CHAPTER 1

FROM FINANCIAL STRUCTURE TO FINANCIAL DISTRESS

1.1. THE FINANCIAL STRUCTURE: THE SOURCES OF FUNDING

Financial structure refers to the combination of debt and equity that a company uses to finance its operations. It is the structure of the company's finances. To finance its assets, a firm can raise funds in order to obtain the necessary capital borrowing from investors or financial institutions and promising them a fixed claim (interest payments) on the revenues generated by the assets (Damodaran, 2015). The creditors or lenders have a limited (or no) role in the day-to-day management of the business. This type of financing is categorized as debt. This financial instrument has a predetermined amount, temporal distribution and may have some guarantees on the expected economic return. Alternatively, the company could offer a residual claim on the cash flows, which means that investors might get a fraction of future profits once that interests to lenders are paid. The financial instruments held by shareholders represent some portion of ownership (Brealey, Myers, & Allen, 2018), so they have a much greater role in the operation of the business. This type of financing is called equity. Equity does not contractually guarantee certain revenue and is subordinated to the reimbursement of debt, however, it allows for greater returns because of the risk involved.

The distinction between debt and equity lies in the nature of the claims on the firm's cash flows (Damodaran, 2001). The first distinctive feature is that a debt claim entitles the lenders to a contractualised set of cash flows, whereas an equity claim entitles the shareholder to any cash flows possibly left over after all the other claims have been met. Another distinction lies with the tax code and the legal framework in which the company operates: in case of liquidation, debt has a prior claim on both cash flows and the firm's assets. Furthermore, debt is more advantageous than equity because interest expenses are tax deductible and create tax savings. Another difference concerns the maturity date, that is fixed for debt while for equity it is undetermined.

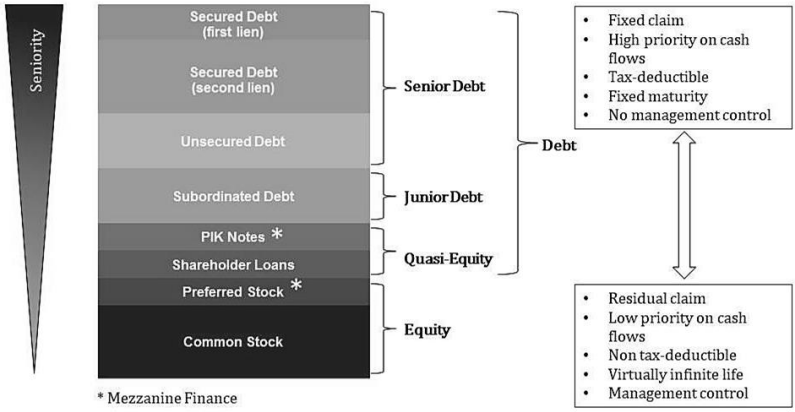
One last distinction regards the merit of the claim held by equity investors, who have complete control over the firm's management while, on the other hand, debt investors play a passive role in management, even though through the covenants in loan agreements they may exercise veto power over significant financial decisions.

The distinction between debt and equity is not always clear, as there are forms of intermediate capital represented by "hybrid financial instruments" which share some characteristics of debt and some of equity. Mezzanine financing refers to a group of financial instruments that features two components: subordinated debt, that provides a remuneration scheme similar to the reimbursement of debt capital and an equity kicker that links the instrument to the economic performance of the company and allows benefiting from extra-revenues (Forestieri & Tasca, 1994). The two components can be incorporated into one instrument that could be an equity or a debt instrument: convertible subordinated bonds or preferred stocks. These forms of financing play a crucial role in corporate restructuring.

Investors make their transactions with the expectation of a financial return (Damodaran, 2001). The expected return for equity investors will include a premium for the equity risk of the investment. This expected return is named "cost of equity". Likewise, the return expected by lenders includes a premium for the default risk, labelled "cost of debt". When all the forms of financing are considered, the cost of financing is a weighted average of the cost of equity and debt, i.e., "the cost of capital".

Many models have been developed to identify the specific benefits and costs of using debt (i.e., the tax effects and the costs of financial distress) and equity, however, the greatest contribution has been by the trade-off theory by Modigliani-Miller and their followers. A company decides on the amount of debt and equity that should finance its investments by balancing the relevant costs and benefits. Over the last 10-15 years, the proportion of debt to equity (D/E, the so-called "leverage") has been significantly increasing, especially in companies subject to takeovers by institutional investors, like investment funds.

FIGURE 1. Main categories of debt



1.1.1. Shareholder equity: characteristics and structure

Equity is represented by all the shares of the risk capital of a company: it is what remains of the assets once liabilities have been subtracted (Annibaletti, 2014). It is the most junior class of financing in terms of seniority: in case of bankruptcy, all the capital invested in the company is lost, if the assets are not sufficient to cover all creditors. An equity investment is a direct participation in the business risk.

This risk is reflected in the return expected by shareholders and, therefore, in the cost of this type of financing. There are two types of risk: income risk (when capital remuneration may be insufficient or even missing) and capital risk (management can cause economic imbalances and, consequently, lead to the erosion of the shareholders' contribution).

Shares can be classified into 2 main categories:

1. *Common shares* (or ordinary shares). The main rights that ordinary shares attribute to the holder relate to: participation in the distribution of net profits of the period, participation in the subdivision of the net capital resulting from the liquidation of the company, participation and voting in ordinary and extraordinary shareholders' meetings, the right to participate to capital increases against payment, free assignment of shares in proportion to those held following the capitalization of reserves, examination of the financial statement documentation.

2. *Preference shares* (or preferred stocks), that represent a mezzanine financing because they incorporate some of the characteristics of debt and some of the equity (Damodaran, 2001). Similarly with debt, they require a fixed payment however, if the firm has no cash to pay, the dividends are cumulated and later paid when there will be sufficient earnings. Like debt, these instruments do not confer any form of control and voting privileges are restricted. Instead, as with equity, payments to preferred stock do not have a maturity date and are not tax deductible. In terms of seniority in case of liquidation, preferred stockholders are paid after debt holders' claims.

