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MASTER FINAL WORK

CAPITAL STRUCTURE AND DIVIDENDS
Evidence from Portugal (2003-2014)

ANA MARGARIDA SANTOS SIMÕES FERREIRA

OCTOBER - 2015

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Abstract

We use the Portuguese case to replicate the study of Fama & French (2002) regarding the capital structure and the connections between profitability, investments and volatility with dividends pay-out and leverage. Our aim is to analyse the relation between capital structure, dividends and interests on equity, using the Portuguese companies traded on Euronext, for the period between 2003 and 2014.

In this research we found evidence supporting that Portuguese companies share the predictions of Pecking Order and Trade-Off models. In some cases, the predictions are the same, and differ only regarding the motive, which is the case of: (1) profitability and dividends; (2) dividends and investments; (3) volatility and dividends. When the models' predictions are set differently, the main goal is to identify whether it behaves, or does not behave according to Pecking Order or Trade Off. For instance, Portuguese companies behave according to the Pecking Order model with regards to the relationship between leverage and profitability. There are also situations where it is necessary to observe beyond the simple model, i.e., to the complex pecking order model , in order to understand what happens to companies' leverage with changes in investment opportunities. One of the others main conclusion is that the target dividends do not absorb short term variations of investment, as the Speed of Adjustment is not big enough to accomplish a total sort term variation

Key – Words: Capital Structure; Dividends pay-out; Leverage; Trade Off; Pecking Order; Debt

Introduction

This research is a complement of the previous literature on Corporate Finance, where firms' Capital Structure has been widely discussed. This is an important issue, which has been addressed in different lines of thoughts. The two main lines of thoughts are divided between the one that identifies and defends an optimal level of capital structure (intern and extern), i.e., in order to minimize the total cost. The second line of thought explains that the value of companies is unaffected, independently of how companies are financed, invoking an inexistence of optimal capital structure (Modigliani & Miller, 1958). However, it is important to mention that the MM theory was developed under strong hypotheses, namely: (1) the non-existence of taxes; (2) no fees or transaction costs, and; (3) no restriction to the cost of default, in such a way that companies could increase their level of leverage without incurring obligations to pay dividends. This is obviously a theory which is centred on a perfect market hypothesis, where all the managers are driven to maximize the profit of shareholders. In spite of the fact that the MM theorem started without taxes, extensions were developed of situations with taxes. The Static Trade Off case states that companies have a leverage target, where the tax deductibility of interest payments is the benefit of getting leverage, and this encourages the use of debt. This gains more importance with the presence of a non-debt tax shield (DeAngelo & Masulis, 1980) and personal taxes (Miller, 1977). Regarding Pecking Order models (Myers, 1984), firms usually prefer internal funds instead of external funds. Both models include variables such as: costs of default; agencies' costs; asymmetric information, and; market imperfections. Following this theme, and maintaining the importance of understanding how companies behave in the face of changes in some indicators of performance and health, this study follows Fama & French (2002), whose research focuses on how companies perform,

based on Pecking Order vs. Trade-Off. This particular study relies on testing how leverage and dividends pay-out react with changes in investment opportunities and profits in Portuguese companies. In order to understand these issues, this research is divided into three different testing hypotheses. The first hypothesis that is tested is whether the target of dividend pay-out ratio changes with: (1) investment; (2) profitability, and; (3) volatility. Secondly, whether target dividend pay-outs are adjusted to absorb short term variation of investments is tested. The next hypothesis is related to the leverage of companies. In this specific case, the aim is to understand whether Portuguese companies behave in line with the Pecking Order, or Trade Off predictions, i.e., by relating leverage with: (1) profitability; (2) investments opportunities; (3) volatility, and; (4) non debt tax shield.

As a result of all of these testing hypotheses, it is possible, in a very superficial way, to identify some of the share predictions that are present in the literature with Portuguese companies. As an example, our predictions are in accordance with Fama and French (2002), examples being profitability and dividends and volatility and dividends.

An interesting conclusion of this study concerns dividends and investments; where evidence was founded suggesting that shareholders are probably so levered, that they need dividends, even when this goes against the company's interest.

Evidence was also found that dividend pay-outs are not used to absorb short term variations in investment, as the speed of adjustment is lower than 1.

The prediction regarding leverage and profitability is only in accordance with Pecking Order. On the other hand, there is evidence in this research that companies behave as predicted by the complex Pecking Order or Trade-Off model, for instance with regards to leverage and investment opportunities.

1. Literature review

Modigliani & Miller (1958) developed a theory which states that in perfect capital markets, the composition of capital is irrelevant when they want to finance investments. They explain that it is the possibility that earnings and the risk of their underlying assets that define their market value, in other words, it is indifferent which method is chosen to finance their investments or dividends pay-out. However this theory is supported by strong assumptions of no taxes, no transaction costs, no bankruptcy costs, and that the cost of debt is the same for companies and investors alike, with no asymmetric information, and finally, that the EBIT[1] is unaffected by the debt. In a simple view, this proposition is transmitted by a constant WACC[2], even with variations in the capital structure. Maybe this example would be easier to understand in the case of a company that does not benefit from tax advantages by interest payments, and that the way that the firm financed itself is equal. Furthermore, when there are no variations or advantages from rising debt, a company's stock price remains the same.

Nevertheless, we must take care that in the real world there are taxes and bankruptcy costs, and these affect a company's stock price, and that the MM theorem apply. That is why they included the effect of taxes and bankruptcy costs. When submitted according to Modigliani and Miller's Trade-Off Theory of Leverage, this model takes these two variables into account. This model explains the benefits of leverage on capital structure, until the optimal capital structure[3] is attained. Controversy surrounds this example, now that a tax benefit from interest payments is identified.

[1] Earnings Before Interest and Taxes
[2] Weighted Average Cost of Capital
[3]The optimal capital structure is when a firm attains the best debt to equity ratio and increases it to a maximum value by reducing the cost of capital to a minimum.

1.1 Trade-Off

The Trade-Off theory is based on the concept of a company maximizing its value by reaching an equilibrium between the costs and benefits of an additional unit of debt. The same idea is used for dividends, where a company establishes a level dividend pay-out whereby the company maximizes its value. Before looking at the Trade-Off model in detail view, we must start inquiring as to why companies pay dividends.

The literature presents some points of view that describe the causes that explain why companies pay out dividends. One of the reasons that is presented, is that dividends exist in order to hedge against risk investment-taking leading to bankruptcy, without giving the reserved assets to shareholders once they liquidate them in advance. The idea here is that investors prefer a lower value of constant payments, rather than the uncertainty of high and extraordinary amounts of pay-outs (Gordon, 1959), which is the Bird The Hand theory. However this justification is not valid if the dividends match the investment, if managers do not extract the company from possible risky investments. However, the literature presents more justification, for instance, that communication to investors, (Hakansson, 1982). This author suggests that distributing dividends is a way of transmitting confidence to investors and of transmitting an image of the good state of the firm. Conversely, there are more effective methods which are even cheaper, whereby it is possible to provide more information in a detailed way. This idea of transmitting information is also valid when investors are not homogeneous, and when the market is incomplete. For these reasons, and because it does not show the projections of the firm in a detailed way, it is not possible to extract positive or negative congestions by changes in the amount of dividend pay-outs. Therefore, firms can contract external auditing services, preferably for a large audit, in order to provide a high quality of service, (DeAngelo,

1981). The act of contracting an audit company allows for the examination of a firm, and enables proof about the behaviour of the managers, including whether they have been truthful and whether what they transmit to the investors is the real scenario of the company.

