



# ENVIRONMENTAL PERFORMANCE AND CORPORATE CAPITAL STRUCTURE

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## ABSTRACT

In the modern globalized economies the corporations, as an institution, has proved to be the most influential societal driver. In this environment there are many who urge for a reexamination of the corporations' role as corporate citizens. While the neoclassical shareholder theory regards a firm's sole interest the maximization of the shareholder's value, new theories have been proposed under the principle of Corporate Social Responsibility (CSR). These theories have incorporated into their design all involved stakeholders and the externalities on the natural environment. On this basis, the Socially Responsible Investment (SRI) strategy have been developed arguing that firms with superior environmental performance, provide superior return at a lower risk. The paper at hand will try to provide some insight by examining whether financial markets reward environmental performance and its disclosure by improving access to debt financing. Adapting the asymmetric information theory and its effect on corporate capital structure as the pecking order theory suggests, we examine the correlation between leverage, and the disclosure of environmental activities and performance. If the proposed hypothesis holds true, increased leverage should be expected as an indicator that cost of capital and default risk are lower for environmentally concerned companies.

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## 1 INTRODUCTION

In the past decades, the role of corporations in economies and societies has become more prominent than ever. While governments moved to the sideshow of regulating the world's most advanced economies, private corporations and institutions took up the role of leading the growth of the newly found truly globalized economies. As we move to what seems a new social and economic era it is probably advisable to reexamine the corporate societal stance in a more holistic approach.

The neoclassical shareholder theory regards a private firm's sole interest the maximization of the shareholder's value. This theory has been strongly criticized over the decades and other theories summarized under the principle of Corporate Social Responsibility have been proposed that take into consideration the interactions of corporations with the social and natural environment. According to the Corporate Social Responsibility theory, the goal of a corporation cannot be to simply maximize stock price or dividends in account of the shareholders. Other groups such as employees, local communities, financiers have a stake at the firm's total value and therefore their interests must be considered in the value maximization effort.

Furthermore, corporate social responsibility supporters claim that, apart from being the right thing to do, it also makes good business to incorporate social and environmental criteria in corporate practices. Keeping all shareholders happy can give the edge to a corporation when troubled times come to pass such us the ones from 2008 and on. A stakeholder's approach in corporate organization and planning can significantly reduce non systematic risk as it minimizes frictions deriving from a firm's interactions with key stakeholders and regulatory environmental and social dictations.

Adapting the corporate social responsibility theories, a new kind of investment strategy has emerged, the one of socially responsible investing. Institutional and individual investors alike have started evaluating and screening corporations in non financial benchmarks taking up their own role as corporate citizens with a more ethically responsible stance towards society and environment. As far as institutional investors are concerned this is also to their best financial interest as they regard good CSR performers as more promising in the long term investment portfolios. Socially

responsible investing makes a significant contribution in the business case of corporate social responsibility which is still under question.

While the debate still holds, the paper at hand will try to provide some insight on the matter by examining whether financial markets actually reward good environmental performance and its disclosure in the way of better access to debt financing. If an argument of improved access to financing due to superior environmental performance can be supported, the main argument of CSR improving financial performance of a company will be significantly boosted. Building a case on the basis of the asymmetric information theory and its effect on corporate capital structure, we examine the correlation between a firm's debt financing rate, and the disclosure of its environmental related activities and performance. If the proposed hypothesis holds true, then increased leverage should be expected as an indicator that cost of capital and default risk are lower for environmentally concerned companies.

## **2 ASSYMETRIC INFORMATION AND CORPORATE FINANCING**

In the first section of the paper we will address the issue of asymmetric information in the financial market which occurs when the counterparties of the market possess different levels of information during a transaction and the way it affects every firm's access to the valuable funding required to pursue its goals.

### **2.1 FLOW OF CAPITAL: SAVERS TO FIRMS**

Before exploring the problem of asymmetric information itself it is advisable to first understand the role of each participant in the financial market and how the available capital flows through it. The total non-government income of an economy (for simplicity we consider the economy to be closed to outsiders) is divided among private consumption and investment. Investment is in fact made possible by using of the part of the income that has been saved (not used for consumption) by households or legal institutions. Therefore savers, in turn become investors with the desire to make something more of their money than just spend it in the present. On the other

hand, corporations of the economy compete with each other in order to attract the available saved funds with the best terms possible. This translates to having to give back to investors as little extra returns (interest) as possible. Thereafter firms use the accumulated funds to undertake their planned investments that will generate them their future cash flows, part of which will have to be returned to the investors providing the capital. As a result, investors provide the firms with their saved money through the financial markets in two ways. Financing is achieved either directly via stocks and debt bonds, or indirectly via financial intermediates to whom they trust their savings in order to invest them on their behalf.

Taking a closer look to the afore mentioned it is reasonable to conclude that what actually gives this something extra to the economy that makes saving worth its while is how well the undertaken investments will perform and the value that they will add to the investor's purse and the economy as a total. In this light, what is yet to be determined is how can an investor actually know which firms have good prospects, are well organized and have planned profitable investments? This is the point where the asymmetry of information problem occurs as the firm's management will, in any case, possess superior information about the prospects of the company and its projects than any investor will ever have. Therefore, the diverged level of information is crucial in the manner that both investor and investees behave in the financing transactions.

## **2.2 ASYMETRIC INFORMATION: FIRMS KNOW BETTER**

Taking this inquiry a step further, a closer look to the decision making process of an investor might provide a better view of the problem. An investor has at his disposal a certain amount of savings. The main motivation for an individual or an institution to save money is for future use when cash flows might deteriorate or an unexpected event might occur. Therefore, this portion of an economy's savings is more likely to be invested with the least risk possible and if it wasn't for inflation it may not even find its way to the financial markets at all. When the limit of savings that makes someone rest easy about his future is accumulated, then the rest of an economy's savings are mostly used in speculation.

Despite the fact that these are actually excess funds, no one wishes to simply choose an investment on a good will basis that the return is going to be the one promised. Nonetheless, taking into consideration the fact that the investor cannot effectively assess the true quality of an investment and of the undertaking corporation makes him very cautious about whom he is going to trust his hard earned savings to.

To make matters even worse, the firms that are usually in more need of funding are constituents of two very different groups. The first group is formed by firms which are on a slippery financial slope and cannot finance their operations or investments through their ongoing activities and their existing investments are underperforming. On the opposite side, the second group of corporations in need of capital is formed out of those who have exceptional projects undergoing and wish to use more leverage.

In this light, the investor will either choose not to invest his money at all and just deposit them to a bank or he will press for extra return to the desired. This extra return is called risk premium interest rate, and this is because it is demanded by the financier to compensate for taking on the risk of being uncertain whether he will get what was promised or not. This fact, though unfortunate, it is an inescapable friction of the financial markets which happens even before the investment begins is called adverse selection problem.

Furthermore, after the financing has occurred, another significant asymmetry information related problem arises, the one of Moral Hazard. Even if the corporation receives the funding, it does not necessarily mean that the money will be spent in the investor's best interest. The firm's management often has other goals that do not coincide with maximizing the value of the firm's equity. The personal goals of the management could be to maximize their own profit by making covert deals, or making themselves more attached to the company, or even cover up for their own shortcomings in the past investments. Any activity of the management after borrowing the lender's money that is considered to be undesirable by the investor contributes to the moral hazard problem and makes investors ask for more in return of getting on their backs yet another risk.



## 2.3 REDUCING THE ASSYMETRY: THE STRUCTURE OF FINANCIAL MARKETS

The problem of asymmetric information, in every aspect, consist a very costly friction of the financial markets in terms of required return by lenders and shrinking of the corporations' investments profit margin. The asymmetry of information is so great that it actually makes it very risk and cost intense on behalf of individuals to invest their savings directly to the productive firms. As a consequence, financial markets of equity and debt through corporate bonds are usually avoided by small time investors.

Subsequently, the economy has developed, in a more or less Darwinian process of market evolution, many ways to overcome this asymmetry and provide sustainable financing terms to the firms. These improved terms are delivered either by institutions that help abridge the information gap between investors and investees or by reducing the investor's risk. The latter is achieved by simply obliging the investee to provide collaterals in case of a credit default that could make up in part for the loss of the investment. In the following paragraphs we are going to examine which are these institutions, their role and how they ordinate in a structured financial market.

### 2.3.1 State Laws and Government Organization

The bases of any societal structure and the economy in specific is the state itself in which the participants are operating and its laws and fundamentals on which it is built upon. The state's laws are the ones providing the legal incentives and responsibilities for both investors and corporations on which any other institution may develop. Therefore the state provides the ground work and the enforcing capabilities upon which every private or governmental contract or institution may be structured.

Furthermore, the law in most of the financially developed or developing countries obliges companies that are actively seeking funds through the financial markets to provide accurate information regarding their financial balance sheets, be subject to financial and tax audit by government agents, and enforce a variety of means of control on the financial markets and the economy as a total. These regulatory actions are aimed to protect investors from the asymmetry of information, since regular audits provide accurate information on a firm's financial status. For this purpose a series of standardized accounting and tax evaluation methods have been

developed which are adapted by most governments in an attempt to actively stabilize the economy.

The level of control differs from one state to the other and it is highly connected to the organizational philosophy of the current government. In the developed countries' free economies, the level of control in the last decades has been reduced significantly with spectacular initial results in terms of money making but ended up in an equally spectacular financial crisis. The freedom of the financial market provided the opportunity for funds' managers to be much more creative in their value adding strategies but increased the moral hazard problem. As managers got more confident and greedy, they took advantage of reduced control to make short termed highly profitable but very risky investments to establish their positions regardless of the long term results.

On the other hand, financially depressed economies make it very difficult for firms to attract the required investments and drive them to actively engage in corruptive under the table deals with government officials in order to circumvent the control's distresses. This is the case in many regime enforced governments and even in governments of financially emerging countries that had regime governments in the past. The corruption of the former establishment seems to be in most cases well entangled in the economic system. As in most cases, the optimal level of control has to be somewhere in the middle between freedom and total distress, that will provide both flexibility for funds' managers and risk assurance for investors.

### **2.3.2 Financial Intermediates**

Following the states inevitable participation, the most important structural institutions of the financial market are the financial intermediates. With this term we are referring to any institution that individual savers or legal entities, and therefore investors, have entrusted their funds to. The financial intermediates on their part take up the role of the investor, evaluating which companies provide the optimal investment opportunities.

The role of banks as a financial intermediate is affecting corporate funding in every aspect of the financing procedure. The banks at the one end of the capital market structure are the best alternative for individual savers when it comes to the adverse selection problem caused by the asymmetry of information. This results in a

major funds' flow from individuals to the banks in the form of a minimum risk but small return investment. This is still an investment though for the individuals who require both the promised return and the assurance that their investment is safe and they will be paid back in full. On the other end of the financial market the banks can lend these funds to the corporations that require capital to undertake their planned investments and they do so in two ways. They either purchase stock and debt in the form of bonds issued by the firms through equity and bond markets or they lend the funds directly conducting private loans to specific firms.

The main advantage of banks over individuals is that they have trained people and elaborate computer programs aimed to assess corporations and their proposed investments based on information that they collect from various sources and keep in both private and collective databases. They are also able to transact with minimum cost and great speed in the equity and bond markets. In addition, they possess sufficient funds to successfully apply investment diversification strategies and minimize the undertaken risk. The combination of the above reduces the asymmetry of information to the minimum while significantly reducing the risk and impact of a particular company's credit default. Banks are also able to enforce on corporations the provision of collateral when conducting a private loan in case of the counterparty's default which further lowers the risk, making private loans the cheapest and preferred source of financing for all corporations.

Other financial intermediates such as pension funds, investment companies or hedge funds though not able to conduct private loans also have the means and skilled people to make very well informed and strategic investment decisions compared to any other individual. These organizations are characterized as institutional investors as their role and level of influence in modern financial markets are increasing by the day.

All financial intermediates are subject to limitations regarding the risks they are allowed to take which are either determined by law, such as the case of banks and pension funds because of their structural role in the whole economy, or by the contracts signed between them and their investors with the hedge funds being the institutions with less control of all able to perform strategic investments of high risk to achieve the promised returns.

### 2.3.3 Control over Management

Once the investment has taken place and the firm has successfully overcome the adverse selection problem, at a significant cost in terms of promised returns, investors still have to cope with the moral hazard problem. The best way to keep moral hazard as low as possible for investors is by applying both internal and external monitoring over the management. The instruments of internal monitoring are the shareholders general assembly and the internal audit department which reports directly to the assembly.

The level and type of monitoring differ according to the type of ownership. State or family owned corporations are tightly monitored, with direct control over the board of directors the members of which are usually personally linked to the ownership. Most likely, these types of ownership reduce moral hazard significantly but are often underperforming because of lack of incentives in the case of state owned firms or lack of top level evaluation in family owned firms.