1.1.2. Financial debt: characteristics and structure

Debt is another form of financing made available to the company by third parties that provide money in the form of credit.

The lenders, in this case, do not participate in the business risk and obtain periodic returns, even if typically, lower than the equity. Moreover, they do not have the right to directly influence the choices of the company through voting in the assembly.

It represents a very versatile form of financing, as it is more modular than equity: in fact, there are many types based on the frequency of payments, entities, hybridization with other instruments, risk, etc.

Debt is the most convenient form of capital for two reasons. Firstly, debtors are privileged over shareholders, if the company goes bankrupt. For this reason, debt, being "safer" than shares, guarantees a lower return to the investors and, at the same time, a lower interest rate compared to the profitability expected by the shareholders. Secondly, because of financial charges that are tax deductible, as opposed to dividends.

Debt can be divided into 5 main categories (Ranciaro, 2015) according to the degree of seniority:

1. *Secured debt* is a debt backed by some sort of security, which will be used to repay first lien creditors before and second lien creditors thereafter (and to the extent that first lien creditors are satisfied). Securities can be either in the form of assets, cash collateral or other sorts of guarantees. It includes mortgage loans and credit lines backed by a guarantee.
2. *Unsecured debt* is a senior debt not assisted by any form of security and includes all non-mortgage loans, overdrafts, unsecured credit lines, non-convertible bonds (except for those classified as high-yield).

3. *Subordinated debt* ("junior debt") is a debt with lower seniority and includes mezzanine debt (particular debt structures, often hybrids of different instruments, exploited to have more flexibility in the financial structure against a higher cost). Convertible bonds are the subordinated debt, as well as high-yield bonds and bonds linked to operations of securitization (CDO[1], ABS[2], etc.). In particular, a convertible bond can be converted into a predetermined number of common stocks at the discretion of the bondholder. Usually, the conversion clause is aimed at reducing the interest payable on the bonds.

4. *PIK notes* ("payments in kind") are subordinated unsecured obligations without guarantees and represent a form of a hybrid instrument (Newman, 2005). Rather than receiving a coupon, investors receive more bonds at the interest payment date. The principal due for repayment accrues at the interest rate. The company has the option to pay the coupon in cash. This decision will depend on alternative investment opportunities that the op.co. (operating company) can make as well as any restrictive covenant and distributable reserves constraints. PIKs can be seen as a cheap form of equity. They are also 'cheap debt' as there is no cash payment.

5. *Shareholders loans* are very similar to capital injections, also because sometimes they are non-interest bearing, in fact, they are included in the mezzanine financing. They are the most common form of quasi-equity. In LBOs[3] they are used to reduce the equity component of the acquisition. It is the most junior debt of the company's debt structure.

The main categories of entities that issue debt instruments are banks, non-financial (listed and unlisted) companies and other financial intermediaries such as SPVs (special purpose vehicles) that issue debt securities pursuant to a securitization (Banfi, Nadotti, Tagliavini, & Valletta, 2016).

[1] Collateral debt obligations (CDO) are defined by the IMF as a structured credit security backed by a pool of securities, loans, or credit default swaps (CDS), where interests in the security are divided into tranches with different repayment and interest earning streams (IMF, 2008).

[2] Asset-backed securities (ABS) are defined by the IMF as securities collateralized by the cash flows from a pool of underlying assets, such as loans, leases, or receivables. Often, when the cash flows are collateralized by real estate, an ABS is called mortgage-backed securities (IMF, 2008).

[3] Leveraged buy-out, as defined by Kaplan and Strömberg in the paper "Leveraged buyouts and private equity" (2008), is a process where a company is acquired by a special investment firm using a small portion of equity and a relatively large portion of debt. The LBO investment firms refer to a private equity firm. In an LBO transaction the private equity firm buys majority control of an existing mature firm. This arrangement is distinct from venture capital firms that typically invest in start-ups or emerging companies, and usually do not obtain majority control.

Financial managers have the possibility to access a vast choice of forms of debt, in fact – beyond the aforementioned classification of debt based on the degree of seniority of the right to reimbursement – they can choose between the following types of debt according to the specific needs of the business:

1. *Short-term or long-term debt.*

If the company only needs to finance a temporary increase in stocks to prepare for a particular season, then it may be advisable to contract a short-term bank loan, supposing that financial resources are needed to pay for an expansion project for an oil refinery. The equipment of a refinery can operate more or less continuously for 15 or 20 years. In this case, it is more appropriate to issue a long-term bond.

2. *Amortizing vs bullet or balloon.*

An amortizing loan (or amortized loan) is one with scheduled regular payments of both principal and interest. The principal of a loan is the amount the borrower borrowed originally. The interest, on the other hand, is what the lender adds on top. The principal balance of the amortizing bond is reduced with each payment such that it becomes zero at maturity. A bullet bond (or loan) is a bond (or loan) that pays interest through periodic payments and the principal amount at maturity through a single payment. As far as the lender is concerned, an amortizing loan is less risky. With loans where the borrower pays the principal at the end, the lender has longer credit risk. The lender's risk in such cases is for the full principal during most of the term. By paying off the principal over time, the risk is lower for the lender. A balloon payment is a large payment due at the end of a balloon loan, such as a mortgage, a commercial loan, or another type of amortized loan. A balloon loan is typical for a relatively short term, and only a portion of the loan's principal balance is amortized over that period. The remaining balance is due as a final payment at the end of the term. The term "balloon" indicates that the final payment is significantly large. Balloon payments tend to be at least twice the amount of the loan's previous payments.