Another possible reason pointed out in this extensive literature is that dividends can be explained by considering the dividends receivers, i.e., by firstly dividing the receivers into two different groups. Next, the criteria of division are the tax payments, divided by the group that pays, and the group of those who do not pay taxes on dividends. For payers, the receivers prefer to obtain the same amount in a different form, for instance by capital gains (Miller & Scholes, 1978). For the other group, it would be indifferent, as there are no costs with this option. Therefore, in the end, the question still remains - why do companies pay dividends? This is even more so, as other forms of paying shareholders exist, such as repurchase on the open market, which has been more frequent over the years in the USA, specifically since 1980. However, there is no clear idea of how firms choose how to pay their shareholders. Allen & Michaely (2003) have reason to believe that repurchase will be the dominant way of doing so. According to these authors, young or risky companies are more likely to repurchase shares than to pay dividends. On the other hand, large and established companies pay out significant percentages of their earnings in dividends and in repurchasing shares. Another evidence stated by these authors is that, when companies have investments with a positive net present value, thee should not resort to repurchases. Nevertheless, if the net present value is low, and if the company has no need of cash, then a repurchase should be carried out. Following this line of thought is that when firms increase their investment, yet suffer asymmetric information, they should not pay dividends, which decreases the cost of the pay-out. One more theory that is defended by F. Allen and Michaely (2003), is that the pay out of dividends should be

accomplished once a year, instead of quarterly, and that investors are then attracted to a long run of capital gains, which would be capable of trading shares earlier to escape the ex-day, and consequently by the tax payments on the dividends. This strategy allows a reduction of administrative and transaction costs. Finally, the authors mention that which has already been stated, that managers should seek other less expensive ways of transmitting credibility.

Easterbrook (1984) follows other path, which mentions that dividends keep firms in capital markets, and that for this reason, it is possible to control managers with lower costs. Dividends are also used to influence financing polices, and this might be a valid reason for why firms use this outflow of cash and raise funds (issue stock, or new debt) at the same time.

Furthermore, there is another relevant issue, which is understanding what happens if managers and shareholders have a conflicting interest with regards to pay-out policies. Next, Jensen & Meckling (1976) explain that if there is an increase of the pay-out amount, then managers have less responsibility and then reduce their caution. To counterbalance this situation, they give more attention to the capital markets, in order to increase their power on the organization again. In this sense, it is important to motivate managers to pay out cash, instead of wasting companies' efficiency. Sometimes managers turn to debt. Jenson (1986) explains the benefits of debt to reduce agency costs, by stating that when debt increases, its cost increases as well, and thus managers try to achieve the optimum level of debt equity ratio. If they achieve this, then the firm has its value maximized, and the marginal costs of debt compensate the marginal benefits. However, this is a paradox of the first preposition defended by Modigliani-Miller (1958), as, according to this author, it is exactly the same if a company finances itself with equity or debt, within certain assumptions.

Regarding the relation of taxes and leverage, it is quite important to take a detailed look at what DeAngelo & Masulis (1980) presented. They carried out an extension of Miller, changing the existent model, as it was too sensitive with regards to changes of corporate tax policies. According to DeAngelo & Masulis (1980), there is a non-debt tax shield [4]that should be included, such as depreciation and investment tax credit, which should be included in the model. In short, this new model requires more than one debt tax shield to attain an optimal level of leverage. Regarding this research, equilibrium of leverage is exclusive for each company, so it is important to include variables such as were mentioned beforehand, in order to define this. It is also stated that personal and corporate taxes are present in relative market prices. Another important component are bankruptcy costs, which must be considered if we want to extract the tax benefit that is related to leverage cost. One of the predictions of this model is that firms have debt-level that has a negative relation with the non-debt tax shield. The authors also mentioned that modifications in debt bring variations to a company's valuation. Therefore, in a situation of equilibrium, relative market prices will involve the tax advantage for corporate debt financing. Should fiscal changes exist (reducing their amount) regarding policies related to non-debt tax shield, then this will be reflected by increases in the amount of debt that firms purchase. Finally, DeAngelo & Masulis (1980) explain that bankruptcy costs are negatively correlated to debt. This idea is also consistent with Brandley, Jarrel & Kim (1984), as they stated that the expected cost of financial necessities and the amount of non-debt tax shield are negatively related to the optimal level of leverage. It is also pointed out that in a situation where the costs of financial distress are non-trivial, changes in firms' earnings and volatility will negatively influence the level of leverage. Another

[4] Non debt tax shield is a reduction in the taxable amount of a company, by applying deductions on non-debt expenses. The deduction reduced in the taxable amount through the current year, or deferred income taxes on future years.

component which interferes with leverage in a negative way, is the intensity of R&D and publicity expenditure. Authors have also pronounced that a kind of perplexity exists, which finds a direct relation between firms' leverage and the comparative amount of non-debt tax shields. However, this goes against the previous literature, which defends the replacement of non-debt tax shield for debt tax shields.[5] A possible explanation referred to by the authors, is that a non-debt tax shield has more influence on the openness of firms' assets, as it infers safety assets and rising leverage ratios.

With regards to taxes and the Trade-Off model, it is necessary to point out another relevant study, that of Miller & Scholes (1978). In this study, it was proved that shareholders' welfare is also affected by the increase or decrease in dividends, independent of the discrepancy of the tax treatment on capital gains and dividends.

With regards to debt level and company size, there are some studies which are consistent with most of the existing theories, for example, that of Titman & Wessels (1988). One of the founded evidences on that study, is that debt level is inversely related to the size of the company. Small firms tend to have higher short-term debt and lower long-term debt ratios. They also suggested that this might be a consequence of the high cost that small companies face when they try to issue long-term financial instruments.

Table II (Appendix - page 45) illustrates Trade-Off predictions.

1.2 Pecking Order

In order to explain the Pecking Order model, the study of Myers & Majluf, (1984) needs to be observed first. In this research, one of the big issues of these authors was how investment opportunities should be financed, as managers are the ones who possess more information (even more than shareholders). The other big question raised is whether it

[5] Debt tax shield is a reduction in the taxable amount of a company, by applying deductions through debt expenses.

might be preferable to pass up investment opportunities or the issuing of stock, when a company needs to be financed.

According to the Myers (1984) model, managers possess better information in comparison to investors. Therefore, the main conclusion of this model is that for the company it is always better to start with risk-free debt, by issuing safer securities than risk. If a company needs to obtain external capital, then it should resort to bonds market, and if it want to increase equity, then it should do so by retention.

According to Myers, situations may exist whereby it is preferable to renounce good investments, rather than issue risky securities in order to finance them. Or, for instance, firms may even accumulate financial slack, and they can do this by restricting the amount of dividend pay-outs, by saving assets that are easily sold, preserving borrowing power and simply by saving cash. Myers goes even further, by explaining that companies ought not to pay dividends if they need to recover cash by selling stocks or other securities risk. The author also explains that dividends are a tool for communicating with the market, and that dividends are high correlated with managers estimating the value of asset. Finally, it has been suggested in this study that, if stocks are issued to finance investments and managers have more information, then the price will fall. On the other hand, if companies issue safe default risk free debt to finance investment, then the stock price will not decrease. In conclusion, what is possible to extract is that internal funds are preferable to external funds.