Another very popular category of ownership is the bank controlled corporation. It is very common for large investment banks to assume active and direct control of the investing companies in order to ensure the profitability of their investment. Although banks have both the required skills and incentives to properly monitor a firm's management it is often the case that banks are interested only in short term returns neglecting the corporation's long term sustainability prospects. On the other hand, it is also common for non-bank institutional investors such as public pension funds to obtain such a great share of a firm's equity capital through the stock market that it is in their best interest to engage in the management if the firm is underperforming than to simply sell their share.

The type of ownership where investors are more subject to moral hazard than all others is the publicly owned companies with dispersed shareholders. Dispersed shareholders usually lack the skills and the motive to actively monitor the management and its decisions. These investors rely on reports of internal audit departments and primarily on external monitoring to safeguard their investment. For this reason independent accounting agencies have been established globally to take on this task.

Independent accounting is the most important external source of information for all investors, responsible by law to audit large corporations and make sure that all financial statements and transactions are carried out and conducted according to the rule of law that obliges firms to report accurately to the shareholders and the public their financial status. If a company's financial statements are not approved by an independent auditor they cannot participate in the financial markets of bonds and equity and no bank will probably lend money to such a firm. The accounting standards have been systematically regulated in every economy and tend to converge even internationally for the better assessment of companies globally. External audit greatly contributes to reducing the asymmetry of information and in particular of minority shareholders or potential minority investors.

#### **2.3.4 Information Market**

Apart from independent accounting firms, other private non state official institutions such as credit rating agencies have been established. In the passing decades, these institutions have taken up a key role in the financial markets as their credit risk evaluation on both private and state owned companies and financing products can shift the markets' expectations and affect investment strategies. They have developed credit risk evaluation models that provide different levels of information according to what the buyer of information is willing to pay, effectively setting up a private information market that can significantly reduce the asymmetry of information for those with sufficient funds to pay for this advantage.

Apart from credit rating agencies, certain news networks such as Bloomberg or Thomson-Reuters have developed personalized applications and database services that refer to professional traders and financial practitioners. These databases cover almost every aspect of the business and financial world and are highly priced according to the level of information the user wishes to obtain. On the same page, other financial databases have been set up mostly from investment counseling enterprises combining their experience with the customers' personal need for monitoring and actively participating in his investment choices.

Another branch of the information market organized in respect of the friction of asymmetric information is the economic and financial press. In most cases, the specialized press is the easier and cheapest way to acquire information about the

financial market as a whole and for individual companies the same. The information provided though is of low level in most cases, and is referring to people that are not actively trading and do not have the required training and expertise to do so. In order to serve the need of professional traders some press agencies have established dedicated financial news services as well as extensive electronic databases available via internet for the right price. The cost of such services is quite overwhelming for individual investors and sometimes even for small trading firms, which makes them somewhat exclusive. There are a number of such agencies with the two most famous being Bloomberg and Reuters. The services they provide though costly, can offer great opportunities. The news sections are usually the best alternative of actually being there when something happens, while the available database can data for every known financial indicator for both firms and countries, and also a wide variety of other, non financial measures.

It is apparent that credit rating and financial data base services firms are a big pool of information for banks and institutional investors that enables them to get into new markets with reduced cost of information. Despite the credit rating companies' contribution to reducing the information gap in the financial markets, they have been subject to fierce criticism since the economic crises of 2007 due to their power to affect even the world economy just by a change of their rating in major countries' bonds and the purity of their incentives is in question.

## **2.4 CONSEQUENCIES OF ASSYMETRIC INFORMATION**

Despite the state's and private organizations' best efforts to provide sufficient structure and flow of accurate information to the financial market there is still a lot more factors that determine the quality of a firm or an investment that are not actively and systematically reviewed or reported by most organizations. It is extremely difficult for example to evaluate the effectiveness of a corporation's internal flow of information and whether it is an actual competitive advantage over its competitors, even if you invent a quantitative model for you valuation. Therefore, one can reasonably conclude that there still exists great asymmetry in the information that managers have at their disposal but cannot or will not communicate to the prospective investors.

Nevertheless, the existing structure has a very precise impact on the financial market with banks and institutional investors playing the leading role. The banks' ability to accumulate most of the economy's saved funds in combination to the well trained staff supported by private and public information databases as well as the legally supported provision of collateral by borrowers have made bank loans by far the most common and preferred way of financing in every economy of the world. Corporations prefer to be funded by bank loans even if they are more risky because it comes at a much lower required interest rate than any other form of financing. Corporate bonds are the second most preferred way of financing, traded at the bond security markets and they are the primary choice of many risk averse institutional investors such as pension funds because of the reduced risk it offers compared to equity which is the least desirable way of financing. The order of the preferred financing solution of corporations reveals just how great a problem is the asymmetry of information for an economy. Corporations prefer to be funded from the riskier to the safer financing channel just because they cannot pass on the required information to individual savers and get its needed funds through the safer equity market but instead are forced to even provide their most crucial assets as collateral to lenders.

### **3 CORPORATE CAPITAL STRUCTURE**

#### **3.1 MODIGLIANNI & MILLER**

The first who set the groundwork for modern study of capital structure and its connection to a firm's financial performance were Franco Modigliani and Merton Miller in 1958. In their initial study they proved that in a given set of assumptions the financing mix of debt and equity does not affect the firm's value. The assumptions stated in this early model however, are profoundly unrealistic and cannot be taken into real consideration not even on their day. More specifically, Modigliani and Miller proposed that under the assumptions that

- I. There are no taxes
- II. There are no bankruptcy costs
- III. There are no transaction costs

- IV. Investors and firms can both borrow at the risk free rate
- V. Investors and firms possess the same information
- VI. EBIT is not affected by the use of debt

A firm's total market value is independent of its capital structure and that the cost of equity increases linearly with its debt to equity ratio of capital structure.

In support of the first proposition let us assume two identical companies which generate the same EBIT and their only difference is that the firm A has been financed only with equity and its market value is  $V_u$  and the firm B has been financed with

$$V_l = aE_l + (1 - a)D_l$$

Where  $E_l$  is firm's B equity capital,  $D_l$  is its debt capital and  $r_f$  is the risk free interest rate of the debt. At this point the two firms' value is equal. In the case where no new investment is made and given the hypothesis of absence of taxes then EBIT which is the same for both companies will be divided among its stakeholders. For A firm EBIT is divided among shareholders and their total income is

$$Y_u = EBIT$$

Whereas for B firm it is divided both shareholders and debt-holders.

$$Y_l = EBIT - r_f D_l$$

Since any investor can borrow at the same rate as the levered firm and in order for an arbitrage argument to hold true, meaning  $Y_u = Y_l$  the value of the two firms after the dividend payments must be equal. This is easily proved by disproving the opposite statement

$$\text{If } V_l > V_u$$

Then an investor owning a  $m$  portion of the shares of the leveraged firm B will receive an income from that firm

$$Y'_l = m(EBIT - r_f D_l)$$



If this investor chose to liquidate his firm B shares receiving  $mE_l$  and borrowed an additional amount of  $mD_l$  at the risk free rate and then acquire shares of the unleveraged firm then he would have an income after the dividend payment

$$Y'_u = [m(E_l + D_l)/E_u]EBIT - rmD_l = m(V_l/V_u EBIT - rD_l)$$

Therefore if  $V_l > V_u$  then  $Y'_u > Y'_l$  and an arbitrage profit could be possible.

On the same approach, if  $V_u > V_l$  then an investor holding a  $m$  part of the unleveraged firm can liquidate his shares and then buy shares and sell debt at the leveraged firm then an arbitrage profit would again be achievable.

The second proposition of the initial model is that the cost of equity, as a consequence of the irrelevance of the financing source, has a linear relationship with the cost of equity. This is derived by the WACC formula where

$$WACC = \left( \frac{D}{D + E} \right) * r_f + \left( \frac{E}{D + E} \right) * r_E \Rightarrow$$

$$r_E = WACC + (WACC - r_f) * \frac{D}{E}$$

As a conclusion, what the Modigliani Miller Capital Structure Model suggests that the source of its financing whether it from equity or debt is irrelevant in the firm's financial performance as it does not affect the total value. The rate of equity and debt only demonstrates the portion of the future cash flows that each party is going to receive. Furthermore, under the second proposition of linear relation between cost of debt and cost of equity it is apparent that the firm will try to increase debt financing as much as possible since it will at any case come at discount compared to equity. This is also to the best interests of the existing shareholders since with every point of debt financing added their benefit increases proportionately without having to share them with new shareholders. Despite the equity portion drops as a rate to total value, in money making terms, the initial shareholders will enjoy excess returns without even further contribution.

Following the initial theory's profound effect in financial economics, Modigliani and Miller in a follow-up paper that was published in 1963 addressed the problem once again this time relaxing the assumption of no-corporate taxes. While taxes reduce the added value from earnings they have a unique characteristic that affect

capital structure, they are paid after the debt interests. This means that despite having to give back to government part of its earnings, the corporation will do so only after they have met their debt obligations which are fixed and not related to operational performance. This characteristic has been introduced in the financial literature as a tax shield.

Using the same hypothesis as before of the levered company compared to the unlevered one Modigliani and Miller proved that when a tax shield is applied, the value of the levered firm is equal to value of the unlevered firm plus the present value of all future tax shields.

$$V_l = V_u + PV \text{ of tax shield}$$

Under the Modigliani Miller assumptions the present value of the tax shield is equal to the total debt multiplied by the corporate tax

$$V_l = V_u + T * D$$

The weighted average cost of capital in turn is decreasing as the total debt ratio of capital structure increases

$$WACC = (1 - T) * \left( \frac{D}{D + E} \right) * r_f + \left( \frac{E}{D + E} \right) * r_E \Rightarrow$$

$$r_E = WACC + [WACC - (1 - T) * r_f] * \frac{D}{E}$$

As we can see from the equation above, the cost of equity  $r_E$  retains its linear relationship with the debt to equity rate but in the tax shielding case the coefficient of the is greater since the tax rate  $T$  is by default lower than 1

$$WACC - (1 - T) * r_f > WACC - r_f$$

Under the tax shield with no default risk hypothesis of the second Modigliani Miller theory it is apparent that the firm's capital structure is no longer irrelevant between the choice of debt and equity. In theory, the ideal corporate capital structure would be to finance a firm's activities purely with debt, exploiting the value maximization and the reduced weighted average cost of capital that the tax shield offers.

### 3.2 TRADE OFF THEORY

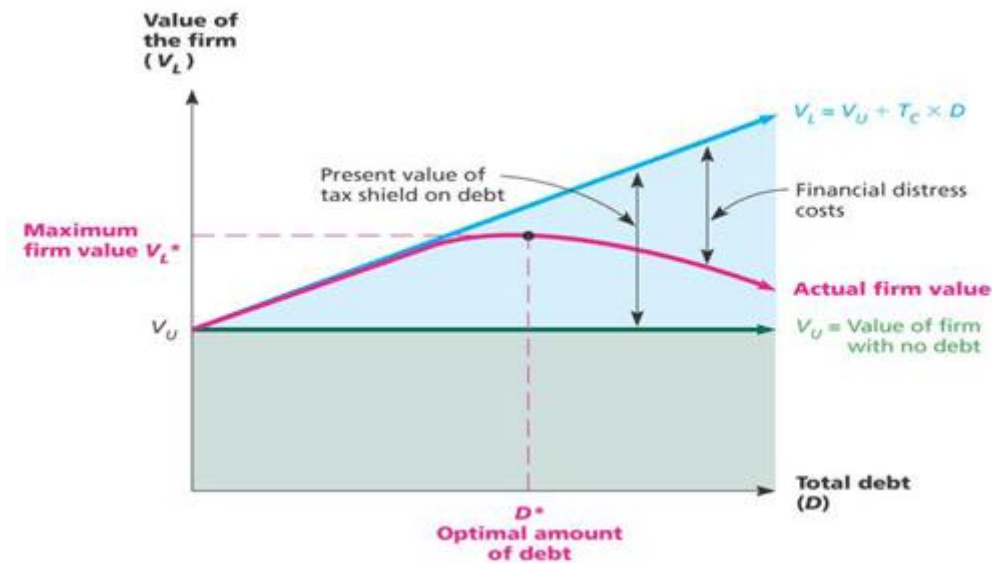
Based on the Modigliani Miller work, in an attempt to create a more realistic model, the Trade Off theory has been developed by relaxing the assumption that there is no bankruptcy cost. According to the second paper of Montigianni and Miller the optimal capital structure would be 100% debt which as anyone can realize is not at all realistic and the reason is bankruptcy cost. Bankruptcies occur when the shareholders exercise their right to default from their obligations to the debt-holders and all other claimants of the company's resources. This process comes at a cost both direct, such as administrative and court costs, and more importantly indirect costs. Examples of indirect costs could be the loss of key employees who will abandon the firm for a more prosperous and stable work environment, refusal of suppliers to provide the required materials and services unless they are paid in advance, fire sale of assets below their replacement value in order to obtain the desirable liquidity and most important capital constrains from unwillingness of financiers to provide debt-financing.

