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**CAPITAL STRUCTURE AND RE-LEVERAGING OPERATIONS: A
CASE STUDY ON AMAZON'S ENTERPRISE VALUE**

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ABSTRACT

To finance their operations, corporations make use of a combination of debt and equity securities which together constitute the firm's capital structure. Firms generally focus much of their day-to-day efforts on designing the best possible capital structure and subsequently level of indebtedness (i.e., leverage) for their business. The definition of an optimal level of leverage in the firm's capital structure is fundamental for any value-focused firm as it aids in the corporation's final objective of maximising the business's value. Modigliani and Miller were the first scholars to investigate how capital structure ultimately affects enterprise value and after their crucial contribution to the matters several other theories were introduced such as the Pecking Order theory or the Trade Off theory. Another crucial factor in the field of corporate finance which has a direct effect on capital structure and subsequently of enterprise value is that of highly leveraged transactions. As it will be shown, also by means of a case study provided in the work, such transactions can have to some extent a beneficial effect on firm's value as a consequence of the tax shield. The case study aims to calculate the enterprise value for fiscal years 2017 and 2021 of one of the most influential firms nowadays that is: Amazon.com Inc. In the case study, after the presentation of the re-leveraging scenarios, it will become evident that beyond a given point of indebtedness such re-leveraging transactions become detrimental for the business's value as the costs linked to a high level of leverage in the firm's capital structure are no longer off-set by the beneficial effects of tax-shield.

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1 Introduction

Capital structure represents the combination of debt and equity securities which any given corporation employs to *externally* finance its operations. A scope of any corporation is that of defining the business's optimal capital structure, not only to finance the firm's operations, but also to maximise the overall value of the enterprise. With this also comes the definition of the optimal level of leverage, that is the identification of the ideal amount of debt which any corporation should issue. As a result, any changes in capital structure (and leverage) – commonly referred to as re-leveraging operations, will have an impact on the overall business value. As a result, it is evident that the capital structure of any given firm deeply influences its market value.

The matter of capital structure, and all its implications, have always been a key point of discussion in the field of corporate finance. As of today, capital structure, is not only a mean to show how funds are introduced into a business but it is also a useful parameter for investors, as the combination of funds employed by any given corporation has a direct impact on its credit risk.

The work hereafter presented aims to discuss the matter of capital structure, its origins and some of the most relevant capital structure theories in the field of corporate finance. A general discussion of the most common re-leveraging operations tools will also be set forth. Finally, a case study will be presented as a real-world application based on the discussed theoretical framework.

In chapter 2, a discussion about the main characteristics of the two components of capital structure will be set forth. As for debt financing instruments, corporations mainly choose to issue corporate bonds. These are considered as a safer choice from an investor's perspective as the company has an obligation towards investors for the payment of the principal and interests. Debt financing instruments are beneficial for the corporation mainly through the effects of the tax shield, which essentially lowers the cost which the firm faces when issuing debt instruments (cost of debt). Nevertheless, for a corporation it is not wise to issue significant amounts of debt securities as these increase the probability of bankruptcy of the business. The second component of capital structure is equity financing which consists in the sale, in financial markets, of the corporation's stocks. Equity securities holders are not entitled

to any payment, this makes equity financing instruments more flexible from the firm's perspective but in general the cost of equity tends to be higher compared to the cost of debt. The overall cost of financing a corporation is usually measured by the weighted average cost of capital (WACC) where the weights for the average are the percentage of debt and equity which the firm has in its capital structure.

Chapter 3 will discuss at length the paper published by Modigliani and Miller "The Cost of Capital, Corporation Finance and the Theory of Investment" which marked the start of modern theory of capital structure. Their work is centred around two propositions. The first proposition presented in their work states that the choice between equity and debt financing does not affect the overall value of the firm. While the second proposition essentially suggests that a firm's WACC is not affected by the firm's capital structure, remaining therefore unvaried as the firm's leverage increases. These propositions are true only in an ideal world where a specific set of assumptions holds, such as: the existence of perfect capital markets and of risk classes to which each firm belongs, the firms' ability to issue only common stock and corporate bonds, and lastly the absence of arbitrage opportunities, taxes, and bankruptcy costs. The last section of the chapter will also set forth the adaptation of the Modigliani–Miller propositions when the assumption of the absence of taxes is dropped.

The following chapter exposes some crucial theories introduced after Modigliani and Miller's ground-breaking work. The aim of said theories is that of identifying the best possible capital structure for a given corporation and to ensure the maximisation of its market value. The *Pecking Order theory* essentially provides firms with a series of subsequent steps to follow to finance its operations, but it does not in any way identify a target level of leverage which the firm has to reach. As for the *Market Timing theory*, once again it does not identify a target level of leverage to reach, it intends to explain the reason behind the choice of the firm to issue a specific combination of debt or equity securities. Its workings are based on the idea that corporations issue equity securities only when these are overvalued, this means that a firm's leverage is dependent on stock market prices' fluctuations. Lastly, the *Trade-Off theory* does indeed aim at detecting an optimal level of capital structure for which the effects of tax shield are maximised while minimising costs of financial distress (i.e., bankruptcy costs and cost of debt). Reaching said optimal level of capital structure, assures the maximisation of the value of the corporation which beyond this optimal

point starts decreasing. The relevant section in the chapter will also take into consideration the distinction between static and dynamic trade-off theory.

Chapter 5 presents the mechanisms of two of the main transactions which impact the level of leverage of a corporation and therefore the overall capital structure. Said transactions are often referred to as *highly levered restructurings* given that they are usually financed by the issuance of significant amounts of debt. Both these types of restructurings tend to have, to some extent, a positive impact on the overall value of the firm. The first type of transaction taken into consideration is the leveraged buyout (LBO) which consists in the purchase of a corporation's controlling stake by another corporation. The transaction is carried out by issuing a rather small quantity of equity and large amounts of debt. At the end of the transaction the target corporation (i.e., the firm being purchased) is taken private. An LBO transaction proves to be beneficial for the corporation under many aspects: it helps in the reduction of both agency and transaction costs. It also implies an increase in tax savings since, given the increase in leverage, the effects of tax shield are amplified. The mechanisms laying behind the second highly levered transaction taken into consideration, that is a leveraged restructuring (LR), are indeed very similar the most crucial difference is that, in this case, the corporation remains publicly traded after the transaction is completed.

Chapter 6 will present a case study based on real financial data for one of the most influential multinational corporations nowadays, that is: Amazon.com Inc. The case study begins by calculating the two components (WACC and FCFO) which together account for Amazon's enterprise value for two fiscal year 2017 and 2021. In a later stage, the case study also evaluates the effects which re-leveraging operations can have on the calculated enterprise value. For the study of the effects of the re-leveraging operation, six scenarios have been taken into consideration, each incrementing by the same amount Amazon's leverage. The scope of the study of these scenarios is that of identifying a range of leverage within which Amazon's enterprise value is maximised. Analysing these scenarios, it also becomes evident what the trade-off theory of capital structure predicts: reaching the optimal level of capital structure assures the maximisation of enterprise value and minimisation of costs (WACC) while beyond said point the enterprise value starts decreasing again due to an increase in costs.

2 Firm Financing and Capital Structure

2.1 Internal and External Financing

Firms need funds to sustain their ongoing business and to engage in new projects. To finance their investments firms can choose to rely either on internal or external financing.

Internal financing, which is also referred to as *internal equity*¹, relies on cash flows generated by the business's existing assets. In most cases, the main source of internal equity is retained earnings which consists in cash flows rightfully belonging to equity owners of the firm which, instead of being distributed, are accumulated for reinvestment in the business.

Internal financing proves to have several advantages. To begin with, it offers managers a higher degree of flexibility in investment decisions regarding the business, it also enables the firm to avoid sunk costs for legal and underwriting fees which the firm would necessarily face when raising its funds externally. Lastly, given that there is asymmetric information about the firm's investment opportunities between managers and investors, if the funds were to be raised externally the firm's new shares might be undervalued with respect to the value that would be assessed if, instead, managers' information about their firm's investment plans were available to the public.

Despite these advantages, internal equity also presents some limitations. First, the funds available can only be used for a limited period of time since, as a matter of fact, they are intended for another use – that is the remuneration of equity holders.

¹ *Equity* represents the capital injected into a company by an investor who bears the full risk of the company's industrial undertakings in return for a share of the profits. (Vernimmen, P., Quiry, P., le Fur, Y., Dallochio, M., & Salvi, A. (2005). What is Corporate Finance?. In *Corporate Finance Theory and Practice* (p. 6). John Wiley & Sons.)

Second, internal equity is limited to the cash flows which the business generates, and in some cases, these may not be sufficient to finance the firm's projects.

As for *external financing*, this represents all cashflows raised outside of the business either from private sources or from financial markets. It can take the form of new *debt* or new *equity* which the firm can issue to raise funds.

Nowadays, companies can choose from a wide variety of financing instruments, as for debt financing the main two options are bank debt and corporate bonds. While for equity financing, a publicly held company mainly issues common stock.

Nevertheless, the main concern for any corporation is that of understanding which is the most adequate combination of debt and equity to issue, that is designing the firm's *capital structure*. More precisely, one of the firm's main objectives is that of determining the company's appropriate level of debt to use for financing operations, that is usually referred to as *financial leverage*.

2.2 Debt Financing

Debt financing is one of the two alternatives which the company has when it decides to finance its operations externally. As it has already been mentioned, one of the main debt financing instruments are *corporate bonds*, which a company issues as a way to borrow money from those who purchase the bonds often referred to as *bondholder* or *debtholders*. From the debt holders' perspective, as they purchase a bond, they know that they will be entitled to two contractual sets of payments. The first being the interest payment and the second the principal payment. Debt holders also have a prior claim to cash flows both in a period-to-period basis and on the company's assets in case of bankruptcy and liquidation. The two above mentioned characteristic make debt instruments a relatively riskless investment from the borrower's perspective. From a managerial point of view, bondholders do not play an active role as they, at most, exercise veto power over crucial financial decisions.

From the firm's perspective choosing to use debt instruments proves to be beneficial for two main reasons: debt instruments tend to discipline managers and grant a tax advantage to corporations.

2.2.1 Managers' Discipline

In a business, *free cash flows* are those cash flow brought in by operations which managers can spend at their full discretion. As for large corporations, these cash flows tend to be very substantial and as a result managers often see them as a protection against their potentially poor managerial decisions. Also, if free cash flows are very substantial, managers can *promise* to pay higher dividends in the future – even if the firm may not be able to keep its promise.

Much to the contrary, those firms which borrow money from debt holders, given that they have a duty towards them for interest and principal payment, will clearly have a smaller amount of free cash flows at their disposal and this will make managers more prudent in how they choose to spend these cash flows and in the promises they make.