Following on from what has already been stated in this research, studies have shown that in the USA, the percentage of firms paying out dividends has declined since 1978. In order to understand this phenomenon, Fama & French (2001) suggest that there are three main features which affect the decision to pay dividends, or not, which are: Profitability, Investment Opportunities, and; Size. In order to have a clear idea of how they influence

dividend payment, Fama and French divided companies into three different groups: Ex-Payer; Never Paid, and; Dividend Payers. The first conclusion is that Ex-Payers have the lowest earnings and the lowest values of investment. Secondly, companies that Never Paid dividends are more profitable than the former payers, with a higher opportunity for growth. This group is the one that has greater investment and a higher ratio of Market value of Assets to their book value. Finally, Dividend Payers are the most profitable. Another suggestion raised in this study, is that, included amongst those that pay dividends, are those that have higher ratios, which tend to be larger and more profitable. On the other hand, small companies with higher values of investments have lower ratios of dividends. This behaviour is consistent with a reluctance for risk security, on account of the existence of asymmetric information problems or transaction costs.

Following this explanation, the viewing of **Table II** (Appendix - page 45) is suggested, in order to obtain a better view from Pecking Order predictions.

2. Methodology

2.1 Sample and analysed period

The data was extracted from Bloomberg[6], and is composed of Portuguese companies (see the detailed list in Appendix page 44 –**Table I**) which are traded on Euronext and have information available for the period of 2003 to 2014.

2.2 Definition of variables

Some of the variables need to be transformed. For volatility, investment opportunities and profitability proxies were carried out by an extension of Fama & French's (2002) procedures.

As for representation for profitability, three different indicators are used: (1) Earnings before Interest and Taxes, divided by the Total Assets; (2) Earnings before Interest, also divided by Total Assets; (3) Market Value of the firm, (which is represented by liabilities minus deferred taxes, and investment tax credit, plus preferred stocks, and plus market equity), divided by Total Assets, which characterises profitability and investment opportunities simultaneously. Investment opportunities is also represented by: (4) Variations in Assets, divided by Total Assets, and; (5) Research and Development also, divided by Assets.

The proxy used for volatility is: (6) the Logarithm of the Assets, which is the size, representing the (inverse) probability of default. Finally, the representation of applied non-debt tax shield[7] is: (7) Research and Development, and; (8) Depreciation Expense, both divided by Assets.

[6] http://www.bloomberg.com/europe

Due to the complexity of both variables and ratios, the following paragraphs show, step by step, their construction. It is also possible to observe them in a simpler manner in **Table III, Table IV** and **Table V** (Appendix - pages 47, 48 and 49).

Table III presents the simple variables, i.e., items taken from the financial records, or a slightly altered variable.

- *At* represents Total Assets at moment t, and At1 Total Assets at moment t+1;
- *dAt* is the variation in Total Assets at moment t;
- *LN* (At) is the ln of the Asset at moment t;
- *D* is the variable which represents the value of Dividends;
- *Et* is the Earnings before Interest for moment t, created by the subtraction of Tax Expenses on Earnings before interest and expenses, and *Et1* at the same moment as t+1;
- *ETt* is the Earnings before Interest and Taxes, which is constructed by the *EBITDA*, adding depreciation and amortization at moment t;
- *dEt* is the variation, which is Earnings before Interest at moment t, minus its value at t-1;
- *dETt* is the change in Earnings before Interest and Taxes of t and t-1;
- *Met* is Market Equity, which is the number of shares, multiplied by the number of shares at moment t;
- *Vt* is the Market Value of the firm, at moment t, constructed by the subtraction of Deferred Taxes and Investments Tax Credit on Liabilities, followed by the addition of Preferred Stocks and Market Equity;
- *RDt* represents R & D Expenditure at moment t;

- *RDDt* is a dummy variable, which takes the value 0, if there are R & D Expenditures, and the value of 1 otherwise;
- *Dt,* which represents the value of Depreciation Expenses at moment t;
- *Lt* is the Liabilities, which is the sum of Short and Long Term Debt;
- *NSt* is the number of Shares Outstanding at moment t;
- *SPt* represents Stock Price at moment t;
- *Dst* is the Variation of The Stock Price, which is represented by;
- *Yt* is the Variations of Market Capitalisation, which is the variation between moment t and t-1 of the Number of Shares, multiplied by the Stock Price;
- *BE* is Book Equity, which is Total Assets minus Liabilities, plus Deferred Taxes and Investment Tax Credits, minus Preferred Stock.

Table IV (Appendix - page 48) and **Table V (**Appendix - page 49) are the build ratios from a better short view, and the next paragraph shows their computation in a more detailed way:

- *ETtAt* consists of the Division of Earnings before Interest and Taxes at moment t for Total Assets, at the same moment;
- *Et/At* is Earnings before Interest at moment t, divided by Total Assets at moment t;
- *VtAt* represents the Market Value of the Firm at moment t, divided by Total Assets at moment t;
- *dAtAt* is the variable used to represent the Ratio of Variation of Total Assets between t-1, and t for the Total Assets at moment t;
- *RDtAt* is the Division of R & D Expenditures at moment t by the Total Value Of Assets, also at moment t;

- *DPtAt* is the ratio that relates Depreciation Expenses with Total Assets at moment t;
- *LtVt* represents the liabilities at moment t, divided by the Market Value of The Firm at moment t;
- *LtAt* is Liabilities divided by Total assets. LAL is the variable applied to show the variations of Liability ratios to Total Assets of t+1 to t;
- *Dt1At1* represents the division of Dividends to Assets, both at moment t+1;
- *YA* is the Variation of Market Capitalisation t+1, divided by Total Assets t;
- *Yt1At1* represents the ratio at moment t+1 of Stock Earnings to Total Assets;
- *DDA* is the Variation of Dividend at moment t+1 to moment t, divided by Total Assets at moment t;
- *DA* is the value of Dividends at moment t, divided by Total Assets for the next period;
- *dAA* is composed by the Difference of Assets between t and t+1, divided by Total Assets at moment t+1;
- *BL* is the division of Liabilities at moment t+1 by the Total Assets in the same period;
- *ML* is Market Leverage at moment t+1, which is Liabilities at t+1, divided by the Market Value of the Firm at moment t;
- *Det* is the Change of EBI for moment t+1;
- *DEA* is the Change of EBI for moment t+1, divided by Total Assets at moment t+1;
- *DAA* is the Variation of Total Assets between t and t-1, divided by Total Assets at t+1;

- *BD* is the Changes in Liabilities between t+1 and t, divided by Assets at t+1.

2.3 Descriptive statistics

305 observations exist for all variables and for all of them the mean is positive with the exception of *dSPt*, the Variation of Stock Price, and *Yt*, the Variation of Market Capitalisation at moment t.

Some of the variables used for this study have negative minimum values, such as, *D; Et; dEt; ETt; dETt; Q; BE; Dst;Yt; ETtAt; EtAt; dAtAt: Dt1; Yt1; Et1*. Others have a minimum of zero, such as Met; *RDt; RDDt; DPt; NSt; SPt; RDtAt and DPtAt*. *At, Vt, Lt, LNAt, VtAt, LtVt,LtAt, Lt1, Vt1, At1* took positive minimums. In fact, all of the variables have at least one positive value once the maximum values are all positive. A value of 1 exists, on account of the variable being a *RDDt* dummy. The descriptive statistics can be observed in **Table VI** (Appendix - page 50).