These implications of bankruptcy consists a very costly friction for corporations. As the rate of debt to equity increases and corporate obligations to outsiders along with it the so does the risk that the firm will not be able to satisfy its debtors. As a consequence the debt-holders require higher risk premium to refinance the firm which notably increases the weighted average cost of capital. Incorporating the bankruptcy cost in the calculation of the firms value in respect of the tax shield we get the following equation

$$V_l = V_u + T * D - PV \text{ of Bankruptcy Cost} = V_u + V_{TS} - V_{BC}$$

Where  $V_l$  is the value of the leveraged firm,  $V_u$  the value of the unleveraged firm,  $V_{TS}$  the added value from the tax shield and  $V_{BC}$  the value subtracted due to the cost of bankruptcy. Therefore, the optimal capital structure is at the point where the tax shield benefit and the bankruptcy cost effect are equal. This is the point that the firm has exploited the benefits of after interest tax payment as much as possible, increasing its debt share of capital to the extend where the credit risk premium marginally negates any further tax shield.

Figure 1: TRADE OFF THEORY



This adaptation of bankruptcy cost into the model is called Static Trade Off theory. It is characterized as static because it assumes that there are no transaction costs in rearranging the level of the firm's debt according to the theoretically optimal level. In addition to the static version of the theory, the Dynamic Trade Off theory has also been proposed.

The Dynamic Trade Off theory incorporates transaction costs into the process of rebalancing the debt to equity ratio. Due to the transaction costs, it is not to the best interest of the corporation's management to alter the capital structure just as it moves from the optimal level. Therefore, in the Dynamic Trade Off theory a window of tolerance in the deviation of the optimal debt to equity ratio is introduced. As a result, it is acceptable for a firm to differ to a certain degree from the desired leverage ratio for a certain period of time as the costs to constantly readjusting would be greater from the benefits.

### 3.3 PECKING ORDER THEORY

One of the Modigliani Miller theory basic hypothesis was the one that all market participants possess the same level of information. If this hypothesis is relaxed, then the asymmetry of information problem both in the form of the adverse selection and of the agency problem appears. The information disadvantage of the investors against

the firm's management will lead to increased risk premiums that will differ depending on the information gap between the parties.

Using the information asymmetry problem as a basis, the Pecking Order Theory of corporate capital structure has been developed. According to the theory, a firm will finance its operations and undergoing investments starting from the financing source with the least cost of capital, moving on to the next less return demanding source and will continue in this order. Therefore corporations are expected to primarily choose to raise internal capital by reinvesting the previous year net income and by liquidating short term securities in their financial portfolio. Next in line come bank loans, who have in their disposal the best available information from all other outside entities about the corporation and are able to assure collaterals. This usually allows banks to charge for lower risk premium than all other investors and despite bank debt being the most risky for the firm it is usually preferred. The rest of the financing options in a lower to higher required return order are non bank corporate debt issues such as bonds, preferred stock and common stock.

When the problem of asymmetric information occurs, it has a profound effect on capital structure. The firm needs to balance between the lower interest payments and tax shields of debt issue and the very little legal claims that equity holders hold over the company's assets. The Trade Off between tax shield and the financial risk that the former theory suggests is not very predictable. While debt reduce the weighted average cost of capital in contrast to equity capital, it actually carries more financial risk for the firm. The optimum level of debt to equity is not constant and varies depending from the economic environment that the firm operates. Using excess debt might seem to be providing a comparative advantage but if the economic environment changes and liquidity drops, the debt holders are able to severely press the company's financial status and suppress its operating and investing capabilities

#### **4 CORPORATE SOCIAL RESPONSIBILITY**

For those who have ventured in the bibliography of business economics the term Corporate Social Responsibility (CSR) is no stranger. Though one might make an easy first guess on what CSR might refer to, it still remains a rather vague term in context. A universal definition of CSR is yet to be reached, so we should best use the generalized definition given by Carroll and Buchholtz: “Corporate Social Responsibility encompasses the economic, legal, ethical and philanthropic expectations placed on organizations by society at a given point of time” (Carroll & Buchholtz, 2000). Therefore, for a company to engage in CSR means that it should embrace its social responsibilities, program and then execute the activities that fulfill the expectations of society as a total.

Taking the definition of Carroll and Buchholtz into consideration a fundamental question emanates: “what is expected from a company by society and which of these expectations should the company meet”? The two scholars have developed a Four-Part model of CSR, still trying to cover as many cases as possible. The model categorizes the general responsibilities of a firm scaled top to bottom by significance for its operation and each category is labeled with its importance to society. The resulting model is the following:

- Economic Responsibilities: Required by society
- Legal Responsibilities: Required by society
- Ethical Responsibilities: Expected by society
- Philanthropic Responsibilities: Desired by society

Although this categorization holds true as to what are the possible areas a company can develop its activities and how society values each of them, the second part of the question as to what a firm should do of those expected of it still remains. There have been several theories developed regarding that question which vary according to the stance each of them holds against CSR and at the level that a company should employ CSR strategies.

## 4.1 CSR RELATED THEORIES

### 4.1.1 SHAREHOLDER VALUE

The theory of Shareholder Value represents the Neoclassical Economic theory regarding the role and responsibilities of a corporation. This theory states that the managers' and as a consequence the company's sole responsibility lies with maximizing the shareholders' value. Every other action that does not serve the goal of shareholder value increase or any other legal obligations of the firm towards the state are deemed as unnecessary and distracting to the true cause of the company.

The conception of this theory is that a company exists only as a legal entity and should not undertake any social agendas rather than gain its advantage through specialization to the business at hand. The shareholders in their turn, as active individuals, can then decide how to dispense the value added from the company's activities in the way they best see fit, regarding their role as members of their local, national and global society. The most famous and one of the most vigorous supporters of the shareholder value theory is the Nobel Prize award winner M. Friedman who has time and again expressed his negative opinion of the corporations engaging to CSR strategies.

The corporation should then emphasize to its relations with the basic business counterparts such as suppliers, employees and customers and produce sufficient funds to satisfy the shareholder's expected return on the investment. This approach to the responsibilities of the company has been under critic mostly due to the moral hazard problem. The shareholders are to a significant degree just speculators who's interest is purely on short term stock price maximization, not caring enough even for the company's own sustainability. In support of the critic other theories taking into account CSR have developed.

### 4.1.2 CORPORATE SOCIAL PERFORMANCE

As expressed by D.J. Wood in 1991 "Corporate Social Performance is understood as the configuration in the business organization of principles of social responsibility, processes of response to social requirements and policies, programs and tangible results that reflect the company's relations to society". According to this statement, any corporation must identify its relations to society and then try to

develop the proper processes inside its organization in order to effectively meet the society's needs and expectations.

Corporate Social Performance theory perceives the corporation as a carrier of social responsibilities which must be actively addressed. The firm needs to set specific, preferably measurable, goals of business, social and environmental purposes. Although socially sensitive, the theory usually refers to societal and environmental interactions of the firm that derive straight from its main business processes.

This means that the organization will deal mostly with potential problems caused by every day business such as the company's personal environmental impact or consumer rights and employee working conditions. It is then notably implied that most companies concern of social performance is limited to the level of not having to deal with any legal or business problems and of what marketing benefits may incur through social activities marketing campaigns. Consumers with a strong environmental and social awareness will note if a company communicates its good social performance despite it is limited to basic actions.

#### **4.1.3 STAKEHOLDER THEORY**

The Stakeholder Theory is the most dominant theory concerning CSR with E. Freeman leading its case. It provides a more specific and orderly answer to the question of "which are the direct and indirect interactions of the firm in every aspect of its activity"? Taking into account not just the basic business and financing procedures, already stated in the classical shareholder theory, it maps all other interactions of the organization with economic or social individuals and groups, the Stakeholders.

With the term stakeholder, we refer to any individual, group, organization, or legal entity which either benefits or sustains loss through the corporation's actions. The benefits or losses are considered to be, economic, legal, ethical, social, environmental or of any other possible aspect. Therefore, the stakeholders are, from an economist's point of view, the receivers of both direct transactions and externalities' profits and losses. According to the stakeholder theory, it is the firm's responsibility to act in the interest, to the furthest extent possible, of all stakeholders. To achieve this, an organized program of CSR activities must be implemented at the



core of the firm's strategic goals and as a part of the organizational culture orientation.

#### **4.1.4 CORPORATE CITIZENSHIP THEORY**

This theory, takes corporate social performance to the next step, considering the corporation not only as a carrier of responsibilities but as a member of society itself. Opposed to the shareholder theory, Corporate Citizenship states that the firm should act as an active individual member of society and take up its share of society's problems and issues. Derived from the vast economic, societal and political influence of multinational business organizations, realizing that such power comes with direct responsibilities towards societies and the planet itself, it is the preferred theory in the business world.

Although not very far from the stakeholder theory, managers around the world prefer to use the term corporate citizenship because of its more vague definition compared to the latter which in a sense dictates a more pragmatic analysis of what are the corporation's obligations, not preferred by managers. Corporate Citizenship also refers to a more active role, rendering the firm a leader in shaping the society it operates in, rather than accepting the passive role of addressing externalities.

#### **4.1.5 SUSTAINABILITY**

Sustainability is a systems theory that applies in economics and the field of CSR and is actually investigating the longevity of a system and its ability to operate with stable efficiency throughout its life cycle. The modern economic environment of globalization along with the massive industrial capabilities of this environment is starting to showcase the lack of a responsible stance towards preservation of raw materials and environmental issues as a hole. Industrial activities motivated climate change and materials shortage are starting to plague all societies, and not only those of the poorest countries as we are used to. An active stance towards these problems by corporations who are in fact the most responsible for these effects is considered in modern societies as a de facto demand.

## 4.2 CSR STRATEGIES – SETTING THE BUSINESS AND ETHICAL BASIS

While supporters of each theory are debating on the role of corporations in society, corporate social responsibility as a business practice will need more than a social theory to present its case to the business world. It is up to the corporate managers then to decide whether any company will engage CSR and to what extent.

In real life, managers will need some more pragmatic business arguments on how CSR is going to benefit their organization and endorse it. There have actually been developed a number of business strategies or arguments in support of CSR. These strategies are developed on the basis of existing financial and business theories such as cost or risk reduction, competitive advantage, reputation management and Synergistic Value Creation and they are aligned to one or more of the CSR theories, even the one of Shareholder Value Maximization.

### 4.2.1 ENLIGHTENED VALUE MAXIMIZATION

The argument of enlightened value maximization states that through proper management of trade-offs between the company's various stakeholders, a firm can add significantly to its goal of value maximization for shareholders and the stakeholders as a group.

From management's point of view, this argument has been adapted long before the systematic study of CSR and the stakeholder theory. Keeping employees safe and satisfied or suppliers happy with a little bit extra cost is a classical business strategy. Even the early days' philanthropy was probably in respect of gaining the local society's trust and support.

Furthermore, managers are morally obliged by the contemporary ethic standards of at least the economically and socially developed part of the world to act in an enlightened manner. Although ethics was always a taboo for management it is made clear that given the power that many large corporations possess now days, it is crucial that the matter of ethics , must be actively addressed. Large firms have the power to influence every aspect of the society it operates that social or even political matters should not be taken in lightly.

#### 4.2.2 BASE OF THE PYRAMID STRATEGIES

In today's global economy environment where the reaches of large corporation are almost anywhere around the world, many firms are starting to realize that profit cannot be gained only by the richer western or upper class societies. There are vast numbers of possible low spending consumers around the world and especially in developing countries who are trying to get their share of the marketable products.

Using CSR corporations are trying to increase the economic and social living conditions of people in developing countries, the Base of Social Pyramid. In their turn, this base, having less to worry about the basic needs of life, with increased social and economic standards can then start to turn into more luxurious products thus rendering the pioneering firms the first to gain their trust and a significant competitive advantage over the competition.

#### 4.2.3 SOCIAL IMPACT HYPOTHESIS AND CAUSE RELATED MARKETING

The Social Impact Hypothesis is based on the argument that failure of a firm to meet stakeholders' and society's expectations may lead to substantial losses in profits, market share and funds or materials access. It is actually one of the few arguments that can be verified and measured in corporate history. There have been numerous cases where a company's poor management in environmental, societal or even strictly business related issues has led to the company's shrinking in market share causing serious problems and endangering its very survival as an organization. This is mostly due to lose of trust by stakeholders, society and investors towards the company.

Recovering from such a misfortune can prove to be very difficult and costly. It is not easy to breach the gap between the firm and the stakeholders in the haste that it must be done and it usually takes a huge funding in marketing campaigns and infrastructure investments. This can only make someone wonder what would have happened if such a company had spent a little more in CSR preventing such catastrophes?