The increase in leverage will also make managers much more prudent and efficient in the choice of a project and on in its management. If they were to take on a faulty project, they now know that they might not be able to meet their financial obligation of repaying their debtholders.

It must be noted that the discipling function of debt is especially effective for managers of already established firms which generate large cash flows and have low prospects of growth in the future, because managers of these types of firms are usually more keen on wasting large sums of money on unprofitable and costly projects.

2.2.2 Tax Advantage and Cost of Debt

Evidence of the firm's tax benefit from the issuance of debt, which is also referred to as *tax shield*, can be found in the difference between pre-tax and after-tax cost of debt.

For any business, the *cost of debt*, represents the effective interest rate which is paid on the issued debt.

Assuming r to be the cost of debt and T to be the marginal tax rate, the after-tax cost of debt can be expressed as:

$$\text{After Tax Cost of Debt} = r(1 - T).$$

The equation shows that the after-tax cost of debt is a decreasing function of the marginal tax rate meaning that the higher the tax rate, the lower the cost of debt.

The issuance of debt instruments also comprises some drawbacks which the business might have to face. Amongst them the most relevant is the *probability of bankruptcy*, which constitutes the risk that the corporation's operating cash flows will not be sufficient to meet its obligations towards borrowers. It must be noted that this insufficiency does not always lead to the firm's bankruptcy, but it might be a trigger. Probability of bankruptcy is a function of the size of the operating cash flows and of their volatility, if these are not sufficiently large or very volatile said probability tends to be higher. It is evident that, companies which have a substantially high level of debt in their capital structure are more exposed to the bankruptcy probability.

2.3 Equity Financing

The second option which a company has for external financing is equity financing. *Equity claims* entitle the holders to the residual cash flows after the payment of all the firm's obligations. As a result, in case of liquidation and bankruptcy, equity holders will only have access to residual claims. From a managerial perspective, those who invest in the firm's equity have more decision-making power and play an active role in the company's administration. Parallely to debt financing, also equity financing entails both benefits and drawbacks.

2.3.1 Advantages and Disadvantages

One of the first advantages of equity financed is that its use is not restricted by creditors, as in the case of debt financing, but can be freely used for enterprise operations or for investment activities. Equity financed funds are also permanent compared to debt financed funds. Indeed, the latter need to be repaid as the debt instruments reach maturity, while in the former has no repayment obligation. Consequently, equity financing ensures that that the business has the minimum funds necessary for carrying on its operations. Lastly, the dividend payments, to which equity holders are entitled, depend on the operations and overall performance of the business. This implies that, in case of financial distress, a firm is by no means obliged

to make dividend payments. Given these advantages it is straightforward that equity financing instruments guarantee a greater degree of flexibility to businesses.

2.3.2 Cost of Equity

As for the disadvantages in the first place it must be noted that to raise equity funds corporations need to be publicly listed. If they are not, they must go through a lengthy process known as an *IPO – Initial Public Offering* which implies very high costs that the firm must face to be able to enter the financial market. Nevertheless, even if the corporation is already publicly listed, the issuance of new securities necessitates the outlay of a significant amount of capital. Moreover, the issuance of new equity, implies the participation of new investors which will reduce the shareholding ratio of existing investors, this might lead to friction between new and existing equity holders and have a negative impact on the control power of the company's shareholders.

As concerns the *cost of equity*, which can be defined as the return that any business pays to its equity holders, this is usually higher compared to the cost of debt.

The first reason is that while the cost of debt is tax-deductible, the cost of equity is not. Secondly, since equity investors face a higher risk when purchasing the company's securities, they require for a higher compensation compared to debt holder.

The most used tool to estimate the cost of equity, especially by large U.S. corporations, is the *Capital Asset Pricing Model (CAPM)*. According to the model the formula for the cost of equity is:

$$\text{Cost of Equity} = r_f + \beta(E(r_m) - r_f),$$

where r_f is the *risk-free rate*, which represents the return that an investor expects to obtain from an investment which carries no risk attached to it and $E(r_m)$ represents the expected return on the asset. It must be noted that $E(r_m) - r_f$ represents the *market risk premium*. As for the *beta* (β), it represents the *levered beta* of the company's stock which, unlike unlevered beta, takes into consideration the effects of capital structure on the risk associated with the firm's equity (as the risk tends to increase when the debt-to-equity ratio is high).

2.4 Cost of Capital and Weighted Average Cost of Capital

The *cost of capital* can be defined as the minimum rate of return on the company's investments that can satisfy both shareholders (cost of equity) and debtholders (cost of debt). The cost of capital is thus the company's total cost of financing². Cost of capital plays a central role in most of the business's investment decisions, as it is used as the discount factor to evaluate the firm's average-risk projects. It is also used as a benchmark meaning that, unless the firm can earn an amount above its cost of capital, it will not be possible to make an economic profit and to create value for investors.

Chiefly, to express their cost of capital, corporations use the *weighted-average cost of capital* (WACC), that is

$$WACC = r_d \frac{D}{D + E} + r_e \frac{E}{D + E}.$$

As its name suggests, it is the average cost of equity (r_e) and cost of debt (r_d) while the amount of debt (D) and the amount of equity (E) which a corporation has in its capital structure are the corresponding weights of the weighted average.

In the upcoming chapter a major contribution to the theory of capital structure and, in general, for the subject of corporate finance will be introduced: Modigliani and Miller's capital structure irrelevance theory. The chapter will depict an overview of the assumptions framework, will illustrate the two propositions introduced by the authors and will analyse their consequent modifications in case the assumptions framework is modified.

² Vernimmen, P., Quiry, P., le Fur, Y., Dallochio, M., & Salvi, A. (2005). From the Cost of Equity to The Cost of Capital. In *Corporate Finance Theory and Practice* (p. 443). John Wiley & Sons.

3 Modigliani-Miller and Capital Structure Irrelevance

As it has been mentioned in the previous chapter, a firm's main concern is that of identifying the adequate combination of debt and equity to issue – that is to find the best possible capital structure to finance its operations. Managers and executives are those usually vested with the responsibility of finding the adequate combination of debt and equity instruments for financing the corporation. When called upon making their decision, managers carefully scrutinize all possible capital structure combinations as they are aware that their final decision will have a noticeable impact on the overall value of the firm both through stock price and value to shareholders.

The starting point of modern theory of capital structure can be identified with the publication of one very influential paper: *The Cost of Capital, Corporation Finance and the Theory of Investment* by Franco Modigliani and Merton H. Miller. Their work dates back to 1958 but proves to be, still to this day, a seminal paper in the corporate finance field.

In their paper Modigliani and Miller present two propositions.

Proposition I, often referred to as *capital structure irrelevance proposition*, states that in specific circumstances, the choice between debt and equity financing instruments does not affect the overall value of the firm. This discovery essentially suggests that, for a given business, an optimal leverage ratio does not exist implying that the value of the firm depends solely on the value of its assets.

Proposition II, asserts that a company's cost of equity, increases linearly with the percentage of debt in the capital structure. Implying that as the corporation's leverage increases, equity holders require a higher compensation for their investments. With their second proposition, Modigliani and Miller are essentially suggesting that a firm's WACC is not affected by the firm's capital structure, remaining therefore unvaried as the firm's leverage increases.

A more in-depth description of these propositions will be set forth in the following pages.

At a first look, the capital structure irrelevance proposition which Modigliani and Miller discovered in their work can rightfully seem controversial with the importance which nowadays managers give to capital structure decisions. The two opposite poles of this matter can only be reconciled by understanding that Modigliani and Miller based their discovery on a coherent set of assumptions which altogether generate an *ideal world*, where these propositions will perpetually hold.

3.1 Modigliani-Miller Assumptions Framework

The assumptions which Modigliani and Miller lay out in their analysis constitute the foundations which eventually lead to the final results which are provided in their work.

Modigliani and Miller assume that investors behave *rationally* as they prefer more to less income. Further assumptions are: existence of perfect capital markets and no arbitrage opportunities (*section 3.1.1*), existence of risk classes and belongingness of firms to unique risk classes (*section 3.1.2*), firms' ability to issue only common stock and corporate bonds (*section 3.1.3*) and lastly the absence of taxes and bankruptcy costs (*section 3.1.4*).

A comprehensive analysis of these aforementioned assumptions will be set forth.

3.1.1 Perfect Capital Markets & No Arbitrage Opportunities at Equilibrium

Firstly, Modigliani and Miller assume that the market where corporations' securities are traded are *perfect capital markets* and that the *law of one price*³ holds. In their work it can be read that "*bonds, like stock, are traded in a perfect market, where the term perfect is to be taken in its usual sense as implying that any two commodities which are*

³ A law stating that, if two sets of financial obligations provide the same cash flow, then they have the same price. (Law, J. & Smullen J. (2008). A Dictionary of Finance and Banking, Oxford University Press)

perfect substitutes for each other must sell, in equilibrium at the same price" (Modigliani & Miller, 1958, p.268).

As a result, in perfect capital markets, leverage and capital structure do not have an impact on the firm's value, as its value is affected only by its future cash flows.

A rather straightforward implication of this first assumption is that firms do not have to concern themselves with designing an efficient capital structure for its investors, as investors are free to design their own portfolio according to their preferences, by borrowing on their own and recreating the firm's leverage (this practice is referred to as *individual leverage*). Investors are enabled to carry out this practice given that, under the assumption of perfect capital markets, it is assumed that single investors can borrow at the same rate as corporations.

Another consequence stemming from the absence of capital market imperfections, is that investors are not able to make a capital gain through *arbitrage*. The financial practice of arbitrage is a process for which a given security sells at two different prices in two different markets. Any investor can purchase the security in the market which is selling it at the lower price and resell it in the other costly market – thereby making a profit. In perfect capital markets, if the share price of two companies which present different capital structures, differ, then the action of arbitrageurs would ensure that the shares of the two companies would reach an equilibrium and trade for the same price therefore eliminating any chance of obtaining a profit.

It must be noted that Modigliani and Miller also assumed that transaction costs are very small and therefore neglectable.

In their work, Modigliani and Miller use both the concept of *individual leverage* and *arbitrage* in the proof for what they state in their proposition I. That is, in perfect capital markets, all companies have the same share price and therefore the same value regardless of their capital structure.

3.1.2 Firms Belong to Unique Risk Class

Modigliani and Miller assume that all firms taken into consideration in their reasoning belong to the same risk class. A risk class for a given group of corporations, can be identified by taking into consideration the expected return which the firms' securities yield to investors. In their work they state, "*we shall assume that firms can be divided into "equivalent return" classes such that the return on the shares issued by any firm in any given class is proportional to [...] the return on the shares issued by any other firm in the same class.*" (Modigliani & Miller, 1958, p.266). By means of this assumption, Modigliani and Miller are essentially assuming that each security belonging to one class is a perfect substitute for another security belonging to the same class.