3. *Fixed or floating rate.*

The interest rate of a bank loan, or the coupon of a bond, is generally set at the time of signing the contract. Fixed interest rate loans are loans in which the interest rate charged on the loan will remain fixed for that loan's entire term, no matter what market interest rates do. This will result in your payments being the same over the entire term. Many bank loans and some bonds include a floating interest rate (the interest rate charged on the outstanding balance varies as market interest rates change). For example, the interest rate in each period can

be set at a level equal to the LIBOR (London Interbank Offered Rate) that represents the rate at which the major international banks lend each other money, plus a spread expressed in percentage points. When the LIBOR changes, the interest rate on the debt will also change, thus payments will vary as well.

4. *Simple or convertible bonds.*

A company may issue securities that give their holders the option to convert them into other securities. These options can have a significant effect on value. A convertible bond gives its holder the option to exchange the bond for a certain number of shares. The holder of a convertible bond usually expects the share price of the issuing company to increase so that he/she can convert the bond and make a substantial gain. Conversely, if the price of the shares decreases, there is no obligation to convert; the holder of the convertible bond will remain a bondholder.

1.1.3. Focus on benefits: the impact of financial debt

Corporations must pay taxes on the income that they earn. Interest payments are considered as costs and are deducted from taxable income; companies pay taxes on their profits after interest payments are deducted, therefore interest expenses reduce the amount of corporate taxes that firms must pay. Interests are paid on a pre-tax income, while dividends of shares are paid on an after-tax income. Governments provide a tax advantage to the use of debt, an advantage that equity does not have.

Debt financing has a very important advantage in the fiscal policy of corporations because interests paid to bondholders are exempt from corporate taxation.

To gain a better understanding of the above, an example formulated by Berk De Marzo (Berk & DeMarzo, 2010) is worth mentioning.

Let us consider the impact of interest expenses on the taxes paid by Macy's, Inc., a retail department store. Macy's had earnings before interest and taxes of approximately USD 2.5 bln in 2012, and interest expenses of about USD 430 mln. Given Macy's marginal corporate tax rate of 35%, the effect of leverage on Macy's earnings is presented in the Table 1.

TABLE 1. Macy's, Inc. – Effect on leverage example

	With leverage	*Without leverage*
EBIT	USD 2,500	USD 2,500
Interest expense	-430	0
Interest before tax	2,070	2,500
Taxes (35%)	-725	-875
Net income	USD 1,345	USD 1,625

As we can see, Macy's net income in 2012 was lower with leverage than it would have been without leverage. Thus, Macy's debt obligations reduced the income available to equity-holders. But more importantly, the total amount available to all investors was higher with leverage:

TABLE 2. Macy's, Inc. – Effect on leverage example

	With leverage	*Without leverage*
Interest paid to debt holders	430	0
Income available to equity holders	1,345	1,625
Total available to all investors	USD 1,775	USD 1,625

With leverage, Macy's was able to pay out USD 1,775 mln in total to its investors, versus only USD 1,625 mln without leverage, representing an increase of USD 150 mln. The additional USD 150 mln come from the reduction in taxes with leverage: *USD 875 mln - USD 725 mln = USD 150 mln*. Because Macy's does not owe taxes on the USD 430 mln of earnings it used to make interest payments, this USD 430 mln is shielded from corporate taxes, providing a fiscal savings of *35% * USD 430 mln = USD 150 mln*. In general, the gain for investors from the tax deductibility of interest payments is called the "interest tax shield". The interest tax shield is the additional amount that a firm would have to pay in taxes if it did not have leverage. The annual interest tax shield can be calculated:

$$\textit{Interest tax shield} = \textit{Corporate tax rate} * \textit{Interest payments} \qquad (1)$$

In order to determine the benefit of leverage proportional to the value of the firm, we must compute the present value of the stream of future interest tax shields (that are calculated annually) that the firm is going to receive.

As shown in the previous example, the cash flows paid to investors are greater than they would be without leverage.

$$CF \text{ to investor with leverage} = CF \text{ to investor without leverage} + \text{Interest tax shield} \quad (2)$$

The firm uses a fraction of the available cash flows to pay taxes and pays the rest to investors. By increasing the amount paid to debt holders through interest payments, the amount of the pre-tax cash flows that must be paid as taxes decreases. The gain in total cash flows to investors is the interest tax shield. This feature of the tax code creates an incentive to use debt.

1.2. THE COST OF FINANCIAL STRUCTURE: THE COST OF CAPITAL

Today, most of the companies estimate the rate of return required by investors for their securities and use this cost of corporate capital to streamline the cash flows of new projects. The cost of corporate capital is the opportunity cost of capital for investments that have the same risk as other business activities. In the case of riskier projects, the opportunity cost of capital is greater than the cost of corporate capital. In the case of less risky projects, it is smaller. The cost of corporate capital is usually calculated as a weighted average cost of capital, or as the average rate of return required by those who invest in the company's bonds and equity securities. We will see later in this paragraph that the cost of corporate capital is equal to the discount rate when projects have the same risk as other business activities. If a project is riskier than the company as a whole, the cost of capital for the project should be adjusted upwards. On the contrary, the cost of capital for a safer project should be corrected downwards.

The most difficult part in estimating the cost of corporate capital concerns the calculation of the rate of return expected by investors who choose to hold shares in the company. The risk-return model that has been in use the longest period and is still the standard in the most real-world analysis is the capital asset pricing model (CAPM). The CAPM establishes that the expected return is equal to the risk-free interest rate plus a premium for the risk that depends on the beta[4] and the market risk premium.

[4] The beta of a security is the expected percentage change in its return given a 1% change in the return of the market portfolio, as defined by Berk and DeMarzo (2010). It measures the systematic risk to market-wide risk factors.