Taking the Social Impact Hypothesis one step further, in respect of the before mentioned prominent question, widely accepted Cause Related Marketing campaigns have been organized by corporations of any size around the world. Promoting the corporation's role as a Corporate Citizen, these marketing campaigns are designed to

promote certain philanthropical, environmental and social events or financial endorsements to gain the society's trust in their favor.

Rather than making sure that no misfortunes will occur, as implied by the Social Impact Hypothesis, managers try to gain the upfront advantage over stakeholders and "win their hearts". Cause Related Marketing is so customary in modern corporations that it is often a crucial part of the firm's main strategic goals and absorbs significant corporate funds.

#### **4.2.4 SOCIALLY RESPONSIBLE INVESTING**

Corporate social responsibility theories and practices have spread in every part of the business world and from this trend financial institutions are not an exception. In the financing business, CSR has found practical implementation at what is called socially responsible investments (SRI). Over the past twenty years SRI, which is often branded as ethical investments or sustainable investments, have increasingly been gaining market share all over the world adding up to a multi-trillion dollar market. While SRI market participants still follow the same rules and applications of traditional financial investment theory, they distinguish themselves from other type of investments in the fact that fund managers incorporate in their decision making process not traditional criteria mostly related to social environmental and quality of corporate governance criteria. Trying to define SRI, it could be characterized as "an investment process that considers the social and environmental consequences of investments, both positive and negative, within the context of rigorous financial analysis" (Social Investment Forum (SIF), 2001:4).

The securities selection from a fund manager when engaging in SRI is made by applying a series of investment screens to evaluate his investment opportunities. These screenings are based on a set of variables related to the social or environmental issues that concerns the investor the most, either in a negative or a positive way. There are two common approaches of asset selection through the use of screening variables. On one hand, many investors use ethical discrimination towards the fund seeking corporations when a certain negative variable is present by simply eliminating this particular investment from their list of choices. On the other hand, a more subtle approach is when the screening criteria variables are only part of the investment valuation model. Socially screened assets have become an important part of the investment universe accounting for roughly 10% of the total assets under management

in United States. What is more, governments have become increasingly aware of SRI, as regulatory disclosure of social or environment related variables is growing by the day.

The practices of investment screens have changed over the course of time. It is common for those who exercise SRI to use a variety of screening criteria. According to the social investment forum more than 65% percent of the SRI mutual funds in the United States apply more than five criteria when screening their investment choices whereas less than 20% of them use only one criteria in the screening process. When SRI appeared in the financial world the discriminative screening was the norm. Based on certain negative attributes, fund managers filter securities, eliminating corporations that operate in certain industries such as weapons or alcohol. The actual funds which have applied and have adjusted their investment strategies accordingly, such screens account for \$2.0 trillion in the US (2001 Report on Socially Responsible Investing Trends in the United States, 2001). A common application of a negative screening process is for the screening criteria to be applied on an initial asset pool such as the S&P 500 stocks. After evaluating the relative performance on topics like alcohol, tobacco, gambling and defense industries, labor relations and environment protection the stocks failing the minimum screening criteria are excluded. Following the negative SRI screening, financial and quantitative selection criteria are then applied in forming the portfolio out of the assets that remain after the screening.

The most widely used negative screens typically exclude assets of firms or organizations affiliated with tobacco, alcohol, gambling, weapons and nuclear power. Less common negative screens can be listed as well, such as irresponsible foreign operations, pornography, abortion, workplace conditions, violation of human rights, and animal testing. A number of socially responsible funds tend to avoid investing in companies when their revenue that results from anti-social or unethical business sectors surpass a certain threshold. On the other hand, other SRI funds include in the negative screening process not only the evaluated firm but also to the company's subsidiaries or suppliers. A small number of SRI funds use screens that relate to the owners' or the managers' ideological or religious convictions. For instance, firms that produce pork products are likely to be negatively screened or even insurance companies that insure unmarried couples.

In modern finance, SRI portfolios are created using mostly positive screens, which in practice refers to selecting assets that meet superior performance over social and environmental factors. The most common positive screens focus on corporate governance, labor relations, the environment, sustainability of investments, and the stimulation of cultural diversity. It is not unusual for funds to select firms with a good track record on variables used to evaluate renewable energy usage or community involvement. The widespread adaptation of positive screens is usually applied using the ‘best in class’ approach. Companies are ranked depending the industry or market sector they operate in, on the basis of social, governance and environmental criteria. Subsequently, out of each economic sector the firms are selected for SRI portfolios are required to have passed a minimum threshold.

The latest practice of SRI in selecting assets and companies to invest in is the combination of both negative and positive screens regarding the economic, environmental and social criteria. This last approach in the financing selection process is often called “sustainability” or "triple bottom line". The sustainable investing approach is some cases combined with shareholder activism and commitment. In this case, portfolio managers or companies specialized in evaluating firms according to corporate social responsibility standards attempt to influence the management of these firms, competing for financing capital. This is achieved either through direct dialogue with the managers in person or by exercising shareholder voting rights at Annual General Meetings.

**Table 1: SRI SCREENING CRITERIA**

This table summarizes the investment screens used by SRI mutual funds. In the last column, the ‘-’ refers to a negative screen, whereas ‘+’ refers to a positive one. Data are compiled from Social Investment Forum (2003: 42) and the Natural Capital Institute ([www.responsibleinvesting.org](http://www.responsibleinvesting.org)).

<b>Screens</b>	<b>Definitions</b>	<b>Type</b>
Tobacco	Avoid manufacturers of tobacco products	-
Alcohol	Avoid firms that produce, market, or otherwise promote the consumption of alcoholic beverages	-
Gambling	Avoid casinos and suppliers of gambling equipment	-
Defense /Weapons	Avoid firms producing weapons for domestic or foreign militaries, or firearms for personal use	-

Nuclear Power	Avoid manufacturers of nuclear reactors or related equipment and companies that operate nuclear power plants	-
Irresponsible Foreign Operations	Avoid firms with investments in government-controlled or private firms located in oppressive regimes such as Burma or China, or firms which mistreat the indigenous peoples of developing countries	-
Pornography / Adult Entertainment	Avoid publishers of pornographic magazines; production studios that produce offensive video and audio tapes; companies that are major sponsors of graphic sex and violence on television	-
Abortion /Birth Control	Avoid providers of abortion; manufacturers of abortion drugs and birth control products; insurance companies that pay for elective abortions (where not mandated by law); companies that provide financial support to Planned Parenthood	-
Labor Relations and Workplace Conditions	Seek firms with strong union relationships, employee empowerment, and/or employee profit sharing. Avoid firms exploiting their workforce and sweatshop	+ -
Environment	Seek firms with proactive involvement in recycling, waste reduction, and environmental cleanup. Avoid firms producing toxic products, and contributing to global warming	+ -
Corporate Governance	Seek companies demonstrating "best practices" related to board independence and elections, auditor independence, executive compensation, expensing of options, voting rights and/or other governance issues. Avoid firms with antitrust violations, consumer fraud, and marketing scandals.	+ -
Business Practice	Seek companies committed to sustainability through investments in R&D, quality assurance, product safety	+

Employment Diversity	Seek firms pursuing an active policy related to the employment of minorities, women, gays/lesbians, and/or disabled persons who ought to be represented amongst senior management	+
Human Rights	Seek firms promoting human rights standards Avoid firms which are complicit in human rights violations	+ -
Animal Testing	Seek firms promoting the respectful treatment of animals Avoid firms with animal testing and firms producing hunting/trapping equipment or using animals in end products	+ -
Renewable Energy	Seek firms producing power derived from renewable energy sources	+
Biotechnology	Seek firms that support sustainable agriculture, biodiversity, local farmers, and industrial applications of biotechnology. Avoid firms involved in the promotion or development of genetic engineering for agricultural applications.	+ -
Community Involvement	Seek firms with proactive investments in the local community by sponsoring charitable donations, employee volunteerism, and/or housing and educational programs	+
Shareholder activism	The SRI funds that attempt to influence company actions through direct dialogue with management and/or voting at Annual General Meetings	+
Non-married	Avoid insurance companies that give coverage to non-married couples	-
Healthcare/ Pharmaceuticals	Avoid healthcare industries (used by funds targeting the "Christian Scientist" religious group)	-
Interest-based Financial Institutions	Avoid financial institutions that derive a significant portion of their income from interest earnings (on loans or fixed income securities). (Used by funds managed according to Islamic principles)	-



Pork Producers	Avoid companies that derive a significant portion of their income from the manufacturing or marketing of pork products. (Used by funds managed according to Islamic principles)	-
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#### 4.2.5 NATURAL RESOURCE BASED VIEW OF FIRM – SUSTAINABLE ENTERPRISE NETWORKS

The sustainability movement has influenced its share of corporation throughout the world and with good reason. Resource based companies and their suppliers are now starting to realize, most likely a few decades too late, that respect of the environment and prudent extraction of the earth's natural resources are mandatory if they mean to stay in business for as long as they have planned.

Despite the cries of naturalists, companies on the course of the second half of the 20<sup>th</sup> century have been vigorously extracting as much natural resources as they see fit with no regard to the longevity of these resources or the environmental and social impact on the extraction lands. This is mostly identified as a moral hazard problem whereas managers did the best they could for short term profit maximization, neglecting the long term investors' interest of keeping the resources to a sustainable level.

Social progress though, along with the demand of socially responsible corporations and the realization that both resources and societies near extraction points need to be preserved so as to vital and sustainable enterprise network may be established.

Sustainability issues have also influenced not only resource based, but material consuming corporations also. It has become regulatory in most countries for corporations to reduce their carbon footprint, trying to reduce the Greenhouse effects. Environmental laws have multiplied around the globe, setting a very tight space for corporation not conforming to environmental and social demands. Even services companies, mostly as an act of Cause Related Marketing and as cost reduction measure have taken up environmental sensitive programs both internally and externally of the company's business activities.

#### 4.2.6 AVIALABLE FUNDS HYPOTHESIS

In conclusion, developed around the hypothesis that corporations tend to retain available funds either by not having a better investing alternative or in order to indulge the managers' certain luxurious habits, is the argument that if not better spent, these available funds should finance the company's social responsibility programs. It is not only the ethically right thing to do but it can also send a quite positive message to the investors' society.

Investing in CSR gives off the impression to investors of a stable company, who can afford to spend a little more on non business activities, and that the moral hazard problem is not an issue in this firm. It also makes good business because a significant part of consumers in socially sensitive societies that tend to appreciate such endeavors when it comes from companies that are not expected to do so in relation to their "business as usual".

### 4.3 RISK AND RETURN OF SRI PORTFOLIOS

While each of the described CSR related business strategies offers sound arguments in support of the superior performance that can be achieved if adapted by a firm seeking both internal and external financing, it is quite difficult to support this claim with actual measurable results. In the end, managers, shareholders and especially scholars are proven disbelieving of non measurable facts. The only of the above mentioned strategies that is somewhat more measurable is the one of socially responsible investment (SRI).

The advantage of it lies in the fact that, when it comes to financial markets, performance is determined by a combination of two very distinct and measurable factors, the risk and the return of the investment. It also comes with the advantages of extensive data availability regarding the financial markets provided by the information market agencies, and of course the fact that most financial market trades are concluded "above the table" with one or more regulating entities involved. In this light, despite the fact that performance of financial investments can be affected by numerous reasons, it is still plausible to compare SRI and non SRI portfolios.

In the last decades there have been several studies that attempt to measure the performance of socially responsible investment strategies compared to the

performance of similar portfolios that do not incorporate any social or environmental screenings. These measurements

## 5 MEASURING CORPORATE SOCIAL RESPONSIBILITY

With the social responsibility theories gaining corporate ground rapidly, business ventures that combine both financial and sustainability driven goals tend to be the norm rather the exception in modern entrepreneurship. Yet to achieve progress through socially driven agendas both corporate executives and financiers must confront a challenge that plagues the corporate social responsibility concept since it's very beginnings - quantifying and tracking social performance.

When it comes to measuring performance of an organization in any kind of activity there usually are two distinct desired measurements. The first is to measure the performance of the organization as a unit. In order to do so a number of variables must be set up that will serve as key point indicators of a business's performance and

### 5.1 The Greenhouse Gas Protocol

The Greenhouse Gas Protocol Initiative is a multi-stakeholder partnership of businesses, nongovernmental organizations (NGOs), governments, academics, and others convened by the World Business Council for Sustainable Development (WBCSD) and the World Resources Institute (WRI) (Greenhouse Gas Protocol (GHG Protocol)). Started in 1998, the Initiative's goal is to develop internationally and widely accepted greenhouse gas (GHG) accounting and reporting standards and protocols, and to promote their broad adoption. The GHG Protocol Initiative is comprised of two separate but linked modules:

- the GHG Protocol Corporate Accounting and Reporting Standard (Corporate Accounting Standard),
- the GHG Protocol for Project Accounting.