That concept of risk class which Modigliani and Miller adopted is rather broad, in the sense that two cash flows do not need to be perfectly correlated to be considered as belonging to the same risk class.

Moreover, firms with different proportions of debt in their capital structure even if they have different probability distribution of return, can still be considered as belonging to the same risk class.

Regarding this second assumption, it should be recalled that the key finding of Modigliani-Miller work that is, in frictionless markets firms have same values, only applies to firms belonging to the same risk class. Any change in the firm's capital structure which causes a consequent shift in risk class will increase or decrease the firm value making Modigliani-Miller proposition I can solely be applied to companies belonging to the same risk class.

3.1.3 Firms Only Issue Two Types of Claims

Modigliani and Miller based their reasoning on another very relevant assumption, companies can finance their operations by issuing at most two types of securities: common stock and corporate bonds. As for the initial part of their reasoning, Modigliani and Miller assumed that corporations could only issue common stock and that these would guarantee stockholders a stream of profits which *extend indefinitely into the future*. These cash flows are not certain and their magnitude is not constant, as a result they are assumed to be represented by a random variable with a given probability distribution. As a result, the average profit stemming from

one single share corresponds to the mean value of its associated random variable. It must be noted that each investor perceives a different probability distribution – making it therefore a subjective probability. For simplicity in the paper, it is assumed that all investors agree on the expected return of the stream of profits, that is the mean value of the random variable.

Further on, Modigliani and Miller proceed by introducing the possibility for companies to finance their operations by debt-financing, removing therefore the aforementioned limitation to only equity financing. They proceed by remarking that bonds, like stocks will be traded in perfect capital markets and that bonds which are perfect substitutes for one another will sell, at equilibrium, for the same price. It is also assumed that all bonds yield, in each unit of time, a constant income which bondholders are certain to receive regardless of the identity of the bond issuer.

3.1.4 Absence of Taxes and Bankruptcy Costs

Another, very relevant assumption which Modigliani and Miller included in their work is that of the absence of taxes. It is this assumption which perhaps caused most of the objections towards their work, for this reason in the following years (1963) the two economists proceeded by publishing “*Corporate Income Tax and Cost of Capital: A Correction*” where they also took into account the effect of taxes on their findings. The effects of taxes on Modigliani and Miller propositions will be analysed in detail later in the chapter.

Bankruptcy costs are also considered to be absent in the model: this essentially means that regardless of the level of debt which any corporation has in its capital structure, the risks which the company might not be able to face its obligations towards debtholders are not taken into consideration. In Modigliani and Miller’s framework, bankruptcy does not threaten corporations thus making transaction costs absent.

3.2 Proposition I

Given all the relevant assumptions, Modigliani and Miller provide Proposition I by stating that “*the market value of any firm is independent of its capital structure and is given by capitalizing its expected return at ρ_k appropriate to its class*” (Modigliani & Miller, 1958, p.268). The same statement can be expressed as follows⁴:

$$V_L = V_U = \frac{EBIT}{\rho_k}.$$

Where, V_U and V_L represents the value of a levered and unlevered firm – that is with or without a given level of debt in their capital structure. Lastly, ρ_k which is the same for every security in the given risk class k , represents the expected rate of return of any security in said class k .

From the formula it is, once more, evident that a firm’s market value is by no means affected by its leverage but solely by its earnings – that is, its assets.

A by-product of this first proposition is that the average cost of capital of any given firm, is independent of its capital structure as it equal to the cost of capital which the firm would face if it were only to finance its operations by equity financing.

$$\text{Given that } V_L = V_U = V, \quad \frac{EBIT}{V} = \rho_k.$$

As it has already been stated, Modigliani and Miller provided a proof based on the notion of arbitrage to prove their proposition I. They started by taking into consideration two firms whose cash flows belonged to the same risk class. Their proof starts by assuming that the two companies have different capital structures, one is leveraged while the other is not. The levered company will be worth more than the unlevered one and as a result its shares will be more costly. Investors can choose to sell shares of the more valuable company, purchase those of the less valuable and

⁴ EBIT represents what, in their work, Modigliani and Miller refer to as expected return on the assets which a company owns before interest is deducted from them, taxes are of course not taken into consideration as they are assumed to be absent. In the original paper, the notation used is \bar{X}_j .

unlevered one and recreate leverage by borrowing on personal account, as they can borrow at the same rate as corporations. By performing such a procedure, investors are essentially recreating leverage on their own account at a lower cost therefore ensuring themselves an *arbitrage profit*. Modigliani and Miller proceed by specifying that as investors exploit their arbitrage opportunity, the value of the levered firm will tend to decrease while that of the unlevered one will tend to rise. The process continues until equilibrium is reached and the value of the two companies is the same, regardless of their capital structure and proposition I holds.

3.3 Proposition II

Modigliani-Miller proposition II, which is indeed very closely linked with proposition I, states that “*the expected yield of a share of stock is equal to the appropriate capitalization rate ρ_k for a pure equity stream in the class, plus a premium related to financial risk equal to the debt-equity ratio times the spread between ρ_k and r* ” (Modigliani & Miller, 1958, p.271).

The above statement can be restated in a formula as follows:

$$\text{Cost of Equity} = \rho_k + (\rho_k - r)L,$$

where ρ_k represents the cost of equity of a firm uniquely equity financed, belonging to the same risk class. The difference $\rho_k - r$, essentially represents a risk premium required by those investing in a levered firm. Said risk premium increases as the level of leverage of the company increases, which in the formula is denoted by L .

Given the formula for the cost of equity it is easily understandable that, given that investors are rational, the required rate of return is directly proportional to the level of leverage of the firm since investors want to be compensated for the higher risk which they face as the level of debt increases.

According to Modigliani and Miller, as the level of debt of a corporation increases, the “average cost of borrowed funds” – that is the cost of debt will tend to decrease while as it has already been mentioned the expected return on equity tends to increase it is this tendency which leads the WACC to remain unvaried to any sort of alteration in capital structure.

For the sake of completeness, it must be noted that Modigliani and Miller also provide a third proposition in their 1958 paper. Proposition III fundamentally states that equity-holders are indifferent about the business's financial policy, the type of instrument used to finance an investment by no means affects the question of whether the investment is worth taking on.

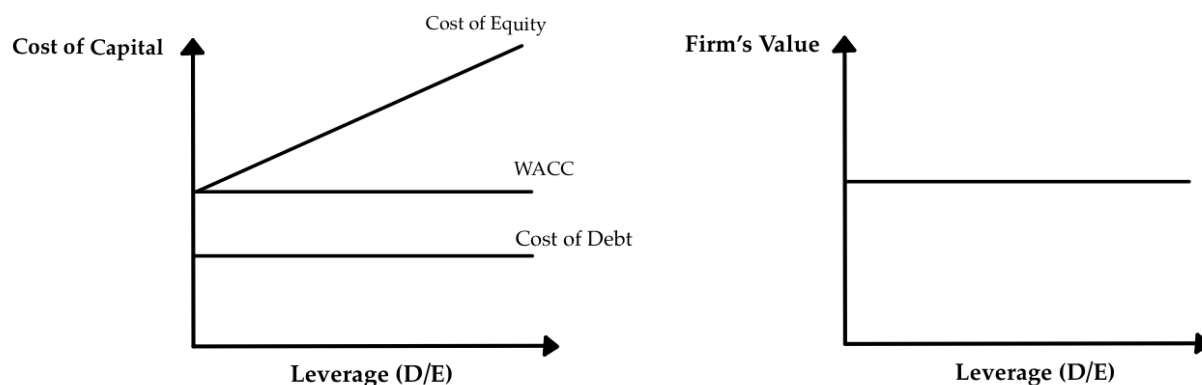


Figure 1 – Firm's Value and Cost of Capital under MM without Taxes

3.4 Effect of Taxes on Modigliani–Miller Propositions

In their 1963 paper, as it has already been mentioned, Modigliani and Miller make a correction to their original propositions by adapting them to a scenario where taxes are indeed assumed to be present.

Proposition I, adapted to the presence of taxes states that firms which have a certain degree of leverage in their capital structure are *more valuable* than those firms entirely financed by equity. This is thanks to the effect of the so-called *tax shield*. This is a rather remarkable difference with the original Proposition I without taxes.

The system of taxation prescribes that firms paying interest to holders of debt securities, should not pay any tax. As a result, those firms having more debt in their capital structure pay indeed less taxes. The final market value of the firm, will also be impacted by the tax-shield as shown by the following formula (which Modigliani and Miller proved in their work):

$$V_L = V_U + DT ,$$

where V_U is the final market value of an unlevered firm, D is the value of firm's debt and T represents the corporation's tax rate. From the formula it is easily understandable that the value of the levered firm increases as the leverage increases, as a result firms will prefer to have more debt in their capital structure as the effect of the tax shield become greater, they can pay less tax and therefore increase their market value. On the other hand, the value of the unlevered firm will remain unvaried.

It must be noted that the companies taken into consideration for this argument must belong to the same risk class.

Nevertheless, this result which appears to suggest that firms can increase unlimitedly increase their value by issuing more debt, does not take into consideration as it has been suggested in the previous chapter that the increase in the value of D also causes an increase in the risk of bankruptcy for the firm.

As for the cost of capital given the tax shield, Modigliani and Miller hold that as the percentage of debt in the firm's capital structure increases and consequently leads to an increase in the company's value, the weighted average cost of capital decreases (unlike what they had previously stated that WACC remained constant in absence of taxes).

Cost of equity can be restated as

$$\text{Cost of Equity} = \rho_k + L(1 - T)(\rho_k - r) ,$$

where ρ_k still represents the return on equity securities, $\rho_k - r$ represents the risk premium which, in this case, does not depend only on the leverage of the business (L) but also on the tax shield. It must be noted that as the value of tax shield is always smaller than one, the magnitude of the increase of the cost of equity with the increase in L is smaller than it would have been in the absence of taxes.