These variables have passed the test of multicollinearity heteroscedasticity, through the Matrix of correlation, and the Breusch-Pagan and Wald tests. The regressions used and the test made were performed by Stata.[8]

2.4 Regressions

2.4.1 The first Testing Hypothesis

In this first testing hypothesis, the main objective of this study is to understand how dividends target pay-out changes with variations in profitability, investment opportunities, and leverage. Previous studies, such as that of Lintner (1956), have a model that explains how dividends behave, however, only for dividends as a function of the target pay-out (r), the current value after taxes profit (Pit), and the last amount of dividends paid (Di(t-1), as shown in Equation 1.

[8] http://www.stata.com/d

Equation (1)

$$D_{it} = a_i + crP_{it} + (1 - c)D_{i(t-1)} + u_{it}$$

In Lintner (1956), p.14 – 109

For this reason, and since the aim is to understand how dividends react when they are a function of profitability, investment opportunities and leverage, one should follow Fama & French (2002), who developed another regression where the coefficient of the net profit is affected by other variables.

Equation (2)

$$D_{t+1}/A_{t+1} = a_0 + (a_1 + a_{1V}\,V_t/A_t + a_{1E}\,E_t/A_t + a_{1D}RDD_t + a_{1R}\,RD_t/A_t + a_{1S}\,ln(A_t) + a_{1L}TL_{t+1} + a_{1A}\,dA_t/A_t) \times Y_{t+1}/A_{t+1} + e_{t+1}$$

In Fama & French (2002), p.10

In Equation (2), it is possible to observe that the target pay-out and the consequences of the dividends are explained by profitability volatility and non-debt tax shield investment opportunities. The regression used in this study is slightly different from that of Fama & French (2002), which finally excludes the variable that would have the multiplication of all estimated coefficient and the explanatory variables model as its coefficient. The regressions used for this test are the following:

- Target book leverage

Equation (3)

$$D_{t+1}/A_{t+1} = a_0 + a_1\,V_t/A_t + a_2\,E_t/A_t + a_3RDD_t + a_4\,RD_t/A_t + a_5\,ln(A_t) + a_6\,dA_t/A_t + a_7L_t/A_t + e_{t+1}$$

- Target market leverage

Equation (4)

$$D_{t+1}/A_{t+1} = a_0 + a_1 V_t/A_t + a_2 E_t/A_t + a_3 RDD_t + a_4 RD_t/A_t + a_5 ln(A_t) + a_6 dA_t/A_t + a_7 L_t/V_t + e_{t+1}$$

2.4.2 The second Testing Hypothesis

At this point, the goal of this research is to understand whether the dividend pay-outs are adjusted to absorb short term variations in investments. Therefore, in order to have a regression that includes changes in dividends because variations around the target pay-out make sense to return to Lintner's (1956) adjusted model, shown in Equation (5). However, for the same reasons that were presented in Fama & French (2002), the impossibility of relating dividends with investments is shown in the equation, which turns out to be misleading in explaining the speed of adjustment to targets pay-out, taking into consideration that which we wish to understand.

Equation (5)

$$D_{t+1} - D_t = a_1 Y_{t+1} + a_2 D_t + e_{t+1}$$

In Fama &French (2002), p.10

For this reason, and in order to measure the speed of the adjustment of dividends to the supply of short term investment variations presented, such as in Fama & French (2002), as shown in Equation (6), which is a model created by Fama & MacBeth (1973).

Equation (6)

$$(D_{t+1} - D_t)/A_{t+1} = a_0 + a_1 Y_{t+1}/A_{t+1} + a_2 D_t/A_{t+1} + a_3 d A_{t+1}/A_{t+1} + e_{t+1}$$

In Fama & French (2002), p.15

Equation (6) is one step ahead of Lintner (1956), as it allows for the average variation during the years, instead of only taking into consideration the normal variations of dividends to the target pay-out. However, according to Fama & French (2002), the targets of distribution and the speed are different for each company, and that is why they presented equation (7).

Equation (7)

$$
\begin{aligned}
(D_{t+1} - D_t)/A_{t+1} &= a_0 + (a_{1V}\, V_t/A_t + a_{1E}\, E_t/A_t + a_{1A} d\, A_t/A_t + a_{1D} RDD_t \\
&+ a_{1R}\, RD_t/A_t + a_{1S} Ln(A_t) + a_{1L} TL_{t+1}) \times Y_{t+1}/A_{t+1} \\
&+ (a_2 + a_{2V}\, V_t/A_t + a_{2E}\, E_t/A_t + a_{2A} d\, A_t/A_t + a_{2D} RDD_t \\
&+ a_{2R}\, RD_t/A_t + a_{2S} Ln(A_t) + a_{2L} TL_{t+1}) \times D_t/A_{t+1} + b_1 d\, A_{t+1}/A_{t+1} \\
&+ e_{t+1}
\end{aligned}
$$

In Fama &French (2002), p.16

Due to the lack of data in this research, only two variations of the equation (6) were used, instead of equation (7). Therefore the equations applied in this study are the following:

- Market leverage

Equation (8)

$$
\begin{aligned}
(D_{t+1} - D_t)/A_{t+1} &= a_0 + a_1\, Y_{t+1}/A_{t+1} + a_2\, D_t/A_{t+1} + a_3 d\, A_{t+1}/A_{t+1} + a_4\, L_t/V_t \\
&+ e_{t+1}
\end{aligned}
$$

- Book leverage

Equation (9)

$$(D_{t+1} - D_t)/A_{t+1} = a_0 + a_1 Y_{t+1}/A_{t+1} + a_2 D_t/A_{t+1} + a_3 d A_{t+1}/A_{t+1} + a_4 L_t/A_t + e_{t+1}$$

2.4.3 The third Testing Hypothesis

At this phase of the research, the focus is to understand the behaviour of leverage. In order to achieve this goal, similar regression to that of Fama & French (2002) is used. This regression relates Book and Market leverage, as both are a function of investment opportunities, profitability and volatility proxies. Using a regression with these variables, it is possible to understand whether companies in Portugal are more likely to behave according to the Pecking Order or the Trade-Off model, as profitability and investment opportunities proxies are used. With these tests it is also possible to observe whether companies use debt to absorb short term variations of earnings and investments. In order to construct the final regression, Equation 10 was used (Fama & French, 2002).

Equation (10)

$$L_{t+1}/A_{t+1} = b_0 + b_1 V_t/A_t + b_2 ET_t/A_t + b_3 Dp_t/A_t + b_4 RDD_t + b_5 RD_t/A_t + b_6 Ln(A_t) + b_7 TP_{t+1} + e_{t+1}$$

In Fama &French (2002), p.18

Two slightly different regressions are used for this study, which are the following:

- Book Leverage

Equation (11)

$$L_{t+1}/A_{t+1} = b_0 + b_1 V_t/A_t + b_2 ET_t/A_t + b_3 Dp_t/A_t + b_4 RDD_t + b_5 RD_t/A_t + b_6 Ln(A_t) + e_{t+1}$$

- Market Leverage

Equation (12)

$$L_{t+1}/V_{t+1} = b_0 + b_1 V_t/A_t + b_2 ET_t/A_t + b_3 Dp_t/A_t + b_4 RDD_t + b_5 RD_t/A_t + b_6 Ln(A_t) + e_{t+1}$$

3. Results

This section is divided among the three main testing hypotheses. The first and the third hypothesis are divided into subsections. The section devoted to the first testing hypothesis is divided between the relationship between dividends and: (1) investment; (2) profitability, and; (3) volatility. These relationships can be interpreted in **Table VII** - (Appendix – page 51). In the third hypothesis, the subsection shows the relations between leverage and: (1) profitability; (2) investments opportunities; (3) volatility, and; (4) non debt tax shield. For this, **Table IX** - (Appendix – page 53) is used. The second hypothesis is not divided into subsections, and **Table VIII** - (Appendix – page 54) is used to describe it.