The GHG Protocol Corporate Standard provides standards and guidance for companies and other types of organizations preparing a GHG emissions inventory. It covers the accounting and reporting of the six greenhouse gases covered by the Kyoto Protocol—carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF<sub>6</sub>). The standard was designed with a set of objectives that would help the corporations who wish to adapt the protocol to prepare a GHG inventory that represents a true and fair account of their emissions, through the use of standardized approaches and principles. It also provide a simplified procedure that will reduce the costs of compiling a GHG inventory and provide business with information that can be used to build an effective strategy to manage and reduce GHG emissions. Along with the devised strategies, the information gathered will eventually be put in use in order to increase consistency and transparency in GHG accounting and reporting among various companies and GHG programs. Both business and other stakeholders benefit from converging on a common standard. For business, it reduces costs if their GHG inventory is capable of meeting different internal and external information requirements. For others, it improves the consistency, transparency, and understandability of reported information, making it easier to track and compare progress over time.

The GHG Protocol for Project Accounting (Project Protocol) provides specific principles, concepts, and methods for quantifying and reporting GHG reductions—i.e., the decreases in GHG emissions, or increases in removals and/or storage—from climate change mitigation projects (GHG projects). The Project Protocol is the culmination of a multi-stakeholder debate and collaboration process, designed to draw knowledge and experience from a wide range of expertise. During its development, more than twenty developers of GHG projects tested a prototype version of the Protocol, and more than a hundred experts reviewed it. The Project Protocol's objectives are to provide a credible and transparent approach for quantifying and reporting GHG reductions from GHG projects and also enhance the credibility of GHG project accounting through the application of common accounting concepts, procedures, and principles. It therefore provides a platform for harmonization among different project-based GHG initiatives and programs. To clarify where specific actions are essential to meeting these objectives, the Project Protocol presents

requirements for quantifying and reporting GHG reductions and provides guidance and principles for meeting those requirements. Though the requirements are extensive, there is considerable flexibility in meeting them. This flexibility arises because GHG project accounting necessarily involves making decisions that directly relate to policy choices faced by GHG programs—choices that involve tradeoffs between environmental integrity, program participation, program development costs, and administrative burdens. Because the Project Protocol is not intended to be biased toward any specific programs or policies, the accounting decisions related to these policy choices are left to the discretion of its users.

The Project Protocol is written for project developers, but should also be of interest to administrators or designers of initiatives, systems, and programs that incorporate GHG projects, as well as third-party verifiers for such programs and projects. Any entity seeking to quantify GHG reductions resulting from projects may use the Project Protocol. However, it is not designed to be used as a mechanism to quantify corporate or entity wide GHG reductions; the Corporate Accounting Standard should be used for that purpose. GHG projects can be undertaken for a variety of reasons, including generating officially recognized GHG reduction “credits” for use in meeting mandatory emission targets, obtaining recognition for GHG reductions under voluntary programs, and offsetting GHG emissions to meet internal company targets for public recognition or other internal strategies. Though the Project Protocol is intended to be compatible with all of these purposes, using it does not guarantee a particular result with respect to quantified GHG reductions, or acceptance or recognition by GHG programs that have not explicitly adopted its provisions. Users are strongly encouraged to consult with relevant programs or other interested parties regarding the resolution of policy-relevant accounting decisions. In the absence of external guidance on these decisions, users should strive for maximum transparency when justifying the basis of such decisions and fulfilling the Project Protocol’s requirements.

## **5.2 Social Accountability International (SAI)**

“Social Accountability International (SAI) is a non-governmental, multi-stakeholder organization whose mission is to advance the human rights of workers

around the world. It partners to advance the human rights of workers and to eliminate sweatshops by promoting ethical working conditions, labor rights, corporate social responsibility and social dialogue”. (Social Accountability International (SAI))

Social Accountability International effort is to protect the integrity of workers around the world by building local capacity and developing systems of accountability through socially responsible standards. It established one of the world's preeminent social standards, the SA8000® standard for decent work, a tool for implementing international labor standards that is being used in over 3,000 factories, across 66 countries and 65 industrial sectors. Many more workplaces are involved in programs using SA8000 and SAI programs as guides for improvement. Social Accountability International is one of the world's leading social compliance training organizations, having provided training to over 30,000 people, including factory and farm managers, workers, brand compliance officers, auditors, labor inspectors, trade union representatives and other worker rights advocates.

Social Accountability International (SAI) is a non-governmental, multi-stakeholder organization whose mission is to advance the human rights of workers around the world. It partners to advance the human rights of workers and to eliminate sweatshops by promoting ethical working conditions, labor rights, corporate social responsibility and social dialogue. SAI established one of the world's preeminent social standards the SA8000® standard for decent work, a tool for implementing international labor standards. Many more workplaces are involved in programs using SA8000 and SAI programs as guides for improvement.

### **5.3 Global Reporting Initiative (GRI)**

The Global Reporting Initiative (GRI) is a leading organization in the sustainability field which promotes sustainability reporting in an effort to engage companies and organizations in the sustainable business practices and contribute to sustainable economic development. A sustainability report is a report published by a company or organization about the economic, environmental and social impacts caused by its everyday activities. It also presents the values and governance model of reporting organizations, as well as demonstrates the link between its strategy and its commitment to a sustainable global economy.

The Global Reporting Initiative aims to make sustainability reporting standard practice for all companies and organizations. It has created a framework, which is a reporting system, that provides metrics and methods for measuring and reporting sustainability-related impacts and performance. The core document of this reporting framework is the GRI's Sustainability Reporting Guidelines named G4. The G4 is actually a guideline of how to conduct sustainability reports that convey disclosures on an organization's material impacts, either positive or negative, on the environment, society and the economy. The robustness of a sustainability report depends not only from the mere data gathering or compliance exercise. It needs to render abstract issues tangible and concrete, helping organizations to set goals, measure performance, and manage change. Under this premise G4 reporting guidelines encouraging organizations to provide only disclosures and indicators that are material to their business, on the basis of a dialogue with their stakeholders. This in turn results in sustainability reports that are centered on the issues that are really critical in order to achieve the organization's main goals and manage its economic, environmental and social impacts, as well as making it easier for report users to navigate through them.

Therefore, the G4 guidelines focus on the following information disclosure points

- G4's **Governance** disclosures focus on how sustainability issues are addressed at the very top of the organization. They ask how far up the responsibility for sustainability goes in an organization, and prompt analysis of the criteria that are used when senior people are appointed.
- The **Ethics and Integrity** disclosures concern information about the organization's values and ethics, and any related codes of conduct. Disclosures cover the organization's systems for conforming to lawful and ethical behavior, including mechanisms for interested parties to raise concerns.
  - The **Anti-corruption** disclosures seek information about how risk assessments are used to identify the potential for corruption. They investigate how widely anti-corruption policies and procedures have been disseminated, including among the organization's business partners. Changes to existing Indicators promote increased transparency on confirmed incidents of corruption, and the organization's responses. They also request more detail about the recipients and beneficiaries of political donations.
- G4's **GHG Emissions** disclosures are directly aligned with the 'Scope' categories of the GHG Protocol issued by WRI and WBCSD and ISO 14064, making it easier to

harmonize reporting with different instruments. Through this alignment with best practice, G4 also achieves compatibility of reporting requirements with the CDP questionnaire. In addition, Indicators on energy have been streamlined with those on emissions, further simplifying the reporting process.

- The **Supply Chain** disclosures require the organization to first assess and describe its supply chain; an exercise that is likely to offer immediate insights. The disclosures can be applied by all organizations, however large or extensive their supply chains. The disclosures focus on environmental, labor, human rights and social impacts – including those the organization has caused or contributed to, or that can be linked with its activities. In line with the UN Guiding Principles on Business and Human Rights, the deciding factor is the impact – not the organization’s level of control over particular suppliers.
- **Generic format for Disclosures on Management Approach (DMA).** The DMA disclosures help organizations to provide an overview of their approach to sustainability issues. What is an organization’s understanding of its sustainability impacts? How does that fit with its strategy and business model? And what needs to change? By offering a template for how best to formulate their thinking and communication, G4 lets companies tell a complete, results-focused story.
- **GRI Content Index, offering a transparent format to communicate issues covered.** As the gateway and map for a sustainability report, the Content Index plays a major part in helping stakeholders to find and assess the information they are looking for. G4 includes advice to help organizations make more effective use of their Content Index, be more thorough, and offer more transparency on where information can be found in the report.

The Global Reporting Initiative have taken special interest in making the G4 reporting guidelines a tool rather than a burden for organizations as well as the interested stakeholders. It provides the flexibility to combine with local and regional reporting requirements and frameworks. Companies and organizations are facing ever-growing reporting requirements. But overlaps and lack of consistency can be a barrier to joined-up and manage-able reporting. G4 can be used flexibly, so that organizations can collate and present information that meets multiple requirements simultaneously, using GRI’s metrics as the basis of their disclosures. Adding up to the flexibility, the guidelines are constantly updated in order to achieve harmonization and reference to internationally-accepted reporting documents. Internationally recognized standards can be used with G4. References,



pointing out synergies and compatibilities with these standards, are provided throughout G4, which is designed as a consolidated framework for reporting performance against different codes and norms; for example, normative frameworks for socially responsible behavior such as the UN Global Compact Ten Principles and the OECD Guidelines for Multinational Enterprises.

From the reporting firm's or organization point of view, if they wish to demonstrate that their report is in accordance with the Guidelines, they must self-declare the extent to which GRI's Framework has been applied in their sustainability report. G4 guideline allows organizations to choose to declare "in accordance" at one of two levels – Core or Comprehensive, based on which best meets their reporting needs. The Core option contains the essential elements of a sustainability report and provides the background against which an organization communicates its economic, environmental, social, and governance performance and impacts. For both Core and Comprehensive options, reporting on the organization's management approach (DMA) is an essential requirement. Under the Core option, an organization must report at least one Indicator for all identified material Aspects. The Comprehensive option builds on the Core option by requiring a number of additional disclosures about the organization's strategy and analysis, governance, ethics and integrity. Under the Comprehensive option, an organization must report all Indicators for all identified material aspects.

As a conclusion, it might be fair to state that the Global Reporting Initiative is perhaps the most promising endeavor of sustainability and socially responsible reporting. It is a fact that one the basic problem of the corporate social responsibility support movement is the lack of commonly accepted and used standards in which to measure an organization's performance in the great variety of business aspects that it CSR refers to. The Global Reporting Initiative is actually trying to compensate that lack of unified approach. Most CSR related companies have set up their own valuation models, which they try to in a way convince either the companies or the stakeholders that this particular model is the best for evaluating the social and environmental performance. On the other hand, the Global Reporting Initiative does not provide an actual reporting, but a set of rules that can be integrated with measurement methods if they happen to "fit" the guidelines. It is only natural and expected that metric and valuation methods will be always evolving. The critical part is that this evolution will be following the reasoning of unified reporting standards and

practices that can provide robust data that will enable to actually compare and evaluate the performance across organizations.

## 6 ENVIRONMENTAL PERFORMANCE AND CORPORATE CAPITAL STRUCTURE – EMPIRICAL STUDY

### 6.1 HYPOTHESIS DEVELOPMENT AND METHODOLOGY

The impact of corporate social responsibility in the financial markets, as the aforementioned studies illustrate is not very clear and cannot be easily determined. Stock and bond markets show very little signs of rewarding socially ethical behavior in terms of excess return despite the fact that socially responsible investment is growing in size by the day. On the other hand, while banks usually adopt a more traditional pure financial assessment approach, when it comes to risk premium they tend to reward, even though marginally, good or perhaps “by the book” corporate citizens. Furthermore as Weber Scholz and Michalik 2010 demonstrated if social and environmental criteria are adapted, default risk can be more accurately estimated (Weber, Scholz, & Michalik, 2008). This is also evident by the superior issuer ratings that rating agencies tend to award to high environmental performers (Bauer & Hann, 2010). Using these insights from the related literature, one might come to the conclusion that what is actually taken into more consideration by the financial markets regarding CSR is the apparent reduced risk it provides. Improved sustainability and endurance to market and individual events shocks seems to be the better argument supporting CSR and SRI.

Tracking these findings, we attempt to examine and determine the existence of correlation between a firm’s disclosed environmental performance and its access to debt financing in respect to the information asymmetry related theories of corporate capital structure. Therefore, we assume that superior environmental performance and its disclosure reduce the information asymmetry problem enabling the firm’s to acquire debt financing with lower risk premium. As consequence, lower risk premium is expected to increase the use of leverage since bankruptcy costs are minimized.