1.2.1. Pricing the financial structure: the capital asset pricing model theory

The CAPM (capital asset pricing model) is a mathematical model of the portfolio theory published in 1964 by Nobel prizewinner William Sharpe, who determines the relationship between the expected return from an asset and its riskiness, measured by a single risk factor, called beta (Hull, 2012). The key assumption is that the risk portion of a security's expected return is a function of that security's market risk. The CAPM requires a number of strong assumptions (Vulpiani, 2014). In particular:

1. Investors only care about the expected return and standard deviation of the return from an asset.
2. The returns from two assets are correlated with each other only because of their correlation with the return from the market. This is equivalent to assuming that there is only one factor driving returns.
3. Investors focus on returns over a single period and that period is the same for all investors.
4. Investors can borrow and lend at the same risk-free rate.
5. Taxes do not influence investment decisions.
6. All investors make the same estimates of expected returns, standard deviations of returns, and correlations between returns.

Because some of these assumptions do not fully describe investors' behavior, some of the model's conclusions are not completely accurate.

Considering a simplified market in which there are no taxes and transaction costs and in which investors have both the same time horizon for investments and the same identical opinions on expected returns and risk, the market portfolio will be the efficient one. In that market the risks related to an investment in a financial asset are limited to the "systematic risk", that is related to the return from the market as a whole (it is an implicit risk in the investment of a specific financial asset and cannot be diversified away), and the "diversifiable risk" or "nonsystematic risk", that is unique to the asset and can be diversified by choosing a large portfolio of different assets. The CAPM argues that the return for individual security, the cost of equity capital, is calculated by adding the equity risk premium to the risk-free rate. The CAPM formula is:

$$Expected\ return = R_F + \beta(R_M - R_F) \quad (3)$$

where R_M is the return on the portfolio of all available investments, R_F is

the return on a risk-free investment, β (the Greek letter beta) is a parameter measuring systematic risk.

The return from the portfolio of all available investments, R_M, is referred to as the return on the market and is usually approximated as the return on a well diversified stock index such as the S&P 500. The beta of an asset is a measure of the sensitivity of its returns to returns from the market. It can be estimated from historical data as the slope obtained when the excess return on the asset over the risk-free rate is regressed against the excess return on the market over the risk-free rate. The beta of security measures its volatility due to market risk relative to the market as a whole, and thus captures the security's sensitivity to market risk. In other words, the CAPM focuses on the systematic risk expressed by the beta; in fact, the cost of equity estimation is a linear function of the security beta. Empirical literature shows that the relationship between beta and cost of equity is flatter than predicted. As a consequence, the CAPM estimates of the cost of equity for high beta stocks are too high and estimates for low beta stocks are too low.

1.2.2. Assessing the financial structure: the Modigliani–Miller theory perspective

Before introducing the cost of corporate capital, it is worth mentioning the Modigliani-Miller theory, which showed that financing decisions are irrelevant in a perfect market (Brealey et al., 2018). Whether the company finances itself by using a combination of debt and equity, or it is financed exclusively through equity, its total value will be the same. In practice the financial structure is relevant; nevertheless, it is important to fully understand the conditions under which the M&M theory is valid, as to understand why a certain financial structure is better than another (Berk & DeMarzo, 2010). The financial manager needs to know which imperfections of the market he/she has to be aware of. The requirements for the model are the conditions for the "perfect capital market": 1) financial markets are perfect, that is, competitive, without friction, taxes and exempt from information asymmetries; 2) the bankruptcy of the company does not involve any real cost of liquidation or any reputational costs for its directors; 3) a firm's financing decisions do not change the cash flows generated by its investments, nor do they reveal new information about them.

The first and the second proposition state that:

1. The market value of any firm is independent of its capital structure and is given by capitalizing its expected return at the rate appropriate to its class or the average cost of capital to any firm is completely independent of its capital structure and is equal to the capitalization rate of a pure equity stream of its class.

2. The expected yield of a share of stock is equal to the appropriate capitalization rate for a pure equity stream in the class, plus a premium related to financial risk equal to the debt to equity ratio times the spread (Modigliani & Miller, 1958).

The first proposition of their theory states that the value of a company is independent of its capital structure, so it implies that the value of an all-equity firm (an unlevered firm) is equal to an all-debt firm (a levered firm). The leverage has no effect on shareholders' wealth (Brealey et al., 2018). Consequently, the financial structure is irrelevant, without prejudice to the company's investment decisions. The second proposition argues that the rate of return that shareholders can expect from their shares increases with the company's debt-to-equity ratio. Can shareholders remain indifferent to the increase in leverage, if this contributes to increasing expected returns? The answer is negative because any increase in expected returns is entirely offset by an increase in risk, indeed a reduction in debt reduces the risk for shareholders and leads to a lower rate of return than the required one. Hence, the proportions of M&M tell us that greater debts increase both the expected returns and the risk of equity. They do not increase shareholder value.

The arguments of M&M hold up if applied to perfect financial markets, but in reality, the markets are imperfect. Market imperfections can put debt-using companies in a position to provide their investors with a valuable service. In this case, the shares of indebted companies could be traded at prices higher than the theoretical values they would have in a perfect market. Supposing companies can contract debts at a lower cost than investors, then investors would agree to contract debts indirectly, holding shares in indebted companies. They would be willing to accept an expected rate of return that does not completely compensate them for the financial and operational risk they run.

The total cost of capital is usually called the cost of corporate capital or the weighted average cost of capital, WACC, which will be discussed in the following paragraph. M&M argues that the WACC does not depend on the financial structure, but this position does not consider several possible complications. The first complication concerns taxes. When the interest on the debt is tax deductible, and we

calculate the WACC after tax, it decreases as the debt ratio increases.