3.1 First Testing Hypothesis

In order to understand how dividends target pay-out changes with variations of profitability, investments and leverage, **Table VII** - (Appendix – page 51) shows the cross section regression of Yt1At1on Dt1At1. There is a low value on R-squared of 0.0072 and adding intersection terms increases the R-squared to values between 0.2980 and 0.3126.

3.1.1 The relationship between Dividends and Investment: RDtAt

Both Trade-Off and Pecking Order models state that higher investments are negatively-related with dividend pay-outs. In the Trade-Off model, the justification for the behaviour is that companies try to avoid problems of underinvesting or not, as they do not want to use risky debt. For the Pecking Order model, the reason for the negative relationship is the fact that companies want to save debt capacity (with low risk) for future investments. As one of the proxies for investments opportunities is the RDtAt variable (5), the expected sign would be a negative one, as companies dispend more resources on R&D and are thus limited in distributing dividends. However, RDtAt, is not statistically significant, and

therefore it is not possible to make any inference.

For the second investment proxy, dAtAt (3), the expected sign is also negative, as a result of positive changes in total assets when companies channel their resources to growth and consequently there is less cash available to be distributed. However, once again, nothing can be stated, as this is not statistically significant.

Finally, with regards to the last investment proxy, that of VtAt (1), which is the market value of firm t to total assets, the coefficients are statistically significant and they have a positive relationship to dividend pay-outs. However this contradicts the prediction that investment has negative effects on dividend distribution.

Although RDDt (4) is not a proxy, it is a dummy, which assumes a value of 0 if there were R&D expenses, and 1 if there were none. This is statistically significant, and is consistent with the last conclusion. The main inference in this subsection is that Portuguese companies finance investments with debt, avoiding dividend pay-outs. The evidence found suggests that shareholders were probably so levered that they needed to receive dividends, even when this goes against the companies' interest.

3.1.2 The relationship between Dividends and Profitability Et/At; Vt/At

Both models rely on the prediction that profitable companies pay out more dividends. According to the Pecking Order model, companies with more profits have more capacity to pay out higher values of dividends and maintain the possibility of recovering a low risk of debt as a means of financing investment opportunities. On the other hand, the Trade-Off model points out that paying out dividends will control the agency costs created by cash flows. Besides these differing motives, both agree that profitability is positively related to dividend pay-outs, and thus one would be expected that the investments proxies are positive.

One of the proxies for profitability is Et/At (2), which is statistically significant. With

regards the other proxy of profitability Vt/At (1), it is also statistically significant in all the regressions of the **Table VII** (Appendix – page 51). Both the variables have positive coefficients which is consistent with previous literature. Companies with more profitability have higher dividend pay-outs.

3.1.3 The relationship between Dividends and Volatility: ln(At)

Concerning volatility, we find the same predictions for both models, although, once again, for different reasons. The Trade-Off points are a reason for more volatile companies having lower pay-out values than safe companies, due to the fact that they have higher expected bankruptcy costs and consequently less leverage, and also that they finally pay out less dividends. Regarding the Pecking Order model, the purpose is related with the fear of having difficulty raising low risk debt. This variable ln(At) (6) is statistically significant and consistent (smaller companies have higher volatilities), and thus smaller companies will pay outs less dividends. This conclusion is in accordance with that found by Fama & French (2002).

3.2 Second Testing Hypothesis

The objective at this stage is to understand whether the targeted dividend pay-outs are adjusted to absorb the short term variation of investments and to examine whether firms vary dividend pay-outs in relation to targets to accommodate short term variations in investments. As Fama & French (2002) stated, Lintner's (1956) partial adjustments model cannot be used, which includes normal variations in dividends due to movements toward the target pay-out. For these causes, a dynamic model is used, which is the augmented Lintner model, which permits different means of variables over the years. According to Lintner (1956), different target pay-out and adjustments rates exist, whereby each company has different goals, experiences and paths. Companies might prefer growth

prospects of an industry or the company, or may prefer to satisfy requirements for internal funding. Despite these worries, managers and stakeholders show preference for stabilizing fluctuations of dividend rates, by using outside debt and new equity. Some companies compare the speed of adjustment to the most competitive firms.

For this hypothesis, i.e., to test whether target dividend pay-outs are adjusted to absorb the short term variation of investments, and also whether firms vary dividend pay-outs from their targets in order to accommodate short term variations in investments, **Table VIII** (Appendix – page 53) is used, where the independent variable is the DDA, which equates to the variations of the dividends divided by the assets. The variable TP (7) presented on this table is the Target Pay-Out, which is YA (1) divided by speed of adjustment - SOA (6). When compared to the R-squared for all regressions, this one is situated in an interval of 0.21 to 0.24.

The mean slope of DAA (3) permits a test of how dividends respond to changes of short term variations in investment. With regards to the speed of adjustment (SOA), which is the symmetric of the average slope DA (2), this is between 0.44 and 0.53. The coefficients are greater than that which is presented by Fama & French (2002), which lie between 0.27 and 0.33. All standard errors of SOA (6) are higher than 1.96, and thus they are statistically significant. Regarding TP (7), target pay-out, we report a negative value and also small positive values. This occurs due to the importance of dividends being replaced by repurchasing shares, such as occurred in the US since 1980, according to Allen & Michaelly (2003). However this equation should be replaced by another one which allows changes in slopes of YA (1) and DA (2) in order to gain a clear idea of what happens when proxies for volatilities, profitability and investments opportunities change. At this moment, the only conclusion that can be made is that none of the coefficients of YA (1) are statistically significant. Concerning DA (2), the coefficients are all negative, and

simultaneously are all statistically significant. With regards to the main question, it is possible to say that target dividends do not absorb short term variations of investment, as the SOA and DA are not large enough to accomplish a total short term variation.

3.3 Third Testing Hypothesis

In order to explain the performance leverage, two different measures of leverage are used, the Book and the Market Leverage. For this test hypothesis, it is necessary to resort to **Table IX** (Appendix –page 54), which include proxies for investment opportunities leverage VtAt (1), and profitability EtAt (2). The R-squared for Book Leverage regression assumes the value of 0.56, and for Market Leverage, a value of 0.29.

3.3.1 The relationship between Leverage and Profitability VtAt(1) EtAt(2)

In order to relate Leverage with Profitability, we start with VtAt (1), which is a proxy for profitability, and the signs differ for Book and Market Leverage. However, in both cases, they are statistically significant. The coefficient of Book Leverage is negative, and its standard error is -13.6. On the other hand, VtAt (1) is positive when used to explain market leverage, and assumes a standard error of 5.16.