*Hypothesis: Firms with superior environmental performance are expected to have a higher total debt to total assets ratio.*

The relationship will be examined by performing a linear regression with the method of ordinary least squares for the coefficient estimate, using as a dependent variable the **total debt to total asset** ratio of each firm and as the independent variable used to measure environmental performance the **Bloomberg Environmental disclosure score**. The dataset is comprised of data from firms strictly from the United States of America for the year of 2007 which is prior to the financial and banking crisis of 2008. Examining corporate capital structure during this period would probably distort the results since it has a profound effect on the access to debt financing terms.

According to the related literature, the most important determinants of a firm's debt ratio are the size of the firm, the total tangible assets, earnings, industry median leverage, growth opportunities and inflation when examining multiple markets (Murray & Vidhan, 2009), (Öztekin, Forthcoming). The size of the firm is usually positively related to debt ratio and it should be expected since large corporations are less risky for investors when compared to smaller firms who in the first side of trouble their cash flows might not be enough to endure a liquidity crisis. In our regression we have used as a proxy variable for the firm size the log of total assets of the firm. The logarithmic scale is used to amend for the skewness that is indicative of total assets as a variable. Tangible assets are also found to be positively related to debt financing ratio and this because tangible assets are qualified as potential collateral on bank loans, which lowers capital constraints. This variable is used as it is measuring the value of tangible assets for each firm.

Next on our list are earnings which are expected to be with a negative coefficient sign. This is consistent to the pecking order theory of the corporate capital structure indicating that firms with superior earnings to others are more likely to finance their future operations and investment through internal financing. On our regression model the variable used to measure effect of earnings is EBITDA (earnings before interest, taxes, depreciation and amortization) to total assets, which is a standardized measure that can be used across different firm sizes and industries. On the other hand, growth opportunities of a firm are expected to show a positive coefficient sign translating into greater need for financing in order to exploit its growth potentials. Market value to Book value of a firm is often used as a proxy of growth opportunities and this is also the case in the current study.

Industry median leverage is another essential factor determining the debt financing rate of a company which can be attributed to the completion between firms of the same industry or the different levels of capital that is needed across sectors. Nonetheless, this variable will not be incorporated in the regression model as its assumed effect is washed out by the application of industry dummies. The industry dummies will be based on the two digit standard industrial classification (sic) codes of the US securities' and exchange commission. There will also be no variable used for inflation rate as the dataset is constituted by firms of the same market and it is consequently not of significance.

To summarize the variables used for the regression are the following

- Total debt to total assets (dba)
- Bloomberg environmental disclosure score (env)
- Log of total assets (lta)
- Tangible assets (tnga)
- EBITDA to Total assets (ebitdata)
- Market value to Book value (mtb)
- Industry Dummies (sic2)

All the data are collected from Bloomberg.

## 6.2 BLOOMBERG ENVIRONMENTAL DISCLOSURE SCORE

In our study we incorporate as a proxy for environmental performance the Bloomberg Environmental Disclosure Score. This measure is not a particularly widespread variable in relative studies but it holds certain key characteristics that render it suitable to this case study. Before presenting these characteristics we should first elaborate on how the variable is established as a combination of other standalones.

To turn first, the Environmental Disclosure Score is actually a part of the Bloomberg ESG Disclosure Score which quantify a company's transparency in reporting environmental, social and governance data. Bloomberg collects data from corporate social responsibility, company websites, annual reports and from surveys created by Bloomberg ESG department. All the data collected can be traced back to

an official company document and are therefore fully transparent. When collected, these data are standardized in multiple units of measure to achieve fully comparable metrics among firms globally.

Launched in 2009, Bloomberg ESG has researched 20,000 companies worldwide in large market cap indices and major exchanges. As a result of this research, Bloomberg acquired ESG data for over 5,500 companies in 68 countries. Like all Bloomberg offerings, ESG is global in scope and fully comprehensive in nature. As companies anywhere in the world initiate reporting of ESG data, Bloomberg will start covering these companies. Bloomberg also has ongoing research of major indices and regions for new company reporting that had not been announced at the time of publication. A company's ESG coverage is updated at the time that all environmental, social, and governance data metrics are available for the fiscal period year end. As CSR reports are often issued at a different point in time than Annual Reports, Bloomberg ESG data updates may not coincide with the data of annual report releases.

The dataset of ESG score is constituted by a number of variables which cover a variety of environmental, social and governance points of interest. The number of the variables is increasing every year. At the date that we retrieved the necessary data for our empirical study (5/2/2014) the variables monitored are 145, compared to 101 data points at 2010 **Invalid source specified**.. Not all of the variables are used to calculate the ESG disclosure score for every corporation. There has been a classification of the most important variables per industry and each company is scored based on the disclosure of these data points that are deemed as more crucial for the industry it operates in. These variables are also categorized depending on which CSR category are related, which means they are broken down to environmental, social and governance related variables. This is very important for calculating individual disclosure score for each of these categories.

An important characteristic of the Bloomberg disclosure score, whether it refers to the aggregate ESG score or to a component of it such as the environmental disclosure score, is that Bloomberg does not make its own evaluation on the firm's performance. Every variable's value is the standardized actual reported value by the corporation itself. The score is calculated as the equal weighted division of the total

number of data points disclosed by a firm to the total number of data points that are indicative for the industry the firm operates in. Therefore the Bloomberg environmental disclosure score used in this study is the rate of the data points disclosed to the total relevant variables. The fact that a non performance evaluation score is used to measure environmental performance might seem puzzling at first but in the scope of this paper this is probably the most recommended measure to use.

Firstly, according the recently published paper of Manpreet Hore and Ravi Subramanian “Relationship Between Environmental Disclosures and Environmental Performance” (Hore & Subramanian, 2013) there is a positive relationship between a firm’s voluntary environmental disclosure and its actual environmental performance and moreover the disclosure of environmental achievements have a stronger positive relation to environmental performance than disclosure of environmental intents. The authors attribute this positive influence to the improved verifiability of the disclosed environmental variables as well as the increased scrutiny by stakeholders of the disclosing firms and are based on the first perspective of the organizational legitimacy theory (Gray, Owen, & Adams, 1995) (Lindblom, 1994). According to the organizational legitimacy theory “firms highlight that they are operating in a manner consistent with stakeholder and societal expectations regarding environmental efforts” (Hore & Subramanian, 2013) and the first perspective states that the firms actually change, or at least they intend to do so, their internal operations to coincide with their disclosures. The fact that the Bloomberg environmental disclosure score is a rate of disclosure that is adjusted according to the corporation’s industry demonstrates the existence of discretionary environmental disclosures given the fact that regulatory disclosures can be assumed to be reported by all industry participants and excess disclosure rate is obtained by non regulatory reporting. This is also achieved by the selection of firms from the same economy which operate under the same regulatory frame.

Furthermore, the Bloomberg environmental disclosure score is a very objective measurement standard. Other valuating firms such as Reughters-Thomson ASSET 4 or KLD whose ratings are widely used in the literature for measuring CSR performance use their own valuation techniques or assign weights to the variables they deem as more critical depending to the case. Despite the fact that the latter techniques are widely accepted and are designed by field experts, a substantial part of

the valuation process is based on models that are contaminated by the experts' subjective stance towards certain indicators and issues. In order to effectively assess the individual environmental performance rating companies methods, requires systematic and in depth examination of scientific trends regarding each valuation criteria separately. This is the reason that, despite the fact that Bloomberg allows each user to create a personalized scorecard regarding environmental and social performance to measure a firms performance, this option was not used in this study because an assessment on our behalf would not have been made on a solid basis.

Nonetheless, the Bloomberg environmental disclosure score still performs an industry wise valuation. As stated earlier, the disclosure score of each firm is calculated only as a rate of the total variables concerning only the industry it operates in and does not take into consideration any other variable that would be of little interest if reported. This fact makes cross examination between firms of different industries possible and along with the use of industry dummy variables in the regression estimation industry related effects are washed out.

Next we provide a list of all variables that are used to calculate the Bloomberg environmental disclosure score as published by Bloomberg SA

- **Environmental Disclosure Score (RX374):** Proprietary Bloomberg score based on the extent of a company's environmental disclosure as part of Environmental, Social and Governance (ESG) data. Companies that are not covered by ESG group will have no score and will show N/A. Companies that do not disclose anything will also show N/A. The score ranges from 0.1 for companies that discloses minimum amount of ESG data to 100 for those that disclose every data point collected by Bloomberg. Each data point is weighted in terms of importance, with data such as Greenhouse Gas Emissions carrying greater weight than other disclosures.
- **Percent of Disclosure (ES074):** Percentage of the company's operations that are covered in its disclosures on emissions. A blank in this field indicates that the scope of coverage on emissions was not disclosed.
- **Scope of Disclosure (ES262):** Specifies the scope of disclosure for the company's emission data. The number represents the disclosure type, as follows: 1 - Operational Control / 2 - Financial Control / 3 - Equity Share.

- **Consistent Reporting Basis (ES263):** Indicates whether the company consistently discloses its environmental data on an operational control or equity share basis. "N" indicates that the company does not consistently report data on either an operational control or equity share basis.
- **Direct CO2 Emissions (Th Tonnes) (ES001):** Direct Carbon Dioxide (CO2) Emissions of the company, in thousands of metric tons. Direct Emissions are those emitted from sources that are owned or controlled by the reporting entity. Examples of Direct Emissions include emissions from combustion in owned or controlled boilers, furnaces, vehicles, and emissions from chemical production in owned or controlled process equipment. Emissions expressed as generic Greenhouse Gas emissions or CO2 equivalents (CO2e) will not be captured in this field.
- **Indirect CO2 Emissions (Th Tonnes) (ES002):** Indirect Carbon Dioxide (CO2) Emissions of the company, in thousands of metric tons. Indirect Emissions are those emitted that are a consequence of the activities of the reporting entity, but occur at sources owned or controlled by another entity. The principle source of Indirect Emissions is emissions from purchased electricity, steam and/or heating/cooling. These emissions physically occur at the facility where electricity/steam/heating/cooling is generated. Emissions expressed as generic Greenhouse Gas emissions or CO2 equivalents (CO2e) will not be captured in this field.
- **Total CO2 Emissions (Th Tonnes) (ES003):** Total CO2 Emissions of the company, in thousands of metric tons. Where the company does not report Total CO2 emissions, this field is populated with the sum of the company Direct CO2 Emissions and Indirect CO2 Emissions. Emissions reported as generic Greenhouse Gas emissions or CO2 equivalents (CO2e) will not be captured in this field. For index tickers, total amount of CO2 emitted by a power plant (in metric tons).
- **Methane Emissions (Th Tonnes) (ES011):** Total amount of methane emitted by the company, in thousands of metric tons
- **Direct Nitrous Oxide Emissions (ES229):** Direct nitrous oxide (N2O) emissions of the company, in thousands of metric tons. Direct emissions are those emitted from sources that are owned or controlled by the reporting



entity. Data includes both energy-related (from fuel combustion) and process-related emissions.

- **Direct Sulfur Hexafluoride Emissions (ES230):** Direct sulfur hexafluoride (SF<sub>6</sub>) emissions of the company, in thousands of metric tons. Direct emissions are those emitted from sources that are owned or controlled by the reporting entity. Data includes both energy-related (from fuel combustion) and process-related emissions.
- **Travel Emissions (Th Tonnes) (ES006):** Carbon dioxide (CO<sub>2</sub>) emissions associated with employee travel, in thousands of metric tons. Travel Emissions are defined as those generated by company employees when conducting business travel by air, rail and any other vehicles. NOTE: employee car travel excludes employee commuting and business travel by company owned vehicle. Business travel by company owned vehicles, reported as CO<sub>2</sub> emissions, should be captured as Direct CO<sub>2</sub> emissions. Travel Emissions expressed as generic Greenhouse Gas emissions or CO<sub>2</sub> equivalents (CO<sub>2</sub>e) will not be captured in this field.
- **Direct Methane Emissions in CO<sub>2</sub> Equivalent (ES231):** Direct methane (CH<sub>4</sub>) emissions of the company, in thousands of metric tons of carbon dioxide equivalent (CO<sub>2</sub>e). Direct emissions are those emitted from sources that are owned or controlled by the reporting entity, in accordance with the Greenhouse Gas Protocol (GHG) Scope 1 definition. Data includes both energy-related (from fuel combustion) and process-related emissions. Where a company does not report emissions in CO<sub>2</sub>e, Bloomberg converts it to CO<sub>2</sub>e using a Global Warming Potential (GWP) of 21.
- **Direct Nitrous Oxide Emissions in CO<sub>2</sub> Equivalent (ES232):** Direct nitrous oxide (N<sub>2</sub>O) emissions of the company, in thousands of metric tons of carbon dioxide equivalent (CO<sub>2</sub>e). Direct emissions are those emitted from sources that are owned or controlled by the reporting entity, in accordance with the Greenhouse Gas Protocol (GHG) Scope 1 definition. Data includes both energy-related (from fuel combustion) and process-related emissions. Where a company does not report emissions in CO<sub>2</sub>e, Bloomberg converts it to CO<sub>2</sub>e using a Global Warming Potential (GWP) of 310.