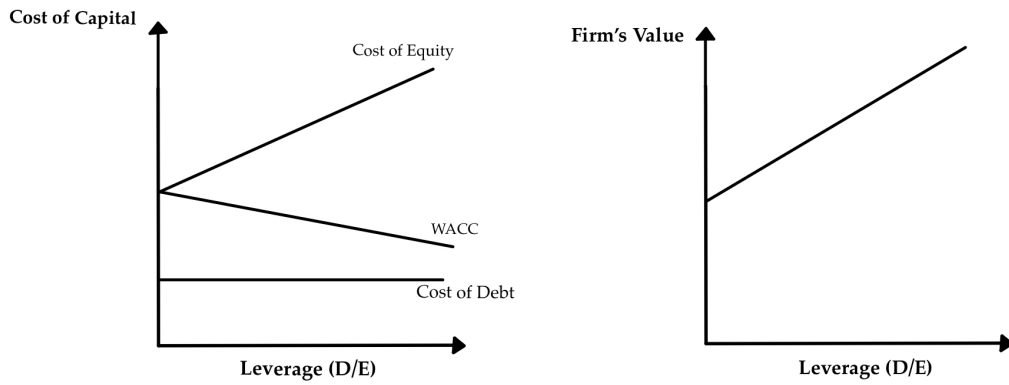


Figure 2 - Firm's Value and Cost of Capital under MM with Taxes

The succeeding chapter will present the features of the most common capital structure theories which tend to loosen up some of the strict assumptions introduced by Modigliani and Miller. The presented theories, unlike Modigliani and Miller's, do not consider the value of the firm to be independent of its capital structure. To the contrary such theories attempt at finding an optimal level, or at least, an optimal range of leverage for the corporation.

4 Capital Structure Theories After Modigliani & Miller

Considering the extensively discussed assumptions in the previous chapter, it is indeed not absurd to think that the capital *structure irrelevance theorem* can hardly be applicable to firms operating in the *real world* where, naturally, the assumptions introduced by Modigliani and Miller do not hold.

Nevertheless, Modigliani and Miller's crucial paper is not to be underestimated as their findings are indeed crucial for the matter of capital structure because, as Miller stated, "*showing what doesn't matter can also show by implication what does*" (Miller, 1988, p.100). The underlying message behind this statement is, given that we do not operate in an ideal world, market imperfections and taxes become crucial in determining firms' actual choices of capital structure (Allen & Yago, 2010, p.27).

In view of this last essential element of Modigliani and Miller's theory of capital structure irrelevance, their work can be considered as the theory which fundamentally paved the way for several other theories which aim at identifying the capital structure which would best fit to a firm and ensure the best outcome for the firm's market value. Such capital structure theories will be inspected in this chapter.

4.1 Pecking Order Theory

The pecking order theory was firstly introduced by Donaldson in 1961 and later modified by Myers and Majluf in 1984. The theory of capital structure which they introduced is not to be considered as a proper optimal capital structure theory as it *does not* indicate a target level of capital structure to reach. As the name suggests, it is rather an indication of the course of action which firms should follow when looking for funds to finance their projects.

The framework of the pecking order theory of capital structure can essentially be divided into *four steps*.

1. The first step to take into consideration, according to the theory, is that *dividends are "sticky"*. The term sticky refers to the idea that short run cuts in dividend payments are not to be employed as a mean to finance any sort of capital expenditure within a corporation.
2. *Corporations prefer internal to external financing*. This is mainly due to the fact that, the firms which choose to raise their funds externally are subject to strict regulations imposed by capital markets. The most relevant body in the United States which takes care of imposing regulations in the US capital markets is the Security Exchange Commission (SEC). The SEC is an independent government agency which, out of its many duties, makes sure that public corporations disclose all financial information necessary to the public to make a fully informed investment decision. It also oversees securities exchanges, securities brokers and dealers. The principal scope of the imposition of such strict regulations on public corporations is to protect investors from any sort of fraud which might be carried out in capital markets by issuers of securities.
3. *If internal funds are not enough*, and the corporation must resort to external financing for the capital investment, it will choose to *issue the safest security first* – that is *debt*.
4. As the corporation's need for external financing increases, the corporation will move down the hierarchy of issuable securities: from debt to preferred stock and to equity as a last resort.

From this framework it can be understood that the pecking order theory is useful in explaining why, for some corporations, most of the external financing comes from the issuance of debt securities. It also explains why, generally, larger and more profitable firms borrow a smaller amount of funds than those firms which are relatively less profitable. This is because more profitable firms, compared to those less profitable, have an ample availability of free cash flows which they can use to finance their investments without having to issue and accumulate debt as a form of external financing.

4.1.1 The Problem of Asymmetric Information

The reason why debt, compared to equity, is usually considered as a safer security is to be found in the matter of *information asymmetry* which, in general, is at the core of the pecking order theory of capital structure.

Asymmetric information, in corporate finance, refers to the idea that firm insiders, typically the managers, have better information than market participants on the value of their firm's assets and investment opportunities (Klein *et al.*, 2002, p.1). Given that managers have more information about the firm, they will choose not to issue stock when they know that the shares are undervalued but will instead issue when said shares are either fairly priced or overvalued. Investors, on the other hand, are aware that managers have access to more information and that they will choose the best time to issue stock. For this reason, when investors find out that a company is issuing stock, this information is interpreted as an unfavourable investment opportunity. As a result, managers, whenever they find themselves forced to issue stock, they will have to do so at a discount – this is to encourage investors to purchase the stock.

As a result of this mechanism, those firms in need of finances for their investment might have to give up on said investment thereby incurring therefore in the risk of giving up on a profitable project, simply because they are unwilling to put on the market their shares which are not selling at a price which they consider to be fair.

On the other hand, the issuance of debt securities is not by any means affected by this mechanism, this shows the rationale behind managers' choice to turn to debt when looking for sources of external financing.

Moreover, according to this theory, firms who are looking to raise their funds externally are to some extent *forced* to issue debt instead of equity, this is once more due to the problem of asymmetric information. In the event that any given corporation issues new equity, investors are well aware that the firm's managers have more information about the true value of these shares, and they are also aware that firms will only issue new shares if these are overvalued. As a result, if debt securities are available at the same investors will prefer those and refuse equity.

4.2 Market Timing Theory

Modigliani-Miller theory and pecking order theory, both assume capital markets to be perfect, this implies that the cost of different forms of finance does not change independently and, as a result, it is impossible for firm to make a gain by switching among equity and debt.

On the other hand, market timing theory, which was first introduced by Barker and Wurgler in 2002 takes into account an imperfect capital market, where firms can directly have an influence on the cost of capital that they face and can actively operate to minimise it.

Managers of those corporations which actively engage in the attempt to lower their cost of capital, when evaluating their options to finance their operations, often engage in a practice known as *equity market timing*. In corporate finance, equity market timing refers to the practice of issuing shares at high prices and repurchasing them at low prices. The intention is to exploit temporary fluctuations in the cost of equity relative to other forms of capital (Beaker & Wurgler, 2002, p.1).

Like pecking order theory, this theory does not imply the creation of an optimal capital structure for the business but instead it only seeks to explain the reason behind the choice of the firm of issuing debt or equity securities – it is by the accumulation of these financing choices that corporations create their capital structure.

As it has already been mentioned, the market timing valuation theory essentially states that companies only issue equity securities when these are overvalued – leverage is therefore very much dependent on fluctuation of the stock market prices. Generally, market timing theory prescribes that *market-to-book equity ratio*⁵ should be used to measure valuation. If the market-to-book equity ratio of the issuance of equity securities is higher than that of debt issuance or stock repurchase, then the corporation can proceed with the issuance of said equity.

⁵ Market to book value (which is often referred to as price to book value) is a financial ratio used to compare a corporation's book value to its current market price.

One key implication of the Market Timing theory is related to the firm's leverage: a high market valuation will reduce leverage in the short run since, given that leverage is the ratio between debt and equity in each corporation, if market valuation is high and the firm issues more equity securities, this ratio will naturally decrease.

Even though, according to the theory, market-to-book value affects a company's leverage in the short run through the issuance of equity it must be noted that those firms which generally have higher market-to-book values are also those which are growing quickly and *might* also be able to issue as much debt as well as equity.

4.3 Trade-Off Theory

The trade-off theory of capital structure, unlike the other abovementioned theories, does indeed identify and target an *optimal level of capital structure* which the corporation should work towards reaching.

The workings of this theory are based on a crucial element which had been introduced by Modigliani and Miller in their 1958 paper – that is the concept of *tax shield*.

As it has already been mentioned, when a given firm issues more debt securities the tax shield enables said firm to obtain a tax advantage, given that interest payments are tax deductible. The trade-off theory essentially states that the firm is indeed faced with (as the name suggests) a *trade-off*, it will borrow up to the point where the marginal value of the tax shield on additional debt is just offset by the increase in the present value of possible costs of financial distress (Myers, 2001, p.88).

The *cost of financial distress* is essentially linked to the idea that any increase in debt level causes a consequent increase in the risk of bankruptcy (thereby increasing bankruptcy costs) because as the debt-to-equity ratio increases, debt holders will require higher interest rates but also the shareholders will claim higher profits for their investments – meaning that cost of debt increases as leverage increases.

From the workings of the trade–off theory it can be understood that the target capital structure which corporations aim at reaching is an optimal level of leverage for which the tax shield is maximised while bankruptcy costs and cost of debt are minimised. By reaching optimal capital structure the *value of the corporation* can indeed be *maximised*.

It must be noted that, according to this specific theory, highly profitable firms must have a high target leverage to reach. This is because given their profitability, those firms have a larger taxable income which can be shielded by the tax-shield. Moreover, these corporations can also issue more debt without taking on the risk of financial distress and increased bankruptcy costs because these can be easily faced given the large pool of finances that these corporations have available. While less profitable firms should prefer, for the same reason, equity financing.

4.3.1 Static and Dynamic Trade–Off Theory

As for the trade–off theory it must be noted that two different theories actually exist. One is known as *static trade–off theory* and the other is known as *dynamic trade–off theory*. A crucial difference exists between these two: as mentioned above for the static trade–off theory an optimal level of leverage is identified and firms strive to reach such level. While for the dynamic trade–off theory, no optimal level exists but rather an optimal range to which corporations try to adjust.

Static trade–off theory essentially assumes that corporations issuing debt compute the present value of both the costs of issuing new debt and of the interest tax shields. In the event that the tax shield off-sets the issuance costs then the business will choose to issue the amount of debt needed to reach the target (optimal) level of leverage.

Dynamic trade–off theory is based on the idea that it is indeed very costly to issue and repurchase the exact amount debt which is needed to reach the optimal level of capital structure, for this reason corporations will only opt for the issuance of debt when its benefits outweigh its costs. In case the firm chooses to issue debt this is, unlike the static trade–off theory, to *adjust* their leverage to the leverage range which has been identified as optimal.

In a subsequent chapter the workings of the trade-off theory will be inspected in a real-world application. It will be shown, as the theory suggests that there is indeed a level of leverage which maximises the firms value. While beyond said level the enterprise value will be affected negatively by any further increase in leverage due to the increase in cost of debt which the firm is no longer able to offset by the tax-shield advantage.

The following chapter is going to portray the main features of two highly levered restructurings, that is: leveraged buyouts and leveraged restructurings. The main scope of these transactions is that of having a positive impact on the overall value of the firm nevertheless, as it will be discussed at length in the chapter, said restructurings are beneficial for the corporation in many ways.