EtAt (2) is also used as a proxy for profitability, assuming negative values for both Market and Book Leverage. In both cases, EtAt is statistically significant at 5%, and the standard error is closest to zero, with a value of -8.34. This is consistent with the Pecking Order prediction, showing that earnings have opposite effects on long and short term leverage.

Other authors stated that more profitable companies have less leverage, such as Rajan & Zingales (1995), or Harris & Raviv (1991), who state that leverage tends to increase with non-debt tax shields, potential investments, and company size. On the other hand, leverage tends to decrease with risk, probability of bankruptcy and profitability. This can be easily understood in an example provided by Harris & Raviv (1991, 38):

> If in the short run, dividends and investments are fixed, and if debt financing is the dominant mode of external financing, then changes in profitability will be negatively correlated with changes in leverage.
>
> In Harris & Raviv (1991), p. 38.

Harris & Raviv (1991) studied this behaviour for several countries. Using these results, and when confronted with their results, we can state that Portuguese companies behave similarly to firms in Japan, Italy, and Canada, and to the opposite of ones in the United Kingdom. These authors found evidence against the static Trade-Off model, which states that more profitable firms should have a higher optimal leverage level. However, extensions of the static Trade-Off theory exist, which state that the negative relationship between profitability and leverage ratios is in fact consistent with the Trade-Off theory. Following Strebulaev's (2003) train of thought that companies are not constantly adjusting their leverage ratios, on account of transaction costs, companies permit that leverage ratios vary to an interval of values close to the optimal target ratios. For this reason, according to Long Chen & Xinlei Zhao (2005), the market equity values of profitable firms grow faster, leading to the inverse behaviour between profitability and leverage ratios. However, sometimes target companies have to resort to external funds. Thus the negative connection of profitability and leverage ratio might occur on account of firms moving away from their target ratios in the short term.

Another possible explanation of the negative relationship between leverage and profitability is related to the so-called dynamic tax consideration, which proposes that internal funds are less costly than external ones, and for that reason are less attractive, although they permit delaying tax payments. Based on these causes, it is more likely that more profitable firms choose less debt and thus have lower target ratios.

The evidence presented is consistent with the Pecking Order predictions, i.e., that

companies choose internal funds before raising debt, trying to escape from adverse selection costs.

More profitable firms raise less debt, as they have more internal funds to rely on. The negative inverse connection between profitability and leverage might transmits the idea of a tax benefit, which is also a worry.

3.3.2 The relationship between Leverage and Investment Opportunities RD/At (5), RDDt(4)

Sometimes, shareholder problems attract situations of inefficient assets substitution- or even under-investment. To oppose this situation, incentives are given to companies that have more investment opportunities, the consequence being that few are under-leveraged. Another reason for the negative relationship between leverage and investment opportunities, according to the Trade-Off model, is the fact that firms can be more flexible towards debt payments as a means of controlling free cashflow problems. Finally, according to Myers (1977), companies with higher levels of leverage are more willing to let profitable investment opportunities pass by, than those with lower levels.

However, as can be observed in Table-3, nothing can be said about the relationship between RD/At (5) for both Book and Market Leverage, as the highest absolute value for standard error presented is only 1.47, and thus they are not statistically significant. Another variable that is not statistically significant and which is not interpretable is RDDt (4)

3.3.3 The relationship between Leverage and Volatility ln(At) (6)

Regarding the relationship between Book Leverage and Volatility ln(At) (6), it is not possible to surmise any type of inference, as this variable is not statistically significant (BL regression). On the other hand, concerning the relationship between Market Leverage

and Volatility ln(At) (6), it is possible to make some conclusions, as the coefficient is statistically significant (ML regression). The evidences found is that they have a negative relationship, which is consistent with the complex Pecking Order model. A possible explanation was presented by Fama & French (2002), in that large companies have more ready access to debt market, with lesser costs.

3.3.4 The relationship between Leverage and Non-Debt Tax Shield RDt/At (5) DP/At (3)

As has already been stated, RDt/At (5) and DPt/At (3) are not statistically significant, which is consistent with Graham (1996), who states that RDt/At (5) and DPt/At (3) in the best case are the weak part when determining the tax rate of firms.

4. Conclusions

This study helps to understand how Portuguese companies react with regards to their pay-out policy and leverage when they suffer changes on their capital structure and polices. It must be borne in mind that this is a very controversial subject, which has been studied for decades. To achieve the results, a replication of the methodology made by Fama & French (2002) was applied, in which both Trade-Off and Pecking Order were tested. The regressions used were similar, or identical to those of Fama & French. It is now possible to state that Portuguese companies experience situations in which they behave in accordance with Pecking Order or Trade-Off, and, in some cases, with both of these models. As has been showed before, the literature states that both models share predictions in some occasions, however this happens for different reasons. The predictions of profitability and dividends are in agreement with the two models. The evidence found shows that higher profits result in a higher pay-out of dividends, independent of the underlying theory, whether it be Trade-Off or Pecking Order. This conclusion is also shared by Fama & French (2002)

Regarding the prediction of dividends and investments, two different situations were in evidence. However, before going into detail, we would like to recall that the prediction in this case is common to both the Trade-Off and Pecking Order model, which states that companies with a greater value of investments have lower dividends. The first situation is that not all of the used proxies were statistically significant, such as, for instance, RDDt (which takes the value 0 if there is R & D expenditure, and the value 1 otherwise) and dAtAt, (variation of assets). The second situation concerns Vt/At, which contradicts the previous literature, such as the research of Fama and French 2002. The main conclusion

here is that shareholders are probably so leveraged that they are require dividends, even when this goes against the company's interest.

Another common prediction of those two models regards volatility and dividends, although from different causes. The prediction is that more volatile companies have lower pay-out values than safe companies. This is in accordance with this research, as the size of the company (the proxy for volatility being the smaller the company, the higher the volatility) has a positive and statistically significant coefficient on the regressions. We would also like to emphasize that this conclusion is in agreement with the conclusions of Fama & French (2002).

Regarding the behaviour of target dividend pay-outs, the main question was to know whether they are adjusted to absorb short term variations of investments. With regards to this, we can say that target dividends do not absorb short term variations of investment. Even with values higher than those that were presented by Fama and French 2002 are in evidence, the speed of adjustment is not big enough to bring about a total short term variation.

Moving to Leverage and Profitability, the prediction of the Pecking Order model and the Trade-Off one differ, once, as in the first one, is expected that companies with more profits have lower leverage (market and book leverage). However, the prediction of the simple Trade-Off model suggests that profitable companies have higher book leverage. Regarding market leverage, there is no prediction for Trade-Off, as market values increase with profitability. The conclusion is that both of the proxies used for profitability (VtAt and EtAt) are consistent with Pecking Order when they are used to explain book leverage, as they have a negative sign. Regarding market leverage, the Pecking Order prediction fails, as one of the proxies is positive. Therefore the conclusion is that there is

evidence that Portuguese companies with high profitability have lower levels of short and long term book leverage.

With regards to Leverage and Investment Opportunities, we would highlight the need to distinguish between the two variants of the Pecking Order model - the simple and the complex. Concerning the simple PO model and market leverage, there are no predictions; and concerning the simple PO and the BL, a positive relationship is expected. On the other hand, the complex Pecking Order model states a negative relationship. Therefore, the larger the expected investment, the less will be the current Book or Market Leverage. From the Trade-Off theory, the prediction is that the higher the investments opportunity, the less will be the Book or Market Leverage. However, this study does not come to any conclusions about this point, as the coefficient is not statistically significant.