- **Direct HFC Emissions in CO2 Equivalent (ES233):** Direct hydrofluorocarbon (HFC) emissions of the company, in thousands of metric tons of carbon dioxide equivalent (CO<sub>2</sub>e). Direct emissions are those emitted from sources that are owned or controlled by the reporting entity, in accordance with the Greenhouse Gas Protocol (GHG) Scope 1 definition.
- **Direct PFC Emissions in CO2 Equivalent (ES234):** Direct perfluorocarbon (PFC) Emissions of the company, in thousands of metric tons of carbon dioxide equivalent (CO<sub>2</sub>e). Direct emissions are those emitted from sources that are owned or controlled by the reporting entity, in accordance with the Greenhouse Gas Protocol (GHG) Scope 1 definition.
- **Direct SF6 Emissions in CO2 Equivalent (ES235):** Direct sulfur hexafluoride (SF<sub>6</sub>) emissions of the company, in thousands of metric tons of carbon dioxide equivalent (CO<sub>2</sub>e). Direct emissions are those emitted from sources that are owned or controlled by the reporting entity, in accordance with the Greenhouse Gas Protocol (GHG) Scope 1 definition. Where a company does not report emissions in CO<sub>2</sub>e, Bloomberg converts it to CO<sub>2</sub>e using a Global Warming Potential (GWP) of 23,900.
- **GHG Scope 1 (ES076):** Scope 1/Direct Greenhouse Gas (GHG) Emissions of the company, in thousands of metric tons. GHG are defined as those gases which contribute to the trapping of heat in the Earth's atmosphere and they include Carbon Dioxide (CO<sub>2</sub>), Methane, and Nitrous Oxide. Scope 1 Emissions are those emitted from sources that are owned or controlled by the reporting entity. Examples of Direct Emissions include emissions from combustion in owned or controlled boilers, furnaces, vehicles, emissions from chemical production in owned or controlled process equipment. Emissions reported as CO<sub>2</sub> only will NOT be captured in this field. Emissions reported as generic GHG emissions or CO<sub>2</sub> equivalents (CO<sub>2</sub>e) will be captured in this field.
- **GHG Scope 2 (ES077):** Scope 2/Indirect Greenhouse Gas (GHG) Emissions of the company in thousands of metric tons. Greenhouse Gases are defined as those gases which contribute to the trapping of heat in the Earth's atmosphere and they include Carbon Dioxide (CO<sub>2</sub>), Methane, and Nitrous Oxide. Scope 2 Emissions are those emitted that are a consequence of the activities of the

reporting entity, but occur at sources owned or controlled by another entity. The principle source of Indirect Emissions is emissions from purchased electricity, steam and/or heating/cooling. These emissions physically occur at the facility where electricity/steam/heating/cooling is generated. Emissions reported as CO<sub>2</sub> only will NOT be captured in this field. Emissions reported as generic GHG emissions or CO<sub>2</sub> equivalents (CO<sub>2</sub>e) will be captured in this field.

- **Total GHG Emissions (Th Tonnes) (ES005):** Total Greenhouse Gas (GHG) Emissions of the company, in thousands of metric tons. Greenhouse Gases are defined as those gases which contribute to the trapping of heat in the Earth's atmosphere and they include Carbon Dioxide (CO<sub>2</sub>), Methane, and Nitrous Oxide. Total GHG Emissions as defined in this field, equals the total of company Scope 1 and Scope 2 emissions. It does not include Scope 3 emissions. Definition of Scope 3 emissions remains subject to much interpretation and therefore there is significant variability in company reported data - this could cause undue variation in company Total GHG emissions figure. Emissions reported as CO<sub>2</sub> only will NOT be captured in this field. Emissions reported as generic GHG emissions or CO<sub>2</sub> equivalents (CO<sub>2</sub>e) will be captured in this field.
- **GHG Scope 3 (ES078):** Scope 3 Greenhouse Gas (GHG) Emissions of the company, in thousands of metric ton. Greenhouse Gases are defined as those gases which contribute to the trapping of heat in the Earth's atmosphere and they include Carbon Dioxide (CO<sub>2</sub>), Methane, and Nitrous Oxide. Scope 3 emissions are all non-scope 2, indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities (e.g. Transmission & Distribution losses) not covered in Scope 2, outsourced activities, waste disposal, etc. Emissions reported as CO<sub>2</sub> only will NOT be captured in this field. Emissions reported as generic GHG emissions or CO<sub>2</sub> equivalents (CO<sub>2</sub>e) will be captured in this field.
- **Nitrogen Oxide Emissions (Th Tonnes) (ES007):** Total amount of nitrogen oxide (NO<sub>x</sub>) emitted by the company, in thousands of metric tons. For index tickers, total amount of NO<sub>x</sub> emitted by a power plant (in metric tons).

- **Sulphur Dioxide Emissions (Th Tonnes) (ES008):** Total amount of sulfur dioxide (SO<sub>2</sub>) emitted by the company, in thousands of metric tons.
- **Sulphur Oxide Emissions (Th Tonnes) (ES079):** Total amount of sulphur oxides (SO<sub>x</sub>) emitted by the company, in thousands of metric tons. Includes sulphur dioxide. For index tickers, total amount of SO<sub>x</sub> emitted by a power plant (in metric tons).
- **VOC Emissions (Th Tonnes) (ES009):** Total amount of volatile organic compounds (VOCs) emitted by the company, in thousands of metric tons.
- **Carbon Monoxide Emissions (Th Tonnes) (ES010):** Total amount of carbon monoxide (CO) emitted by the company, in thousands of metric tons.
- **ODS Emissions (Th Tonnes) (ES012):** Total amount of ozone-depleting substances (ODSs) emitted by the company, in thousands of metric tons.
- **Particulate Emissions (Th Tonnes) (ES013):** Total amount of particulates emitted by the company, in thousands of metric tons.
- **Total Energy Consumption (MWh) (ES014):** Total Energy Consumption Figure in thousands of megawatt hours (MWh). This field might include energy directly consumed through combustion in owned or controlled boilers, furnaces, vehicles, or through chemical production in owned or controlled process equipment. It also includes energy consumed as electricity.
- **Electricity Used (ES080):** Total amount of electricity used by the company. In thousands of megawatt hours (MWh).
- **Renewable Energy Use (MWh) (ES015):** Amount of energy consumed that was generated by a renewable energy source, in thousands of megawatt hours (MWh). This includes REC (Renewable Energy Certificates) amounts company purchased as well.
- **Fuel Used - Coal/Lignite (ES107):** Total mass amount of coal used as fuel by the company during the reporting period, in thousands of metric tons. Field includes any blend or quality of coal, including but not limited to lignite, anthracite, bituminous, metallurgical or coking coal.
- **Fuel Used - Natural Gas (ES108):** Total volume of natural gas used as fuel by the company during the reporting period, in thousands of cubic meters. Field includes gas and gas-liquids primarily composed of methane, including natural gas, liquefied natural gas (LNG), compressed natural gas (CNG), and

City/Town Gas in Japan. This field does not include gas or gas-liquids from any other type or mixture of gases, such as liquefied petroleum gas (LPG) or propane.

- **Fuel Used - Crude Oil/Diesel (ES109):** Total volume of crude oil and its distillates used as fuel by the company during the reporting period, in thousands of cubic meters. Field includes fuel types such as crude oil, fuel oil, diesel, gasoline/petrol, jet fuel, light fuel oil, heavy fuel oil, kerosene, gas oil, and naphtha.
- **Total Water Use (ES016):** Total amount of water used to support a company's operational processes, in thousands of cubic meters. The sum of all water withdraws for process water and cooling water and all water retained by company facilities through recycling.
- **Total Water Withdrawal (ES269):** Amount of water diverted for use by the organization from all sources, including but not limited to surface, ground, saltwater, and municipal, in thousands of cubic meters. Includes cooling water.
- **Surface Water Withdrawals (ES237):** Amount of water diverted for use by the organization from all surface freshwater sources, including but not limited to lakes, rivers, and streams, in thousands of cubic meters. Includes cooling water.
- **Groundwater Withdrawals (ES238):** Amount of water withdrawn by the organization from underground reservoirs, in thousands of cubic meters. Includes cooling water.
- **Salt Water Withdrawals (ES239):** Amount of water diverted for use by the organization from brackish or salt water sources, including seawater or estuarine withdrawals, in thousands of cubic meters. Includes cooling water. This field is part of the Environmental, Social, and Governance (ESG) group of fields.
- **Municipal Water Use (ES240):** Amount of water diverted for use by the organization from municipal water treatment facilities, in thousands of cubic meters. Includes cooling water.
- **Reclaimed Water Use (ES241):** Amount of water diverted for use by the organization which has been captured either directly or indirectly from

rainfall, including runoff, in thousands of cubic meters. Includes cooling water.

- **Total Water Recycled (ES242):** Amount of process water and cooling water used by the company's operations that was derived from internal recycling/reuse processes, in thousands of cubic meters. Includes cooling water.
- **% Water Recycled (ES017):** Percentage of water usage from recycled sources.
- **Water per Unit of Production (ES082):** Water consumed by the company per unit of production. The unit of production depends on the company's activity. For oil companies, this field reflects water consumption per barrel of oil, etc. In liters.
- **Process Water Use (ES236):** Amount of water used for company processes that is not immediately returned to the environment in the same uncontaminated state, in thousands of cubic meters. This could include water withdrawals, municipal water use, and water derived from recycling. Does not include cooling water.
- **Cooling Water Inflow (ES245):** Amount of water diverted for use by the organization for cooling purposes, in thousands of cubic meters.
- **Cooling Water Outflow (ES246):** Amount of cooling water used by the company's operations that was derived from internal recycling/reuse processes, in thousands of cubic meters.
- **Total Water Discharged (ES081):** Total volume of liquid waste and process water discharged by the corporation, in thousands of cubic meters. Includes treated and untreated effluents returned to any water source. The volume of cooling water discharged is specifically reported as the field "Cooling Water Outflow."
- **None (ES270):** No information available
- **Discharges to Water (ES018):** Amount of discharges to water that influence the biophysical or chemical quality of the water, in thousands of metric tons.
- **Chemical Oxygen Demand of Discharges (ES243):** Measure of the chemical oxygen demand (COD) of wastewater effluent discharged by the company. High COD is a proxy of poor water quality as it measures the total quantity of

oxygen required to oxidize all organic material, regardless of biological availability.

- **Biological Oxygen Demand of Discharges (ES244):** Measure of the biological oxygen demand (BOD) of wastewater effluent discharged by the company. High BOD is a proxy for diminished oxygen available to aquatic life as it measures dissolved oxygen in water that bacteria will consume while decomposing organic matter.
- **Total Waste (Th Tonnes) (ES020):** Total amount of waste the company discards, both hazardous and non-hazardous, in thousands of metric tons.
- **Hazardous Waste (Th Tonnes) (ES019):** Amount of hazardous waste the company discards, in thousands of metric tons.
- **Drilling Waste (ES248):** Total amount of drilling wastes the company produces as a result of exploration and extraction processes, in thousands of metric tons. This field may include sand, disturbed soil, and rock for the purposes of drilling, or other oily wastes which may or may not be hazardous.
- **Mining Overburden (ES267):** Total quantity of waste rock or overburden removed in the process of resource excavation or extraction and which is discarded by the company during the reporting year, in thousands of metric tons.
- **Tailings Waste (ES268):** Total volume of tailings created in the preparation and extraction of a company's mineral products and discarded during the reporting year, in thousands of metric tons. Tailings consist of any remaining ground rock and process chemicals used to extract a product from a mining ore. This quantity may also be referred to as mine dumps, slimes, tails, or slicken.
- **Waste Recycled (Th Tonnes) (ES021):** Total amount of waste the company recycles, in thousands of metric tons.
- **Waste Sent to Landfills (ES104):** Amount of company waste sent to landfills, in thousands of metric tons.
- **Paper Consumption (Th Tonnes) (ES022):** Paper used by the company for printing, packaging, office use, etc., in thousands of metric tons. When paper is consumed by the company as part of its manufacturing process, as with a

newspaper publisher, this amount appears under Raw Materials Used (Th Tonnes), (ES025, RAW\_MAT\_USED).