5 Highly Leveraged Transactions: Leveraged Buyouts and Leveraged Restructurings

Leveraged buyouts and leveraged restructurings fall in the category of *highly levered restructurings*. These transactions usually imply the issuance of a very significant amount of debt. The workings of these two types of restructurings will be fully analysed in the chapter. Such restructurings are generally beneficial as they increase the value of the firm and the overall wealth of shareholders.

5.1 Leveraged Buyout Transactions

Leveraged buyouts (LBOs) consist in the purchase of a corporation's controlling stake by another corporation, the transaction is generally financed by rather small quantity of equity and large amounts of debt. The *target corporation* (i.e., the firm being purchased) is acquired by specialised investment firms which are usually referred to as *private equity firms*. Said private equity firms, when carrying out an LBO, essentially purchase majority control of an existing firm. The target corporations of leveraged buyouts can be both private and public and in case the target company is public, it is indeed taken private after the transaction is completed⁶.

The purchase is generally financed by a rather small quantity of equity and by large amounts of debt. The incurred debt is secured by the existing assets of the firm. The issuance of debt plays an important role in LBOs, as it is one of the relevant drivers to maximize the final returns on the private equity firm's investment. An LBO debt package consists of several debt tranches with different characteristics. These tranches mainly differ in maturity and collateralization, which results in different terms and margins (Jenkinson & Stucke, 2011, p.6). The heavy reliance on debt financing in LBOs leads to a profound variation in the target corporation's capital structure as leverage increases noticeably leading to an increased risk of bankruptcy.

⁶ These specific transactions are often referred to as public-to-private transactions (PTPs)

A widespread diffusion of leveraged buyouts first broke out in the 1980s but lasted only until the 1990s. LBOs started regaining some success around the early 2000s until the financial crisis of 2008 when their decline restarted.

The main concern, when addressing the issue of leveraged buyout transactions is whether they generate value. Some believe that LBO transactions are carried out as a mean to make short-term gains thereby sacrificing the long-term growth potential of the firm. In this view, the change in capital structure, following an LBO, is believed to have no concrete and positive effect on the firm's output and therefore on value.

Nevertheless, in some specific instances (which are now to be scrutinised) it can be shown that LBOs are indeed beneficial for the target firm and its stakeholders.

5.1.1 Benefits of Leveraged Buyouts: Reduction in Agency & Transaction Costs

In the first place, leveraged buyouts help in the *reduction of agency costs*. These arise from the *principal-agent problem* which is at the core of public corporations. In public corporations, given the separation between ownership and control, managers (*i.e., the agents*) who run and control the corporation should act in the best interest of the shareholders (*i.e., the principals*) who are indeed the rightful owners of the firm.

This is not always the case, considering that managers have diverging interests from those of the stockholders as well as an informational advantage. As a result, stockholders perceive the firm as not being run efficiently by managers. A solution for this problem is indeed the choice of the corporation to undergo an LBO and become private.

The consequent benefit of this choice lays in the *agency theory* which conjectures that the managers of a privately owned company are more prone to act in the best interest of shareholders than the managers of listed companies (Renneboog & Vansteenkiste, 2017, p.5).

Moreover, during an LBO transaction, private equity firms implement reward mechanisms for well-performing managers as a way to re-align the interests of managers with those of shareholders.

This is usually referred to as the *incentive realignment hypothesis* which states that shareholder wealth gains from going private largely result from an improved system of incentives providing better rewards for managers and ensuring that they act in line with the investors' interests (Renneboog & Vansteenkiste, 2017, p.6).

With regards to the beneficial effects of LBOs on agency costs other two hypothesis attempt at explaining the choice of corporations to undergo leveraged buyouts and its consequent wealth gains.

The *free cash flow hypothesis* suggests that the shareholder wealth gains from going private are largely the result of debt-induced mechanisms forcing managers to pay out free cash flows (Renneboog & Vansteenkiste, 2017, p.7). This is because, when undergoing this type of transaction, the firm issues a noticeable amount of debt on which it is then bound to repay interest and principal payment. As a result, managers are left with less free cash flows available to "waste" by investing in unprofitable projects. At the same time, the risk of default attached to the capital restructuring via LBOs increases the downside risk for managers (e.g., losing their jobs) who do not act in the best interest of the principal (Renneboog & Vansteenkiste, 2017, p.6-7).

Lastly, the *control hypothesis* suggests that shareholder wealth gains from going private largely result from an improved monitoring system imposed on the management team (Renneboog & Vansteenkiste, 2017, p.7). This last hypothesis holds that LBOs might be capable of solving the problem of shareholders of corporations (with a very dispersed shareholder base) who underinvest in monitoring activities. This is often referred to as the *free-rider problem*. In fact, after the LBO transaction is completed the equity ownership of the corporation goes from highly dispersed to highly concentrated, this serves as an incentive for investors to invest in managers' monitoring.

The leverage buyout process does not only reduce agency costs, but it is also a mean for the reduction of *transaction costs*. Public corporations face outstandingly high charges for public ownership, registration and listing on financial markets. In some cases, the costs which a corporation faces to remain on the market can even outweigh its benefits. Therefore, according to the *transaction cost hypothesis*, for public firms which encounter difficulties in facing the high maintenance costs of financial markets, undergoing and LBO can be beneficial as it eliminates the direct and indirect costs of

the stock exchange market (thereby, contributing once again to the wealth gain of shareholders).

5.1.2 Benefits of Leveraged Buyouts: Tax Reduction

A great source of financial gain for private equity firms, which carry out LBOs, is associated with the *increased tax savings* which result from the increase in leverage and the consequent increase in tax shield. It is clear that tax shield does indeed have a positive impact on the overall wealth gain of leveraged buyouts. Nevertheless, it must be noted that, for private equity firms, it is not the *absolute amount of tax savings* which matters but indeed the *size of the tax savings relative to the value of the firm* being acquired.

Private equity firms, before the beginning of the LBO transaction attempt at calculating a forecast of the expected tax shield. This is not a straightforward process as the tax benefit's magnitude depends on a series of factors such as: the type of debt which the corporation is planning on issuing, future earnings' projections, and others.

However, such calculations are necessary because, given that the market for leveraged buyouts is indeed rather competitive, the private equity firm must account for predicted tax savings in the acquisition price. That is, the higher the expected tax savings, the higher the takeover premium which the private equity fund can offer to the vendor. It is evident, as a result, that in most cases the party which benefits the most from leveraged buyouts is the vendor, namely the shareholder of the corporation being acquired in the transaction. It must be noted that the premium which private equity firms pay to shareholders does not only reflect the anticipated tax saving but also the unobservable expected efficiency improvements and changes in market valuation (Jenkinson & Stucke, 2011, p.22).

5.2 Leveraged Restructurings

The workings of leveraged restructurings (LRs) are indeed much the same as those of the above-mentioned LBO transactions. One crucial difference is that, in the case of LR the corporation *remains publicly traded* after the transaction is complete. Nevertheless, in the same fashion of LBOs, in LRs the corporation issues a significant

amount of debt. A typical LR transaction entails making a substantial debt-financed pay-out to existing equity holders. The pay-out can be in the form of cash or a mix of cash and debt securities and in some cases the existing equity is exchanged for a new equity security plus cash and debt securities (Gutpa & Rosenthal, 1991, p.70). Despite the pay-out to existing shareholders, in leveraged restructurings existing shareholders can choose to maintain an equity position in the now restructured firm.

As mentioned above in LRs, like in LBOs, the firm witnesses a relevant increase in its debt-to-equity ratio. The immediate consequence of such transaction is that of assuring more efficiency in the running of the corporation by its managers and assuring a re-alignment with the shareholders' interests. A LR transaction, given the noticeable increase in leverage also assures a consistent tax saving as a result of the workings of the tax shield. It can be immediately noticed that LRs do indeed share many of their upsides with LBOs.

Nevertheless, the two transactions do indeed present some differences beyond the most crucial one of target corporations going private in LBOs while remaining publicly traded in LRs. Another difference is that while in LBOs managers of the newly restructured corporation are bound to report to a relatively small group of shareholders (that is, the investors of the private equity firm) in LRs, given that equity holding is more diluted, managers have to report to a greater number of shareholders thereby making shareholders servicing costs higher in LRs. The last difference lays in the fact that while in LBOs major creditors may also be major stockholders (with a consequent reduction in monitoring and agency costs), in LRs, unless debt is paid to the stockholders, these do not become bondholders as well (Gutpa & Rosenthal, 1991, p.70). It has been shown, in various studies on the matter, that LRs do increase the value of the firm, especially through a noticeable increase on shareholders' returns.

In the upcoming chapter a case study of the effects on enterprise value of changes in capital structure will be presented. The corporation taken into consideration in the case study is Amazon.com Inc, the case study aims to identify Amazon's enterprise value for fiscal years 2017 and 2021 and to evaluate the effects which re-leveraging operations can have on said value. As it has been discussed in this chapter, leveraged restructurings generally have a positive impact on the firm and its shareholders. These transactions deeply alter the target corporation's capital structure therefore the scope of the case study is that of, not only identifying a range

of leverage within which Amazon's enterprise value is maximized, but also of highlighting beyond which point a leveraged restructuring can become detrimental for the business.

6 Enterprise Value Case Study: Amazon.com Inc.

6.1 Amazon.com Inc.: Company Presentation

Amazon.com, Inc. is a multinational corporation that provides, chiefly, online retail purchasing services. Its three main business segments are North America, International, and Amazon Web Services (AWS). As for North America, retail sales of consumer products and subscriptions are operated through North American-focused websites such as *www.amazon.com* and *www.amazon.ca*. The International sector sells consumer products and subscriptions over the internet to people all over the world. While Amazon Web Services provides computation, storage, databases and other AWS services to start-ups, companies, government organizations, and academic institutions throughout the world. As of today, Amazon is considered to be one of the Big Four technological companies along with Apple, Google and Microsoft.

The main focus for Amazon is that of gaining customers' trust, therefore they strive to provide customers with a wide selection of products, sold at an affordable price, and delivered speedily.

The company was founded by Jeffrey P. Bezos in July 1994 as an online book retailing business. By May 1997 Amazon went public (*Amazon.com, Inc.*) selling its shares \$18 each, with its initial public offering (IPO) the company managed to raise \$54 million and to reach \$438 million in enterprise value. By December 1997 Amazon's stock was already selling at \$59 per share and by the end of the fiscal year the company recorded a total of \$148 million in sales. In the years following Amazon's overall very successful IPO, the business witnessed a rapid expansion also because of the company's choice to extend its business to several other categories beyond books (e.g., toys, home appliances, video games etc.).