Paradoxically, the theorem of the irrelevance of M&M, although obtained in a rather aseptic theoretical context characterized by hypotheses such as the absence of taxes and perfection of the capital market, seems almost provocative as it contradicts the behavior practices of most companies in financial strategies (Scarpa & Ziliotti, 1986). In the famous interview with Merton Miller (Tanous, 1997), he describes the M&M proposition by saying:

"People often ask: Can you summarize your theory quickly? Well, I say, you understand the M&M theorem if you know why this is a joke: The pizza delivery man comes to Yogi Berra after the game and says, "Yogi, how do you want this pizza cut, into quarters or eighths?" And Yogi says, "Cut it in eight pieces. I'm feeling hungry tonight." Everyone recognizes that's a joke because obviously the number and shape of the pieces don't affect the size of the pizza. And similarly, the stocks, bonds, warrants, et cetera, issued don't affect the aggregate value of the firm. They just slice up the underlying earnings in different ways".

We can conclude that debt policy is rarely important in an efficient financial market. Few financial managers would accept this conclusion as a practical guide. If the debt policy is not relevant, it should not be dealt with and financing decisions could become routine decisions. Instead, they worry about debt policy. If debt policy was totally irrelevant, real debt ratios should vary randomly from company to company and from sector to sector.

1.2.3. The weighted average cost of capital (WACC)

Nowadays most companies estimate the rate of return required by investors for their securities and use this cost of corporate capital to discount the cash flows of new projects. The cost of corporate capital is the opportunity cost of capital for investments that have the same risk as other business activities. In the case of riskier projects, the opportunity cost of capital is greater than the cost of corporate capital, while in the case of less risky projects it is smaller. The cost of corporate capital is usually calculated as a weighted average cost of capital, or as the average rate of return required by those who invest in the company's bonds and equity securities. The theory of the CAPM encourages investments in any project that offers a return that can compensate the β of the project. In order to evaluate the asset cost of capital or the unlevered cost of capital, we have to consider it as an expected return of a portfolio composed by debt and equity, simply evaluating an average mean of the expected return of debt and equity.

$$r_U = r_D \times \frac{D}{V} + r_E \times \frac{E}{V} \quad (4)$$

The unlevered cost of capital (or pre-tax WACC) is the expected return investors will earn holding the firm's assets. In a world with taxes, it can be used to evaluate an all-equity financed project that has the same risk as the firm.

As previously seen, a tax shield benefits the debt and we must take it into account when evaluating the cost of capital; the firm's actual after-tax cost of capital is:

$$r_{WACC} = \frac{E}{V} \times r_E + \frac{D}{V} \times r_D \times (1 - \tau_C) \quad (5)$$

where τ_C is the interest tax shield.

The weighted average cost of capital (or WACC) is the effective after-tax cost of capital to the firm. Since interest expense is tax deductible, the WACC is less than the expected return of the firm's assets. In a world with taxes, the WACC can be used to evaluate a project bearing the same risk and the same financing as the firm itself.

Via some simple mathematical steps, we can rewrite the WACC as a function of the unlevered cost of capital:

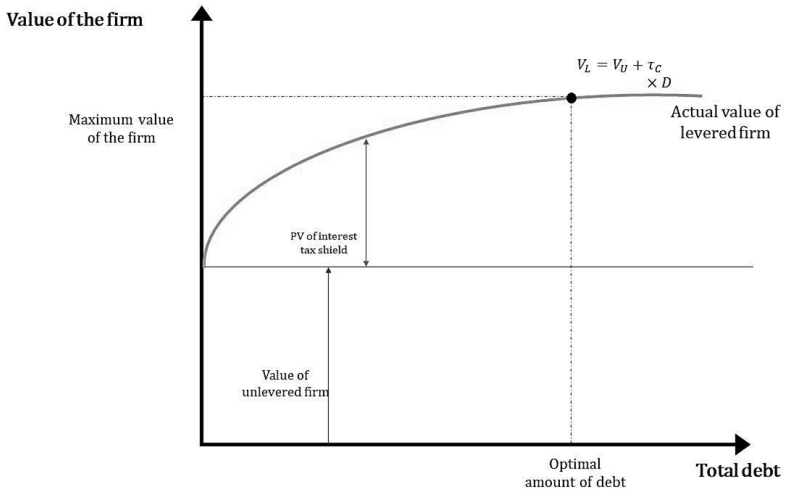
$$r_{WACC} = r_U - \frac{D}{V} \times \tau_C \times r_D \quad (6)$$

This version of the formula clearly highlights the advantages of debt.

The trade-off theory states that the value of a levered firm is equal to the value of an unlevered firm plus associated side effects. These side effects include the debt tax shield and the expected costs of financial distress. Bradley, Jarrell, and Kim (1984), Graham and Harvey (2001), Harris and Raviv (1991), Kraus and Litzenberger (1973) further describe this theory when they state: "The trade-off theory is centered on the idea that firms have an 'optimal' capital structure that presupposes a target debt ratio and explains this target debt ratio as a trade-off between tax and other benefits against financial distress and other costs that are consequences of the use of debt" (Canarella, Nourayi, & Sullivan, 2014, p. 365). The regulation permits companies to deduct interest payments on their debt, which benefits corporations as the reduction in net income lowers tax costs. Therefore, the tax shield is equal to the cost of debt X(1 - marginal tax rate). All else being equal,

debt financing is cheaper than equity financing due to the tax shield. However, high debt levels raise the cost of capital, as the firm's risk levels increase. Risk comes in the form of bankruptcy costs that includes the probability that the firm will enter financial distress and consequentially the added cost of the possible financial distress. If suppliers believe that a firm is unable to pay them back, they will either be unwilling to grant it credit or look for new clientele altogether. Thus, this trade-off is between the impact of the debt tax shield and the increase in bankruptcy costs. The figure shows the trade-off theory and the optimal debt level. The goal for corporations is to find the optimal capital structure between debt and equity financing that maximizes the market value of the company.

FIGURE 2. Trade-off theory of capital structure



From this figure, we may surmise the consequences for a company when the "optimal value" (Giorgino, 2006) is not reached.