- **Paper Recycled (Th Tonnes) (ES023):** Total amount of paper the company recycles, in thousands of metric tons.
- **Raw Materials Used (Th Tonnes) (ES025):** Total amount of raw materials consumed by the company, in thousands of metric tons.
- **% Recycled Materials (ES026):** Percentage of raw materials used from recycled sources. Field part of Environmental, Social or Governance (ESG) group of fields.
- **Gas Flaring (Th Tonnes) (ES027):** Total amount of gas flared and vented by the company, in thousands of metric tons.
- **Number of Spills (ES028):** Actual number of spills of hazardous materials by the company in the period.
- **Amount of Spills (Th Tonnes) (ES083):** Amount of spills of hazardous materials by the company in the reporting period. In thousands of metric tons.
- **Total Power Generated (ES103):** Total power generated by the company internally, in gigawatt hours (GWh).
- **Nuclear % of Total Energy Production (ES029):** Percentage of total energy production that came from nuclear power.
- **Solar % of Total Energy Production (ES030):** Percentage of total energy production that came from solar power. This is for utilities that are producing solar energy for distribution.
- **Phones Recycled (ES031):** Number of cellular phones that were recycled by the company in the period, in millions.
- **Number of Environmental Fines (ES032):** Number of environmental fines paid by the company in the period.
- **Environmental Fines (Amount) (ES033):** Total amount of environmental fines paid by the company in the period, in millions.
- **ISO 14001 Certified Sites (ES034):** Number of sites the company owns that are certified by the ISO 14001 environmental management standards.
- **Number of Sites (ES084):** Number of locations the company owned and operated at the end of the reporting period.



- **% Sites Certified (ES085):** Percentage of the company's total worksites that are certified by the ISO 14001 environmental management standards.
- **Environmental Accounting Cost (ES086):** Cost of environmental conservation and other environmental initiatives undertaken during the normal course of business as defined by the company. Examples might include the cost of environmental remediation, the cost of pollution prevention, the cost of R&D investment in solutions to environmental challenges/environmental product development, the cost of recycling, the cost of implementing an Environmental Management System etc.
- **Investments in Operational Sustainability (ES056):** Amount of money spent by the company, in millions, on operational environmental and social compliance and other internal environmental and social initiatives, as defined by the company. Examples might include the amount invested in environmental remediation, pollution prevention, recycling, employee training, safety initiatives etc. Figure excludes financing and other external investment activities related to sustainability such as clean energy project financing by company.
- **Energy Efficiency Policy (ES035):** Indicates whether the company has implemented any initiatives to make its use of energy more efficient. "N" indicates that the company has not explicitly disclosed any such efforts in its most recent Annual or Company Responsibility reports.
- **Emissions Reduction Initiatives (ES036):** Indicates whether the company has implemented any initiatives to reduce its environmental emissions to air. "N" indicates that the company has not explicitly disclosed any such efforts in its most recent Annual or Company Responsibility reports.
- **Environmental Supply Chain Management (ES037):** Indicates whether the company has implemented any initiatives to reduce the environmental footprint of its supply chain. Environmental footprint reductions could be achieved by reducing waste, by reducing resource use, by reducing environmental emissions, by insisting on the introduction of environmental management systems etc. in the supply chain. "N" indicates that the company has not explicitly disclosed any such efforts in its most recent Annual or Company Responsibility reports.

- **Green Building Policy (ES038):** Indicates whether the company has taken any steps towards using environmental technologies and/or environmental principles in the design and construction of its buildings. "N" indicates that the company has not explicitly disclosed any such efforts in its most recent Annual or Company Responsibility reports.
- **Waste Reduction Policy (ES039):** Indicates whether the company has implemented any initiatives to reduce the waste generated during the course of its operations. "N" indicates that the company has not explicitly disclosed any such efforts in its most recent Annual or Company Responsibility reports.
- **Water Policy (ES247):** Indicates whether the organization has undertaken any initiatives to reduce the quantity of water used or to improve the efficiency of its processes, and whether the company is considering the potential water stress to its areas of operation.
- **Sustainable Packaging (ES040):** Indicates whether the company has taken any steps to make its packaging more environmentally friendly. This might include efforts to improve the recyclability of packaging, to use less environmentally damaging materials in packaging etc. "N" indicates that the company has not explicitly disclosed any such efforts in its most recent Annual or Company Responsibility reports.
- **Environmental Quality Management Policy (ES041):** Indicates whether the company has introduced any kind of environmental quality management and/or environmental management system to help reduce the environmental footprint of its operations. "N" indicates that the company has not explicitly disclosed any such efforts in its most recent Annual or Company Responsibility reports.
- **Climate Change Opportunities Discussed (ES105):** Indicates whether the Management Discussion and Analysis (MD&A) and its equivalent section of company's annual report discuss business opportunities related to climate change. This is marked "Y" when MD&A explicitly mentions opportunities associated with climate change.
- **Risks of Climate Change Discussed (ES106):** Indicates whether the Management Discussion and Analysis (MD&A) and its equivalent section of company's annual report discuss business risks related to climate change. This

is marked "Y" when MD&A explicitly mentions risks associated with climate change.

- **Climate Change Policy (ES071):** Indicates whether the company has outlined its intention to help reduce global emissions of the Greenhouse Gases that cause climate change through its ongoing operations and/or the use of its products and services. Examples might include efforts to reduce Greenhouse Gas (GHG) emissions, efforts to improve energy efficiency, efforts to derive energy from cleaner fuel sources, investment in product development to reduce emissions generated or energy consumed in the use of the company's products etc. "N" indicates that the company has not explicitly disclosed any such efforts in its most recent Annual or Company Responsibility reports.
- **New Products - Climate Change (ES042):** Indicates whether the company has developed and/or launched products during the current period only which address future impacts of climate change and/or which mitigate customers' contributions to climate change by reduced Green House Gas (GHG) emissions. The products may or may not be new to the market.
- **Biodiversity Policy (ES088):** Indicates whether the company has implemented any initiatives to ensure the protection of biodiversity. This might include trees and vegetation as well as wildlife and endangered species.
- **Verification Type (ES073):** Indicates whether the company's environmental policies were subject to an independent assessment for the reporting period.

### 6.3 RESULTS

After collecting the required data for the aforementioned variables from Bloomberg in an annual basis for the year of 2007 a linear regression model was set up to estimate the coefficient of the Bloomberg environmental disclosure score and its statistical significance using the Debt to Equity ratio as the dependent variable. Taking into account the rest, according to related bibliography, statistically significant factors that might affect the dependent factor and the appropriate industry dummies the final regression model is as follows.

$$dba = c + a_1env + a_2lta + a_3tang + a_4mtb + a_1ebitdata + U$$

Firstly the regression was performed using the ordinary least squares method for estimating the independent and control variables' coefficients with a 5% confidence interval. The statistical computer program STATA 12 was used to execute the regression. The results of the regression with the method of the ordinary least squares are shown on the following table.

Table 2: RESULTS OF LINEAR REGRATION WITH OLS

<b>Linear Regression with OLS</b>						
Source	SS	df	MS	Number of obs	283	
				<b>F( 52, 230)</b>	4,7	
<b>Model</b>	31504,27	52	605,851	<b>Prob &gt; F</b>	0	
<b>Residual</b>	29667,81	230	128,99	<b>R-squared</b>	0,52	
				<b>Adj R-squared</b>	0,41	
<b>Total</b>	61172,09	282	216,922	<b>Root MSE</b>	11,36	
<b>dba</b>	<b>Coef.</b>	<b>Std. Err.</b>	<b>t</b>	<b>P&gt;t</b>	<b>[95% Conf. Interval]</b>	
env	-0,12	0,06	-2,03	0,043	-0,234	0,004
ebitdata	-30,49	11,65	-2,62	0,01	-53,44	-7,53
Lta	3,70	1,59	2,33	0,021	0,564	6,831
Mtb	0,76	0,13	5,98	0	0,508	1,009
Tnga	0,00	0,00	3,8	0	0,000	0,000
_cons	-10,28	16,84	-0,61	0,54	-43,46	22,90

### **Breusch-Pagan / Cook-Weisberg test for heteroskedasticity**

Ho: Constant variance

Variables: fitted values of dba

**chi2(1)** 2.72

**Prob > chi2** 0.0992

As one may easily deduct, the results of the designed regression using the ordinary least squares method are somewhat inconclusive. To be more specific the independent variable, Bloomberg environmental disclosure score, appears to be contradictory to our hypothesis, since the expected sign of the coefficient would be positive and not negative. The resulting  $-0.12$  value therefore indicates a negative relationship between a firm's environmental disclosure and debt to total assets ratio and its leverage as an extension. The P-value of the Bloomberg environmental disclosure score coefficient nevertheless is  $0.043$  which might be below  $0.05$  which indicates the confidence interval that is set to the regression but is still a value that allows plenty of room for further discussion.

The somewhat inconclusive results statement can also be adapted for the control variables as well. The earnings before interest and taxes to total assets (ebitdata) variable presents a coefficient of  $-30.49$  which is as expected regarding its sign since according to the pecking order theory adaptation firms with higher earnings are expected to use less leverage. The P-value of the coefficient is  $0.01$  and is well below the confidence interval but the coefficient value can be considered extreme. The log of total assets (lta) variable sign is also as expected, and its value of  $3.70$  is much more understandable than the latter coefficient's one. The P-value of  $0.021$  renders the result acceptable too. The market value to book value ratio (mtb) coefficient indicates a weaker but positive, as expected, correlation between the control and the dependent variable and its P-statistic of  $0$  leaves no room for questioning of its statistical importance. The last control variable used, tangible assets (tnga) resulted in a coefficient equal to  $0$  which indicates the absence of any correlation with the debt to total assets dependent variable with a P-value of  $0$ .

The regression's adjusted R squared scored  $0.41$  which is quite high if we take under consideration the small number of variables used. To check the robustness of the regression's results a Breusch-Pagan / Cook-Weisberg test for heteroskedasticity (Breusch & Pagan) (Weisberg & Cook) was conducted and the resulting  $0.0992$  might be below the value of  $1$  heteroskedasticity cannot be dismissed for certain since the test's value is alarmingly close to the confidence interval. The combined results of the Breusch-Pagan / Cook-Weisberg test for heteroskedasticity along with the close to  $0.05$  P-value of the independent variable's coefficient which even if supported its significance is quite low, do not allow for any definite statistical evidence.

In this light, a second linear regression was performed with the method of robust standard errors to compensate for the heteroskedasticity risk. The results of the second regression are even more puzzling as observed in the following table.

Table 3: RESULTS OF LINEAR REGRESSION WITH ROBUST STANDARD ERRORS

<b>Linear Regression with Robust standard errors</b>						
Linear regression		<b>Number of obs</b>	283			
		<b>F( 37, 230)</b>	.			
		<b>Prob &gt; F</b>	.			
		<b>R-squared</b>	0,515			
		<b>Root MSE</b>	11,35 7			
Robust						
<b>dba</b>	<b>Coef.</b>	<b>Std. Err.</b>	<b>T</b>	<b>P&gt;t</b>	<b>[95% Conf. Interval]</b>	
Env	-0,12	0,06	-1,88	0,06	-0,24	0,01
ebitdata	-30,49	20,21	-1,51	0,13	-70,30	9,33
Lta	3,70	2,34	1,58	0,12	-0,91	8,30
mtb	0,76	0,08	9,66	0,00	0,60	0,91
tnga	0,00	0,00	4,23	0,00	0,00	0,00
<b>_cons</b>	<b>-10,28</b>	<b>25,36</b>	<b>-0,41</b>	<b>0,69</b>	<b>-60,25</b>	<b>39,69</b>

Using the robust standard errors method the coefficients of each variable, both independent and control, are actually the same since the data or the number of observations have not changed. What differs though is the P-values of the t-statistic test. The Bloomberg environmental disclosure score variable coefficient is not supported as the P-value is 0.06 which is higher than the confidence interval of 5%. Furthermore, both the earnings before interest and taxes to total assets (ebitdata) variable coefficient and the log od total assets (lta) variable coefficient are deemed as statistical insignificant since the P-value of the t-statistic test is 0.13 and 0.12 accordingly. This fact comes to total contradiction to all bibliography regarding the statistically significant relevant factors that affect the leverage. The remaining

two variables P-values remain the same as before, which means equal to zero but are not sufficient to provide a sound conclusion out of the performed regression.

To conclude with, the only safe conclusion that can be achieved is that there are no decisive or statistical important conclusions to be made out of the designed empirical study. The independent Bloomberg environmental disclosure score variable appeared to be negative correlated to the dependent debt to total assets ratio variable which means that the stated hypothesis is not supported by the regression results. The high P-value of the test statistic though augmented by the close to 1 value of the Breusch-Pagan / Cook-Weisberg test for heteroskedasticity indicates rather inconclusive results.

These results could be misleading for a number of reasons. The most prominent reason that probably affected the quality of the analysis the most is that the data sample can be characterized as insufficient since it only concerns only one year of 2007. The main reason for using data from just this year is that from 2008 and on the financial crises has obscured the corporate financial data especially in the field of banking financing due to the fact that the banking systems had to cope with a huge liquidity problem. On the other hand there were not sufficient observations regarding the Bloomberg environmental disclosure score prior to this date. The use of another variable measuring voluntary corporate environmental disclosure was more or less prohibited by the available sources. Therefore it would be advisable to examine the same hypothesis using data of another period. The stated hypothesis should also be examined and in other markets, such as the European corporate financing market.

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