At the beginning of the new century, Amazon managed to successfully cope with the burst of the *dot-com bubble* by adopting some specific manoeuvres such as the reduction of the discount on books which the company offered its customers. By 2002 Amazon Inc.'s sales reached \$3.9 billion, and its shares increased by 75% in value: this

last result is particularly outstanding seen that at the time the market was falling altogether.

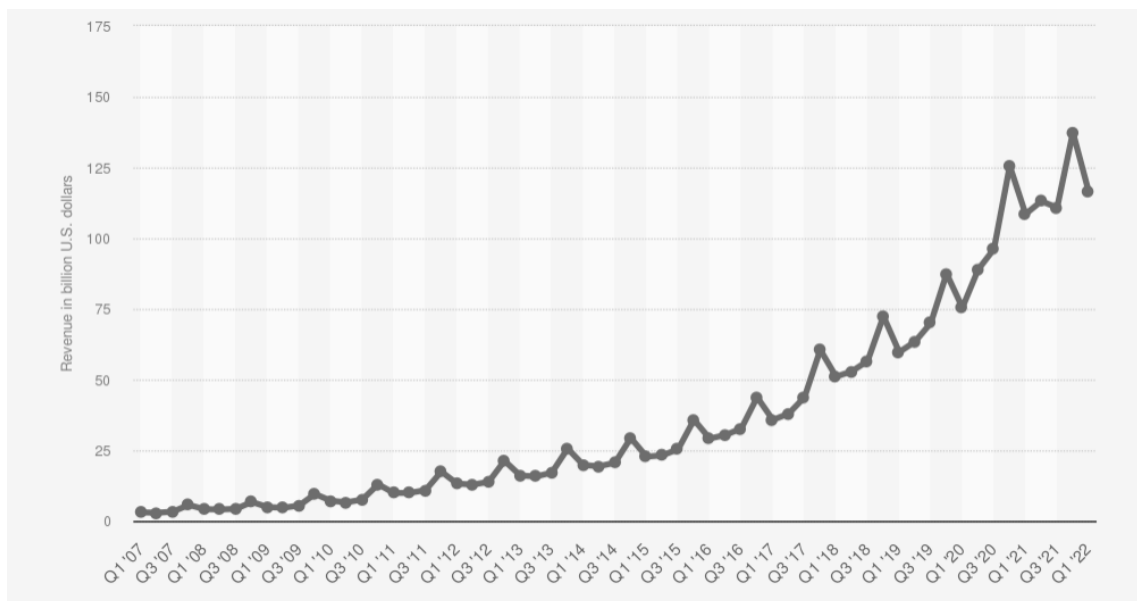


Figure 3 - Net Revenues 1Q 2007 - 1Q 2022 (Source: Statista)

With time, Amazon’s profits steadily increased also thanks its entry into new categories such as apparel, accessories and health and personal care products. During the 2008-2009 recession Amazon’s sales continued growing from \$19.2 billion in 2008 to \$24.5 billion in 2009 reaching \$34.2 billion by 2010. In 2014, Amazon recorded sales of \$89 billion and operating profits of \$178 million.

By 2015, profits continued increasing significantly. The first three quarters of the year were all profitable, the first time the company had achieved this in three years. Moreover, third-quarter profits were a record, but shareholders were unimpressed therefore on the announcement, the shares fell 15% in after-hours trading. The years 2016 and 2017 saw much higher levels of profitability, and the shares reached record levels. (Wells et al., 2018, pp.12-13).

Amazon’s profits continued to grow over the years even during the outbreak of the *Covid-19* pandemic. In the second quarter of 2020 Amazon’s sales rose by 40% to a total of \$88.9 billion despite the unexpected increase in costs which reached the \$4 billion mark. These results appeared to be well above analysts’ expectations mainly thanks to the rapid changes in customer’s shopping attitude caused by the pandemic.

It is therefore evident that Amazon.com Inc. is, in these times, one of the most relevant businesses in the global stock market picture.

6.2 Amazon.com Inc's Enterprise Value Model Presentation

The case study thereafter presented is going to analyse the enterprise value of Amazon.com Inc. and the effects which changes in capital structure have on said enterprise value.

Two sets of results will be presented: one presents the enterprise value accruing for fiscal year 2017 and the second for fiscal year 2021. The set of data used is the real-world data retrieved from official financial records provided by the corporation. For what concerns the 2021 enterprise value, forecasts provided by financial analysts have been employed in the calculation.

The formula employed for the computation of the enterprise value is as follows:

$$EV = \sum_{i=1}^n NPV(FCFO_i) + \frac{TV}{(1+WACC)^n} = \sum_{i=1}^n \frac{FCFO_i}{(1+WACC)^i} + \frac{TV}{(1+WACC)^n}$$

where TV stands for *terminal value* which represents the value of the business beyond the selected forecast period (that is the n-th year). And NPV(FCFO) represents the Net Present Value of the Cash Flow from Operations.

As it can be seen in the formula for Amazon.com Inc. valuation, two prior elements must be computed: the weighted average cost of capital (WACC) and the Cash Flow from Operations (FCFO). The data for the consequent calculation of these two components will now be set forth.

It must be noted that all values thereafter are expressed in Million US\$.

6.2.1 WACC Calculations

The first element to take into account for Amazon's valuation is indeed the after-tax weighted average cost of capital (WACC). The formula employed in the

model for its calculation (refer to chapter 2 section 2.4 for theoretical explanation of WACC) is:

$$WACC = r_d \frac{D}{D + E} (1 - T) + r_e \frac{E}{D + E}.$$

The cost of equity is calculated as:

$$\text{Cost of Equity} = r_f + \beta * MRP + Sp = r_f + \beta * MRP + CRP + SCP,$$

where r_f represents the *risk-free rate*, the number in the calculations corresponds to the YTM of 10-years US treasury bonds as they are assumed to be risk free. β corresponds to the *levered beta* of Amazon's stock. MRP refers to the *market risk premium* which represents the additional return which investors are entitled to for their choice to hold a risky market portfolio instead of risk-free assets. The value for MRP is country specific therefore in the data displayed the figures corresponds to the US market risk premium for the relevant year of the calculation. Sp corresponds to *size premium*, which is composed of two elements: CRP (*country risk premium*) which for the specific case of the US is zero and SCP, that is *small company premium*, which is always assumed to be valued zero for companies with a market capitalization above \$500M.

The cost of debt is calculated as:

$$\text{Cost of Debt} = \frac{\text{Annual Interest Expenses}}{\text{Total Debt}},$$

where annual interest expenses represent the 12-month cost incurred by Amazon for its borrowed funds.

The formulas for the other entries in the WACC calculation can be found in *appendix 1*.

	FY 2017	FY 2021
Beta Levered [Error! Reference source not found.]	1.12	1.12Error! Reference source not found.
Beta Unlevered	1.11	1.13
(D) Net Debt [a]	13,161	(15,665.00)
(E) Market Cap [a]	650,000	1,690,000
D/E	2.02%	-0.93%
D/(D+E)	1.98%	-0.94%
E/(D+E)	98.02%	100.94%
Tax Rate [a]	41.00%	16.38%
Risk Free Rate [b]	2.41%	1.51%
US Market Risk Premium [c]	5.70%	5.50%
Country Risk Premium (CRP) [d]	0.00%	0.00%
Size Premium	0.00%	0.00%
Cost of Equity	8.79%	7.67%
Weighted Cost of Equity	8.62%	7.74%
Annual Interest Expenses [a]	848.00	1,809.00
Total Debt [a]	24,743.00	80,834.00
Cost of Debt	3.43%	2.25%
Tax Shield	59.00%	83.62%
Weighted Cost of Debt	0.07%	-0.02%
WACC	8.66%	7.72%

Table 1 - WACC calculation FY 2017 and FY 2021

6.2.2 FCFO Calculations

The second element to consider for Amazon's valuation is the Cash Flow from Operations. This is a measure of the amount of cash which Amazon generates during its normal business operations.

The formula for FCFO is:

$$FCFO = NOPAT + D\&A - \text{Change in Working Capital} + CAPEX ,$$

where NOPAT stands for *Net Operating Profit after Tax*, D&A refers to Amazon's depreciation and amortization value and CAPEX stands for the business's capital expenditure.

The formulas for the other entries in the FCFO calculation can be found in *appendix 1*.

	FY-1 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY2022	FY2023	FY2024	TV
EBIT [a]	4,106.00	12,421.00	14,541.00	22,899.00	24,879.00	30,692.00	47,075.00	72,302.00	
Corporate Tax Rate [a]		10.63%	16.99%	11.80%	16.38%	18.17%	18.72%	17.95%	
NOPAT		11,100.65	12,070.48	20,196.92	20,803.82	25,115.26	38,262.56	59,323.79	
Depreciation & Amortization [a]	11,478.00	15,341.00	15,715.00	25,251.00	34,296.00	40,232.00	46,413.00	54,782.00	
Net Working Capital [a]	2,314.00	6,710.00	8,522.00	6,348.00	9,314.00	2,892.00	6,435.00	(22,476.00)	
Change in Net Working Capital		4,396.00	1,812.00	(2,174.00)	12,966.00	(16,422.00)	3,543.00	(28,911.00)	
CAPEX [a]		(13,427.00)	(16,861.00)	(40,140.00)	(61,053.00)	(58,842.00)	(60,592.00)	(55,957.00)	
FCFO		8,618.65	9,112.48	7,481.92	(18,919.18)	22,927.26	20,540.56	87,059.79	1,005,355.20
Time Coefficient		0	1	2	3	4	5	6	6
Discount Factor		1.00	0.92	0.85	0.78	0.72	0.66	0.61	0.61
NPV		8,618.65	8,386.27	6,336.90	(14,746.81)	16,446.74	13,560.37	52,894.30	610,816.55
FCFO NPV									91,496.42

Table 2 - FCFO calculation FY 2017

The calculation of FCFO for fiscal year 2021 assumes a growth rate of 2.41% which corresponds to the market growth rate that has been forecasted for the upcoming fiscal years.

To account for said growth rate the formula for TV is adjusted to:

$$TV = \frac{FCFO(1 + g)}{(WACC - g)}$$

where g stands indeed for growth rate.