With regards to the relationship between Leverage and Volatility through the Complex Pecking Order model or the Trade Off one, the relationship is negative, i.e., the higher the volatility, the less will be the leverage. Evidence found in this study is in accord with the previous literature, in that companies with more volatility of net cash flow have less book leverage. Regarding Market Leverage, it is not possible to make any inference, as the coefficient is not statistically significant.

There are no statements regarding non-debt tax shield and its relationship with leverage, as the coefficients were not statistically significant.

One of the limitations of this research is the reduced number of companies used in the sample, so it would thus be very interesting to carry out this research not only for Portuguese cases, but as well for the whole European zone, and also to carry out an analysis by sector. In this way, it would be possible for companies to have different behaviours, according their sector.

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Appendix

Table I *- Population of the study - list of Companies.*

VAA Vista Alegre Atlantis SGPS (VAFK PL)
VAA Vista Alegre Atlantis SGPS (VAF PL) - By Segment
SAG GEST-Solucoes Automovel Globais SGPS SA (SVA PL)
Sonae Industria SGPS SA (PL)
Sonae Capital SGPS SA (SONC PL)
Sonae SGPS SA (SON PL)
Sonaecom - SGPS SA (SNC PL)
Semapa-Sociedade de Investimento e Gestao (SEM PL)
SDC - Investimentos SGPS SA (SDCAE PL)
SDC - Investimentos SGPS SA (SDCP PL)
Toyota Caetano Portugal SA (SCT PL)
REN - Redes Energeticas Nacionais SGPS SA (RENE PL)
Reditus-SGPS SA (RED PL)
Portugal Telecom SGPS SA (PTC PL)
Portucel SA (PTI PL)
Sociedade Comercial Orey Antunes SA (ORE PL)
NOS SGPS (NOS PL)
Novabase SGPS SA (NBA PL)
Mota-Engil SGPS SA (EGL PL)
Grupo Media Capital SGPS (MCP PL)
Martifer SGPS SA (MAR PL)
Lisgrafica Impresso & Artes (LIG PL)
Jeronimo Martins SGPS SA (JMT PL)
Impresa SGPS SA (IPR PL
INAPA - Investimentos Participacoes e Gestao SA (INA PL)
Impresa SGPS SA (IPR PL)
Ibersol SGPS SA (IBS PL)
Imobiliaria Construtora Grao-Para SA (GPA PL)
Global Intelligent Technologies SGPS S.A. (GLINT PL)
Galp Energia SGPS SA (GALP PL)
Futebol Clube Do Porto (FCP PL)
F. Ramada Investimentos SGPS SA (RAM PL)
Estoril Sol SGPS SA (ESON PL)
Estoril Sol SGPS SA (ESO PL)
EDP Renovaveis SA (EDPR PL)
EDP - Energias de Portugal SA (EDP PL)
Corticeira Amorim SGPS SA (COR PL)
Compta-Equipamento e Servicos de Informatica SA (COMAE PL)
Cofina SGPS SA (CFN PL)
CIMPOR Cimentos de Portugal SGPS SA (CPR PL)
Sport Lisboa e Benfica-Futebol SAD (SLBEN PL)

Table II *- Pecking Order vs Trade-Off Predictions*

Source: Author´s construction, based on the previous literature

Predictions	Pecking Order	Trade-Off
Financing	Companies will always choose the least expensive method of financing the company. Companies choose how to finance themselves through: **1. retained earnings** **2. safe debt** **3. risky debt** **4. equity**	Dividend and leverage decisions are based on a Trade-Off between a number of costs and benefits. The predictions are organized by four stages: • **bankruptcy costs** • **taxes** • **free cash flow agency problems** • **stockholder/bondholder agency problems**
Dividend Pay-outs and Investment	Firms with higher ratios of investment to earning have less dividend distribution.	Firms with more investments have lower dividend pay-outs.
Dividend Pay-outs and Profitability	With higher profitability ratios, companies have more dividend pay-outs.	With higher profitability ratios, companies have more dividend pay-outs.
Dividend Pay-outs and Volatility.	Larger companies have less volatility and higher pay-outs	Volatile companies have lower pay-out values than safe companies.
Dividends and Leverage	Higher leverage, less dividend pay-outs.	The higher the leverage (Book or Market), the less the dividend payouts.*
Volatility and Leverage	Complex Pecking Order- Companies with more-volatile earnings have less current debt (Book or Market Leverage).	Companies with more-volatile earnings should carry less debt.
Profitability and Leverage	More-profitable companies will have lower leverage.	***Book Leverage:*** A Positive Relation between Book Leverage and Profitability. ***Market Leverage:*** No prediction, between Market Leverage and Profitability because Market Value increases with profitability.
Financing Non-debt tax shield and Leverage		Companies with higher levels of non-debt tax deductions (depreciation and research expenses) have lower leverage.

Predictions	Pecking Order	Trade-Off
Leverage and Investments	*Simple Pecking Order:* ***Book Leverage:*** Higher investment, higher Book Leverage ***Market Leverage:*** No prediction *Complex Pecking Order* ***Book Leverage:*** Larger expected investment, less current leverage. ***Market Leverage:*** Larger expected investment, less current leverage.	***Book Leverage:*** Negative relation between Book Leverage and Investment Opportunity.* ***Market Leverage:*** Negative relation between Leverage and Investment Opportunity.*
Target leverage	Does not have obvious leverage targets. However dividends are inelastic, and thus short-term variations in earnings or investments are presumed to be by incorporation of variations of leverage.	Companies have leverage targets and that the level of leverage is mean, reverting around this target.

*Depends if the debt capacity is a function of Book or Market Assets.

Table III *- Variables Description*

Source: Author's constructions, based on Fama and French (2002)

Variable's Name	Variable	Formula
Total asset at t moment	At	Short term Asset t + Long term Assets t
Changes on Total Asset at moment t	DAt	Asset t – Asset t-1
Dividends at t moment	D	Value of dividend
Earnings before interest at moment t	Et	EBIT-Tax expenses
Changes of EBI at moment t	DEt	EBIt-EBIt-1
Earnings before interest and taxes at moment t	ETt	EBITDA - Depreciations and Amortizations
Changes of EBIT at moment t	DETt	EBITt-EBITt-1
Market Equity at moment t	Met	Number of shares t * Stock Price t
Market value of Firm at moment t	Vt	Liabilities – deferred taxes and investments tax credit + preferred stocks + market equity
R & D Expenditures at moment t	RDt	Value of R & D Expenditures
Dummy of R & D Expenditures at moment t	RDDt	Takes the value 0 if there is R & D Expenditures and the value 1 otherwise
Depreciation Expense at moment t	DPt	Value of Depreciations
Liabilities at moment t	Lt	Short term debt t+ long term debt t
Number of shares outstanding at moment t	NSt	Number of Shares
Stock price at moment t	SPt	Value of stock Price
LN(asset) at moment t	Ln(At)	Logarithm of the Asset´s Value
Book Equity at moment t	BE	Value of Book Equity
Variations of Stock Price at moment t	DSPt	Stock Price t - Stock Price t-1
Variation of Market Capitalization at moment t	Yt	(Number of shares t * Stock Price t) – (Number of shares t-1 * Stock Price t-1)