If the current value of D/E is greater than the optimal value, the company is considered overfinanced. It could face default therefore debt must be reduced rapidly by converting a portion into equity or selling assets to repay the debts, alternatively by renegotiation of the debts. If the company doesn't face default, it is an opportunity to seek investment prospects. Whether it is carrying out new projects by issuing new share capital or not, the company has to extinguish debts with retained earnings or reduce dividends, or as another option by issuing new share capital.

In the opposite situation, when the current value is lower than the optimal value, the company is underfinanced. It could face graduated risk, and in this situation, the debt must be increased rapidly by equity swapping or taking out loans, or possibly, by buying back shares. If the company doesn't have a graduated risk problem, it is a favourable time to seek investment opportunities. Whether it is carrying out new projects with new debt financing or not, it must pay dividends and buyback shares.

Clearly, the two situations are different; indeed, a rapid debt increase is more problematic because the company could be perceived at a very high default risk by the market. The best option is to increase capital and repay loans although the market may be unfavourable to an operation of this kind, therefore it is feasible to renegotiate debts or sell assets and liquidate some creditors.

1.3. THE FINANCIAL DISTRESS

In literature, a variety of terms are used to characterize an economic problem that affects distressed firms (Altman, Hotchkiss, & Wang, 2019). Failure, insolvency, default, bankruptcy are commonly found and sometimes they are used interchangeably despite their different meanings. When the rate of return on invested capital, considering the risk premium, is significantly lower than the prevailing rates, the distressed company is classified as "in failure". A different scenario is a company being unable to meet its debts as they come due; this means that the company is insolvent. Default is another term to depict a negative state; it consists of a borrower violating an agreement with a creditor as specified in the contract with the lender. Finally, the economic meaning of "bankruptcy" is reflected in the excess of liabilities of involved assets.

1.3.1. The signals of financial distress: reasons for corporate failures

Distress occurs when the promises made to the creditors are not kept, or they are met with great difficulty: when a firm fails to make a required payment to debt holders, it is in default (Brealey et al., 2018). Before examining the costs of financial distress, it is possible to outline the reason why firms fail. A distortion of the capital structure of a company (Ranciaro, 2015), leading to its financial crisis, can be

originated by many factors that could result from financial and/or economic distress. Financial distress is caused by a shortfall in cash flow needed to meet debt obligations but does not necessarily require fundamental problems in the business model; conversely, business distress is caused by unsuitable business models. In reality, many distressed firms suffer from a combination of both business and economic distress. Common reasons that contribute to corporate failure are demonstrated below:

- poor operating performance (that may result from factors such as poorly executed acquisitions, the inability of the company to react to its competitors, or increase in the number of competitors in the same market) that could be exacerbated by high financial leverage on the likelihood of corporate performance;
- lack of innovation, especially technological (the arrival of technological innovation creates negative shocks to firms focusing on older technologies that may result in firms being driven out of the business);
- liquidity and funding shock (as during the 2008-2009 financial crisis when some firms were unable to roll over maturing debt because of the markets' illiquidity);
- lack of programming/planning;
- pursuing excessively aggressive growth strategies;
- deregulation of key industries (removes the "cover" of a regulated industry and fosters larger numbers of entering existing firms, so it greatly increases competition);
- unexpected liabilities (firms could fail because off-balance sheet contingent liabilities suddenly become material on-balance sheet liabilities).

In practice, there are multiple reasons why a company has solvency problems (Carbone, 2013). Sometimes it is due to poor managerial decisions, often because the company has borrowed far more than its revenue can sustain (overleveraged), especially in the current financial climate. A company needs cash flows to generate profit to pay back its debts, if a business takes on more debt, the company needs to generate higher profits in the income statement to service the debt and a firm must be able to consistently generate profits to carry a high debt load. A company's crisis is often generated by exceedingly aggressive growth strategies which are mainly financed with short term debt. Such scenarios can expose the company to the risk of not being able to service the debt repayment, especially in case of an unforeseen event in the implementation of the growth process, or of a change in the economic context.

Generally, it is possible to conclude that corporate failure occurs when the following performance patterns exist:

- a firm's performance never rises above a poor level;
- a firm shoots up very high levels of performance before crashing down;
- a firm's performance partially collapses, followed by a relatively longer "plateau" period of poor performance, and then a rapid decline into insolvency (Khaled & Sherif, 2006).

It is interesting to understand the likelihood of financial distress. There are some indicators that help to predict the crisis of a company (Foster, 1986). One source is cash flow analysis that focuses directly on the notion of financial distress in a specific period. Clearly, this information source critically depends on the assumptions of the underlying preparation of the budget. The second indicator of distress is corporate strategy analysis that considers a firm's potential competitors, cost structure, plant expansions in the industry, the ability of the firms to pass along cost increases, the quality of management and so on. The focus on strategy issues can highlight the consequences of changes occurring in the industry. The third source of information is an analysis of the financial statements of a set of firms. Finally, external variables such as security returns and bond ratings are considered as they could hold future information about cash flows and corporate strategy.

1.3.2. The costs of financial distress

A failure occurs when the shareholders exercise their right to default. It is a right of the utmost importance: when a company experiences a problem, limited liability allows shareholders to abandon it, leaving its troubles to the creditors. Creditors become the new shareholders, while the previous ones are left empty-handed. A bankruptcy is considered to be "the funeral of a company". Those who follow the funeral (creditors and especially the shareholders) observe the sad state in which their company finds itself. They can reflect on the past value of their titles and how little is left of them. They also believe that lost value is one of the costs associated with bankruptcy. Herein lies the mistake. The decrease in the value of assets, the cause of desperation, is not necessarily related to the failure. Bankruptcy is simply a legal mechanism that allows creditors to take over from shareholders when the diminishing value of the assets gives rise to default. Failure is not the cause of the decrease in this value, but the consequence. It is

imperative to be careful not to mistake the cause for the effect.