	FY-1 2021	FY 2022	FY 2023	FY 2024	TV (using g)
EBIT [a]	24,879.00	30,692.00	47,075.00	72,302.00	
Corp. Tax Rate [a]		18.17%	18.72%	17.95%	
NOPAT		25,115.26	38,262.56	59,323.79	
Depreciation & Amortization [a]		40,232.0	46,413.00	54,782.00	
Net Working Capital [a]	19,314.00	2,892.00	6,435.00	(22,476.00)	
Change in Net Working Capital		(16,422.00)	3,543.00	(28,911.00)	
CAPEX [a]		(58,842.00)	(60,592.00)	(55,957.00)	
FCFO		22,927.26	20,540.56	87,059.79	1,674,429.92
Time Coefficient		0	1	2	2
Discount Factor		1.00	0.93	0.86	0.86
NPV		22,927.26	19,067.74	75,022.48	1,442,915.15
FCFO NPV					117,017.49

Table 3 - FCFO calculation FY 2021

6.3 Enterprise Value Results

Having now calculated all the necessary components, the formula for the enterprise value can be applied to find Amazon.com Inc's value.

$$EV_{2017} = \sum_{i=1}^6 NPV(FCFO_i) + \frac{TV}{(1 + WACC)^6} = \$91,496.42 + \$610,816.55 = \$702,312.97.$$

$$Value\ per\ Share_{2017} = \frac{EV_{2017}}{Number\ of\ Outstanding\ Shares_{2017}} = \frac{\$702,312.97}{484.00} = \$1,451.06.$$

$$EV_{2021} = \sum_{i=1}^2 NPV(FCFO_i) + \frac{TV}{(1 + WACC)^2} = \$117,017.49 + \$1,442,915.15 = \$1,559,932.63.$$

$$Value\ per\ Share_{2021} = \frac{EV_{2021}}{Number\ of\ Outstanding\ Shares_{2021}} = \frac{\$1,559,932.63}{503.00} = \$2,163.59.$$

From the data presented it is evident that Amazon substantially increased its leverage from US\$ 24,743.00M in 2017 to US\$ 80,834.00M in 2021, in the same timeframe the company continued substantially growing as it can be seen for instance from the increase in EBIT which rose from US\$ 4,106.00M to US\$ 24,879.00M in 2021. The increase in EBIT is only one of the numerous parameters which can lead to assume that Amazon is indeed able to repay its obligations stemming from the increase in leverage. Combining this assumption with the positive effects of tax shield from the change in leverage, Amazon's enterprise value and subsequent value for shareholders, as it is evident from the results of the calculations, has indeed increased in the period of time between 2017 and 2021.

6.4 Re-Leveraging Operation

In this section the effect of further increases in leverage on Amazon's value are to be inspected. Six different leverage scenarios have been considered; each scenario will increment the debt issued by the corporation by an amount equal to \$15,000 for fiscal year 2017 while for fiscal year 2021 the increment will be equal to \$80,000. The scope is that of

identifying a potential range of values within which the value for Amazon's business is maximised.

The starting point of this analysis is to understand that the further issuance of new debt will have an effect on the rating of the issued securities. As it has already been mentioned in the work (*see chapter 2 section 2. 2.2*) the issuance of significant amounts of debt increases the probability of bankruptcy of the corporation thereby having an effect on the cost of debt which increases as the leverage increases. The consequence is that the financial market is increasingly less confident in its expectations about the company's ability to fulfil its obligations.

In the model evaluation of the effect of an increase in leverage on the securities' ratings has been performed by means of the following table:

Rating Class	Net Debt/EBTDA	Delta Default Spread (%)
AAA	1.70x	0.00
AA	1.80x	0.20
A+	2.40x	0.35
A-	2.90x	1.85
BBB	3.70x	2.50
BB+	5.20x	3.25
BB	8.10x	3.65

	Scenario 0	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
(D) Net Debt	13,161.00	30,000.00	45,000.00	60,000.00	75,000.00	90,000.00	105,000.00
Net Debt/EBTDA	0.84	1.93	2.89	3.85	4.81	5.78	6.74
Rating	AAA	AA	A-	BBB	BB+	BB	BB
Delta Default Spread		0.20%	1.85%	2.50%	3.25%	3.65%	3.65%
Cost of Debt	3.43%	3.63%	5.48%	7.98%	11.23%	14.88%	18.53%
WACC	8.66%	8.50%	8.43%	7.32%	8.57%	8.79%	9.09%
Enterprise Value (2017)	702,312.97	719,868.22	727,422.14	725,734.88	712,149.80	688,195.37	657,940.07
Value per Share	1,451.06	1,487.33	1,502.94	1,499.45	1,471.38	1,421.89	1,359.38

Table 4 – Effects of re-leveraging on EV FY 2017

	Scenario 0	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
(D) Net Debt	(15,665.00)	80,000.00	160,000.00	240,000.00	320,000.00	400,000.00	480,000.00
Net Debt/EBTDA	(0.22)	1.11	2.22	3.33	4.44	5.56	6.67
Rating	AAA	AAA	AA	A-	BBB	BB+	BB+
Delta Default Spread		0.00%	0.20%	1.85%	2.50%	3.25%	3.25%
Cost of Debt	2.25%	2.25%	2.45%	4.30%	6.80%	10.05%	10.05%
WACC	7.72%	7.41%	7.18%	7.16%	7.35%	7.81%	7.83%
Enterprise Value (2021)	1,088,288.19	1,136,150.49	1,172,751.39	1,176,205.38	1,144,781.01	1,075,886.03	1,072,785.35
Value per Share	2,163.59	2,258.75	2,331.51	2,338.38	2,275.91	2,138.94	2,132.77

Table 5 – Effects of re-leveraging on EV FY 2021

The data presented in the tables show that each increment in the level of leverage of the firm has a direct effect on enterprise value. The initial effect of an increase in the level of leverage in Amazon’s capital structure is that of an increase in enterprise value and value for shareholders – this positive impact is a direct consequence of the effect of the tax shield. When Amazon’s leverage reaches a certain point (in the scenarios projected in the data, said point is represented by *scenario 4*), the positive effect of the tax shield is indeed offset by the substantial increase in the cost of debt which indeed has a detrimental effect on Amazon’s final enterprise value.

The data presented does indeed show the workings of the trade-off theory. Scenario 3 can indeed be considered as the range of level of leverage which maximises the firm’s value and value for shareholders. While beyond said level the enterprise value is affected negatively by any further increase in leverage due to the increase in cost of debt.

