies while in financial distress paying out large dividends and repurchasing shares to the detriment of the debtholders, and in some cases, aligning the interest between equity holders and certain debt holders, but excluding other debt holders. We have witnessed occurrences of a majority of debtholders agreeing to the removal of various covenants

on a particular debt issue ,which benefitted them via a new secured debt issue which they financed, but which were substantially harmful to the non-participating minority debtholders.

It is important to note that bondholders don't behave passively and simply sit still. In fact, their level of aggressiveness can be rather extreme relative to the shareholder activist saber rattling we often witness. A highly publicized example is Caesars Entertainment, the largest casino operator in the United States. In December 2006, Caesars agreed to a leveraged buyout by Apollo and TPG, two large and well-known private-equity firms. Caesars was one of the largest buyouts in corporate history. By the time the deal formally closed in January 2008, the economy was in a downturn and headed for a financial crisis. Due to its heavy debt burden, management of Caesars embarked on numerous financial and asset restructuring programs to survive. The asset restructuring programs included transferring some of the best casino properties to other entities that they owned. The debtholders, led by Elliott Management, Appaloosa Management, and Oaktree Capital, did not take the asset transfers lightly. They sued Caesars and the private equity sponsors for fraudulent convenance. It ended up becoming one of the nastiest corporate brawls in history, involving some of the largest Wall Street players on both sides. The entire impetus for the war between the equity holders and the debtholders of Caesars was due to the divergence of incentives caused by the financial distress and ultimately, the inability of Caesars to meet its debt obligations.