The bankruptcy code is designed to provide an orderly process for settling a firm's debts. However, the process is still complex, time-consuming, and costly. From the time perspective, the World Bank report "Doing business 2013" (The World Bank, 2012) tells us that the average duration of a commercial dispute in Italy is 1210 days, while the average period of OECD countries is 510 days. Among the 185 countries studied by the World Bank, Italy ranks 160th. Germany is in 50th place, the United States is the 6th and the United Kingdom is the 21st.

If all the actors that are related to the company are considered, it is possible to distinguish costs associated to each of them with a state of distress (Ranciaro, 2015):

- for the bank providing the financing because they will face losses in case of debt non-collection or in case of restructuring with a reduction of the value of the borrower's assets;
- for the community, in terms of social consequences that are proportional to the size of the company;
- for the creditors, who lose a portion of the whole amount they're owed;
- for the other company that asks for debt, the bank's losses have negative influences on the banking sector and are likely to deteriorate the conditions to tap the market.

In addition to the money spent by the firm, even the creditors may incur costs during the bankruptcy process. To ensure that their rights and interests are respected, and to assist in valuing their claims in a proposed reorganization, creditors may seek separate legal representation and professional advice.

Typically, costs of financial distress are classified as either direct (focus almost entirely on costs on bankruptcy proceedings) or indirect (all the unobservable opportunity costs).

Direct costs including lawyers, accountants, restructuring advisors, turnaround specialists and other professionals are the so called "out of pocket" expenses (Altman et al., 2019). These costs are easy to identify. There is an evidence of the most expensive failures in the World Bank report "Doing business 2013" (The World Bank, 2012). Between 2003 and 2005, United Airlines paid a team of over 30 consultancy firms an average of USD 8.6 mln per month for legal and professional services related to its reorganization. Enron spent a then-record USD 30 mln per month on legal and accounting fees in bankruptcy, with the total cost exceeding USD 750 mln. WorldCom paid its advisors USD 620 mln as part of its reorganization to become MCI,

and the Lehman Brothers bankruptcy, the largest in history, has reportedly entailed fees of USD 1.6 bln.

Whether paid by the firm or its creditors, these direct costs of bankruptcy reduce the value of the assets that the firm's investors will ultimately receive. Studies typically report that the average direct costs of bankruptcy are approximately 3% to 4% of the pre-bankruptcy market value of total assets. The costs are likely to be higher for firms with more complicated business operations and for firms with larger numbers of creditors, because it may be more difficult to reach an agreement among many creditors regarding the final disposition of the firm's assets. Since many aspects of the bankruptcy process are independent of the size of the firm, the costs are typically higher, in percentage terms, for smaller firms.

Aside from the direct legal and administrative costs of bankruptcy, many other *indirect costs* are associated with financial distress (Berk & DeMarzo, 2010). While these costs are difficult to measure accurately, they are often much larger than the direct costs of bankruptcy:

1. *Loss of customers*. Since bankruptcy may enable or encourage firms to walk away from commitments to their customers, customers may be unwilling to purchase products whose value depends on future support or service from the firm.

2. *Loss of suppliers*. Customers are not the only ones who retreat from a firm in financial distress. Suppliers may also be unwilling to provide a firm with inventory if they fear they will not be paid. This type of disruption is an important financial distress cost for firms that rely heavily on trade credit. In many cases, the bankruptcy filing itself can alleviate these problems through debtor-in-possession (DIP) financing. DIP financing is a special form of financing meant for companies in financial distress (typically during restructuring under corporate bankruptcy law, such as Chapter 11 bankruptcy in the US or CCAA in Canada). Because this kind of debt is senior to all existing creditors, it allows a firm that has filed for bankruptcy renewed access to financing in order to keep operating.

3. *Loss of employees*. Since firms in distress cannot offer job security with long-term employment contracts, they may have difficulty hiring new employees, and existing employees may quit or be hired away. Retaining key employees may be costly. This type of financial distress cost is likely to be high for firms whose value is derived largely from their human resources.

4. *Loss of receivables*. Firms in financial distress tend to have difficulty in collecting money that is owed to them. Knowing that the firm might go out of business or at least experience significant

management turnover reduces the incentive of customers to maintain a reputation for timely payment.

5. *Fire sales of assets*. In an effort to avoid bankruptcy and its associated costs, companies in distress may attempt to sell assets quickly to raise cash. To do so, the firm may accept a lower price than would be optimal if it were financially healthy. Discounts are also observed when distressed firms attempt to sell subsidiaries. The costs of selling assets below their value are greatest for firms with assets that lack competitive, liquid markets.

6. *Inefficient liquidation*. Bankruptcy protection can be used by management to delay the liquidation of a firm that should be shut down. On the other hand, companies in bankruptcy may be forced to liquidate assets that would be more valuable if held.

7. *Costs to creditors*. Aside from the direct legal costs that creditors may incur when a firm defaults, there may be other indirect costs to creditors. If the loan to the firm was a significant asset for the creditor, the default of the firm may lead to costly financial distress for the creditor.

In contrast with direct costs, they are difficult to empirically measure. The first to provide a methodology was Altman in 1984 who defines indirect costs as "those lost sales and profits caused by customers choosing not to deal with a firm that has high likelihood of bankruptcy as well as the increased costs of doing business (e.g., higher debt costs and poorer terms with suppliers) while in a financially vulnerable condition".

1.3.3. The trade-off theory

With perfect capital markets, recalling Modigliani-Miller (M&M) proposition 1 applies the following: "The total value to all investors does not depend on the firm's capital structure. Investors as a group are not worse off because a firm has leverage. While it is true that bankruptcy results from a firm having leverage, bankruptcy alone does not lead to a greater reduction in the total value to investors. Thus, there is no disadvantage to debt financing, and a firm will have the same total value and will be able to raise the same amount initially from investors with either choice of capital structure" (Berk & DeMarzo, 2010, p. 187). Investors know that an indebted company can get into trouble and worry about it. The concern is reflected in the current market value of the debt of the indebted company.