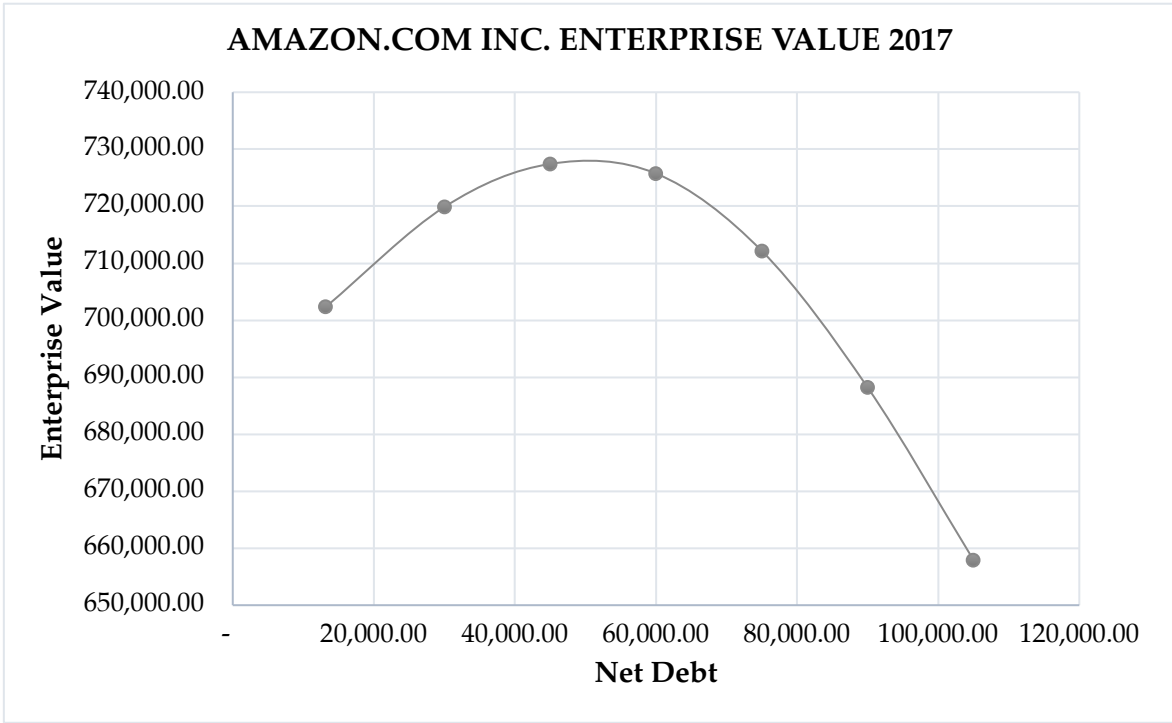


Figure 4 - Effects of Re-leveraging on Enterprise Value FY 2017

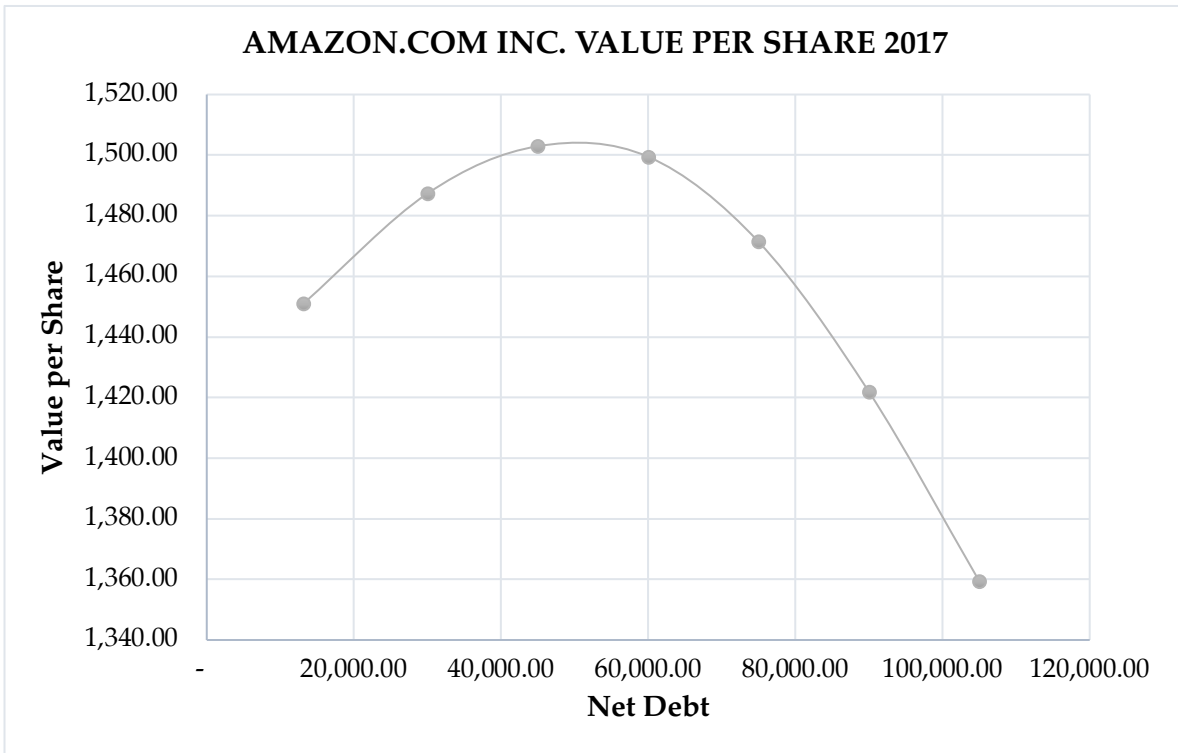


Figure 5 - Effects of Re-leveraging on Value per Share FY 2017

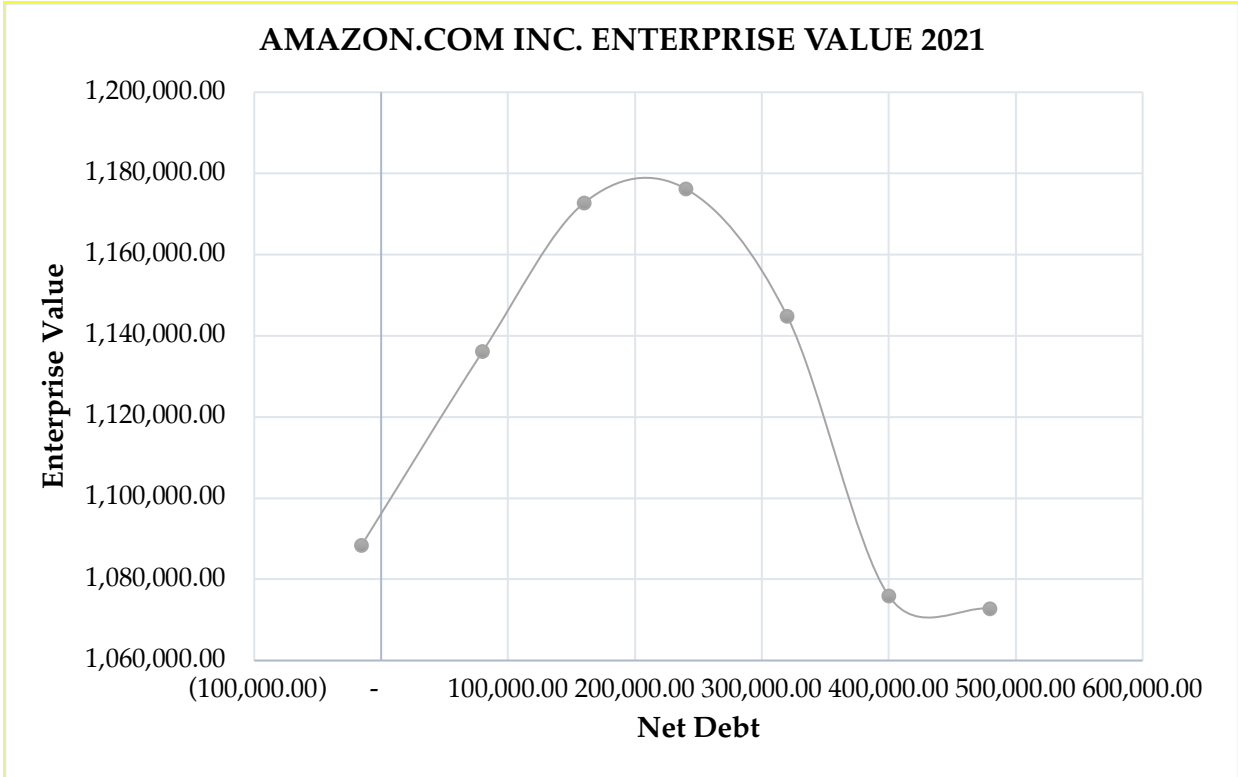


Figure 6 - Effects of Re-leveraging on Enterprise Value FY 2021

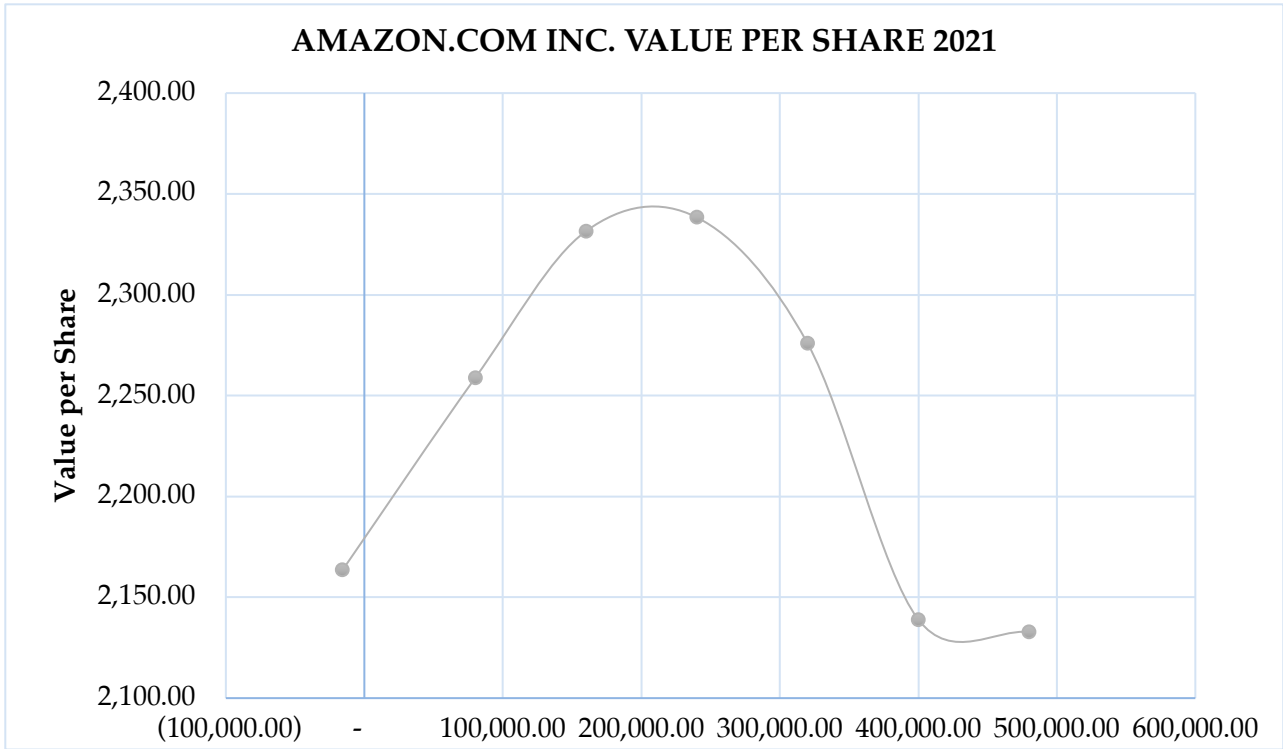


Figure 7 - Effects of Re-leveraging on Value per Share FY 2021

7 Conclusions

Modigliani and Miller's crucial work opened the discussion on the matter of capital structure and enterprise value, but it is, still to this day, a crucial topic in corporate finance both from a theoretical and practical point of view. As it has been discussed, their work paved the way for the introduction of several other theories which ultimately aim at the maximisation of the firm's market value. A clear point of discussion can be raised once one focuses its attention on the matter of value maximising firms, that is: is it indeed necessary for firm's executives to put so much of their day-to-day efforts for the sole scope of maximising the corporation's value?

As it has been discussed at length in the work, the matter of enterprise value is crucial for any corporation, but it is indeed worth noticing that it is not only enterprise value in itself which matters to a corporation but also all that is linked to it. The value of a business is, indeed, a useful measure for the evaluation of the performance and riskiness of a business but there is more that goes beyond that. The scope of value-focused firms is that of maximising value for the sake of the corporation in itself and for its shareholders but, in the long-run, this also has a relevant impact on all other stakeholders surrounding the corporation, namely: the firm is able to create more employment and to provide its employees with an improved working environment, improved salaries and other benefits. Moreover, the corporation usually has more resources available to invest in present-day matters such as sustainable production processes and environmentally conscious behaviours. Customers are largely more satisfied and there is an overall more efficient employment of resources, and much more.

Taking into consideration this fundamental point which essentially recognises that the importance of enterprise value is not only strictly linked to the creation of value for the firm itself and its shareholders but has a profound influence on all stakeholders as well, it is indeed clear that all the elements which can have an influence on said enterprise value become of crucial importance for the, efficient, management of the corporation and for assuring the best impact both on its shareholders and on the stakeholders.

Having recognized the beneficial impact of the enterprise value maximisation, the scope of the work has been that of analysing in depth all the elements which contribute

to the attainment of such goal. It became evident throughout the whole reasoning that any, even minor, variation in a firm's capital structure or level of indebtedness can have an impact on the value of the firm and subsequently on all that surrounds the firm. The effects which any of these changes can have on the market value of any corporation emerged even more clearly in the presentation of the case study. The analysis carried out on Amazon's capital structure changes, clearly showed that some variations, even when they are made with the intention of bettering the general situation of the firm, can even have to some extent a disadvantageous effect on the business's market value.

Having understood the impact on both the firm's internal and external environment which a decrease in the firm's value can have, it becomes evident that the constant effort which managers put in the achievement of an optimal level of leverage and the attention which they put in the design of their capital structure, is indeed more than justified as it is done, in most cases, looking after the interest of the firm's ecosystem as a whole.

Appendix 1

Formulas for WACC calculation

$$\beta_{unlevered} = \frac{\beta_{levered}}{1 + \frac{D}{E}(1-T)}$$

$$\text{Weighted Cost of Equity} = \frac{E}{D+E} * \text{Cost of Equity}.$$

$$\text{Cost of Debt} = \frac{\text{Annual Interest Expenses}}{\text{Total Debt}}.$$

$$\text{Tax Shield} = 1 - \text{Tax Rate}.$$

$$\text{Weighted Cost of Debt} = \frac{D}{D+E} * \text{Cost of Debt}.$$

Formulas for FCFO calculation

$$NOPAT = EBIT * (1 - T).$$

$$\text{Change in Working Capital} = \text{Working Capital}_{t+1} - \text{Working Capital}_t .$$

$$\text{Discount Factor}_i = \frac{1}{(1 + WACC)^i}$$

i is the time coefficient.

$$NPV(FCFO_i) = \text{Discount Factor}_i * FCFO_i .$$

$$NPV(FCFO) = \sum_{i=1}^n NPV(FCFO_i) .$$

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