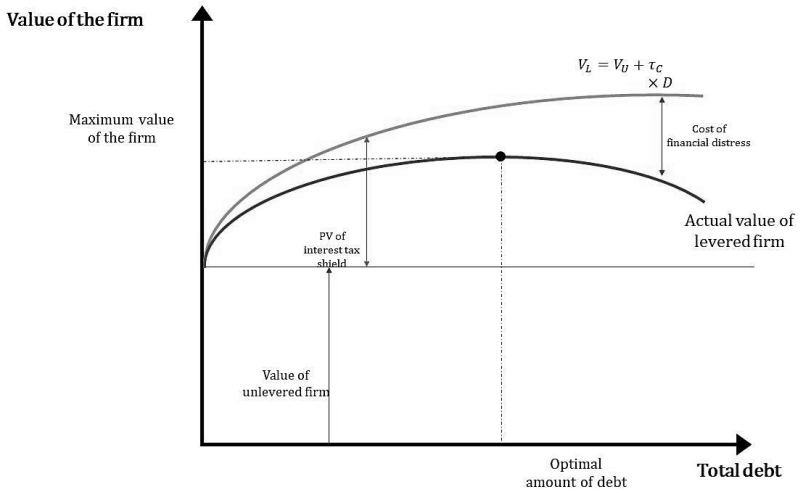
Consequently, the value of the company is:

$$Enterprise\ value = Value\ if\ totally\ financed\ by\ equity + \\ + PV\ tax\ benefit\ of\ the\ debt - PV\ cost\ of\ distress \quad (7)$$

The costs associated with failure depend on its probability of occurrence and the amount of costs that will have to be faced if it occurs. In fact, it has been shown that distress costs are an important determinant of the pricing of a firm's debt and of its capital structure (Altman et al., 2019).

The financial distress costs reduce the payments to the debt holders when the new product has failed. In that case, the equity holders have already lost their investment and have no further interest in the firm. It might seem as though these costs are irrelevant from the shareholders' perspective. Why should equity holders care about costs borne by debt holders? After a firm reaches bankruptcy, equity holders don't care about the costs, but debt holders realize they will suffer from the default and will initially pay less for the debt; they will reduce the amount paid for the debt of the present value (PV) of bankruptcy costs. Clearly, if they pay less, there will be a lower amount of money in the company. Ultimately, the costs associated with bankruptcy and financial distress are paid by the shareholders.

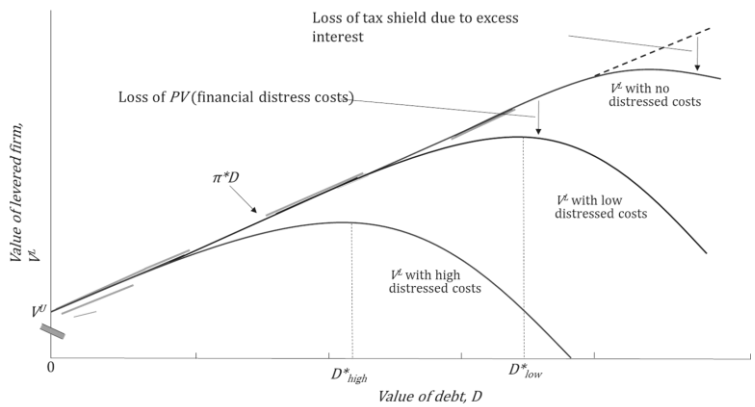
FIGURE 3. Trade-off theory of capital structure



In accordance with the benefits of debt and the cost of distress, the optimal capital structure should be reformulated following the trade-off theory, indeed if the distress costs are significant the optimal leverage for a company may be lower. According to this theory, the total value of a levered firm equals the value of the firm without leverage plus the present value of the tax savings from debt, minus the present value of financial distress costs. In the end, the tax benefit of the debt is balanced with the increased cost linked to a greater probability of default or possible financial distress. It is evident that the trade-off between tax benefits and the costs of instability leads to the optimal financial structure. Initially, the PV of the tax benefit increases with the increase in debt. At moderate levels of debt, the probability of failure is insignificant, so the PV of the related costs will be minimal, and the tax advantages will dominate instead. But at some point, by contracting even more debt, the probability of collapse increases rapidly, and the relative costs begin to affect the value of the company. Moreover, if the company cannot be sure of exploiting the tax benefit of the interest, it is likely that the tax advantage of the debt will start to decline until it disappears altogether. The theoretical optimum is achieved when the current value of tax savings due to greater debt is offset by the increase in the current value of the costs associated with the collapse. This is, in summary, what the theory of the trade-off of the financial structure states.

The discount rate applied to the distress costs will depend on the firm's market risk, this is crucial. Since the distress costs are high when the firm does poorly, the beta of distress costs will have an opposite sign to that of the firm. More negative beta leads to a lower cost of capital. Other things being equal, the present value of distress costs will be higher for high firm betas.

FIGURE 4. Trade-off theory of capital structure with distress costs



The figure shows the relation between the value of the debt and the value of the levered firm starting from the value of the firm financed only by equity. It highlights the fact that for low levels of debt the risk of default remains low, while an increase in leverage leads to an increase in the interest tax shield. With no costs of distress, the debt continues to increase until the interest on the debt exceeds the firms' earnings before interest and taxes and the tax shield is exhausted. The costs of financial distress reduce the value of the levered firm, V^L. The amount of the reduction increases with the probability of default, which in turn increases with the level of the debt D. The trade-off theory states that firms should increase their leverage until it reaches the level D^* for which V^L is maximized. At this point, the tax savings that result from increasing leverage are just offset by the increased probability of incurring the costs of financial distress. The figure shows the optimal debt choices both for a firm with low costs of financial distress, indicated by D^*_{low} and for a firm with high costs of financial distress, indicated by D^*_{high}. Unsurprisingly, with higher costs of financial distress, it is optimal for the firm to choose lower leverage.