Table IV *- Proxies*

Source: Author's constructions, based on Fama and French (2002)

Proxies	Variable's Name	Variable	Formula
Profitability	Earnings before interest and taxes t / total assets t.	ETtAt	ETt/At
	Earnings before interest t / total assets t.	EtAt	Et/At
	Market value of firm t / total assets t.	VtAt	Vt/At
Non-debt tax Shield	R & D expenditures t / value of assets t.	RdtAt	RDt/At
	Depreciations expenses t / total assets t.	DPtAt	DPt/At
Investment opportunities	Earnings before interest t / total assets t.	EtAt	Et/At
	Market value of Firm t / total assets t.	VtAt	Vt/At
	(Total assets t - total assets between t-1) / total assets t.	dAtAt	dAt/At
	R & D expenditures t / value of assets t.	RdtAt	RDt/At

Table V *- Ratios*

Source: Author's constructions, based on Fama and French (2002)

Variable's Name	Variable	Formula
Market Leverage at moment t.	LtVt	Lt/Vt
Book Leverage at moment t	LtAt	Lt/At
Dividends t+1/ total Assets t+1	Dt1At1	Dt1/At1
Variation of Market Capitalization t+1/ total Assets t+1	Yt1At1	Yt1/At1
(Dividends t+1 – Dividends t)/ total Assets t+1	DDA	(Dt1 - Dt)/At1
Dividends t/ total Assets t+1 Dt/At1	DA	Dt/At1
(Total Asset t+1 – total Assets t)/ total Assets t+1 (At1 - At)/At1	Daa	(At1 - At)/At1
Variation of Market Capitalization t+1/ total Assets t	YA	Yt1/ At
Target Book leverage moment t+1	BL	Liabilities t+1/ total Assets t+1
Target Market leverage moment t+1	ML	Liabilities t+1/ Market value of Firm t
Variation of Liabilities to assets ratio between t+1 and t	LAL	Lt1/At1 - LtAt
Changes of EBI moment t+1	Det	Et+1 – Et
Changes of EBI moment t+1 divided by total assets on moment t +1	DEA	(Et+1 – Et)/At+1
Changes of Total between t and t-1t to Total assets t+1	DAA	dAt/At1
Liabilities t+1/market value of the firm t+1-Liabilities t/market value of the firm t	ML2	Lt1/Vt1 - Lt/Vt
(Liabilities t+1- Liabilities t)/ assets t+1	BD	(Lt1 - Lt)/At1

***Table VI** - Descriptive statistics*

Source: Author's constructions, based on the Bloomberg database.

Variable	Obs	Mean	Std. Dev.	Min	Max
At	305	3027.496	6491.339	23.92754	42627.84
Dat	305	164.7716	1050.731	-10347.3	8006.459
D	305	54.51837	145.818	-0.01382	1451.952
Et	305	208.2193	436.0296	-65.8871	2575.043
DEt	305	3.61167	131.1518	-1078.61	974.945
Ett	305	179.0855	375.721	-57.135	2267.39
DETt	305	3.203665	116.027	-843.514	982.373
Met	305	1371.332	2730.07	0	16275.39
Vt	305	3546.505	7113.137	29.87208	41638.61
RDt	301	0.308131	1.32307	0	11.1
RDDt	305	0.836066	0.370825	0	1
DPt	305	107.4327	249.6192	0	1973.172
Lt	305	2184.742	4836.663	20.91455	31196.18
Q	305	839.2143	1753.38	-48.4604	11431.67
NSt	305	417.1338	702.5543	0	3656.538
SPt	304	3.06682	3.026376	0	18.39
LNAt	305	6.5955	1.736628	3.17503	10.66026
BE	305	852.3228	1763.232	-48.471	10944.19
DSPt	305	-0.00208	2.143102	-12.465	11.45
Yt	305	-10.998	1619.648	-9839.27	9494.92
EttAt	305	0.039631	0.068538	-0.39048	0.36524
EtAt	305	0.047248	0.07704	-0.38666	0.425889
VtAt	305	1.195544	0.451481	0.529297	3.559077
DAtAt	305	0.009155	0.197386	-1.08676	0.726898
RdtAt	305	0.000526	0.003177	0	0.037809
DptAt	305	0.028943	0.025544	0	0.178529
LtVt	305	0.668756	0.204978	0.158789	1.081201
LtAt	305	0.740074	0.217788	0.39567	2.440831
Lt1	305	2251.463	5045.329	20.91455	31196.18
Vt1	305	3631.626	7354.615	28.77579	41638.61
Dt1	305	55.29464	148.1679	-0.01382	1451.952
At1	305	3133.514	6799.615	23.92754	42649.9
Yt1	305	55.38969	1188.658	-9295.9	9494.92
Et1	305	878.5126	1854.86	-48.4604	11528.56

Table VII *- Fama and French (2002) Regressions used to understand how Target Pay-Outs behave when they are a function of investment opportunities, profitability and volatility proxies.*

Statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1;
Source: Author's constructions based on Bloomberg database and Fama and French (2002).

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)			
Variables		Vt/At	Et/At	dAt/At	RDDt	RDt/At	LN(At)	Yt1At1	Lt/At	Lt/Vt	Constant	Observations	R-squared
Dt1At1	Regression 1												
	Coefficient							0.0060			0.0098***	305	0.0072
	Standard deviation							-14.802			-97.413		
Dt1At1	Regression 2												
	Coefficient	0.0130***	0.0348***	-0.0000	-0.0046*	-0.0375	0.0031***				-0.0238***	305	0.3073
	Standard deviation	-65.937	-28.258	(-0.0010)	(-1.7941)	(-0.1260)	-56.264				(-4.5136)		
Dt1At1	Regression 3												
	Coefficient	0.0139***	0.0252*	-0.0010	-0.0048*	-0.0658	0.0030***		-0.0071		-0.0184***	305	0.3126
	Standard deviation	-67.614	-18.207	(-0.2214)	(-1.9037)	(-0.2214)	-54.715		(-1.5141)		(-2.9023)		
Dt1At1	Regression 4												
	Coefficient	0.0152***		-0.0012	-0.0052**	-0.0891	0.0033***		-0.0110***		-0.0172***	305	0.3049
	Standard deviation	-79.000		(-0.2710)	(-2.0610)	(-0.2987)	-61.039		(-2.6350)		(-2.7208)		
Dt1At1	Regression 5												
	Coefficient	0.0116***	0.0297**	-0.0006	-0.0046*	-0.0574	0.0031***			-0.0054	-0.0181**	305	0.3090
	Standard deviation	-45.992	-21.713	(-0.1434)	(-1.7999)	(-0.1923)	-55.540			(-0.8536)	(-2.1195)		
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)			

Variables		Vt/At	Et/At	dAt/At	RDDt	RDt/At	LN(At)	Yt1At1	Lt/At	Lt/Vt	Constant	Observations	R-squared
Dt1At1	Regression 6												
	Coefficient	0.0111***		-0.0010	-0.0049*	-0.0887	0.0034***			-0.0114**	-0.0139*	305	0.2980
	Standard deviation	-43.945		(-0.2143)	(-1.9156)	(-0.2957)	-63.394			(-1.9857)	(-1.6640)		

The Regressions are run for each year during a 10 years period for 41 companies. The table show the coefficients and the t-statistics for the means. The regressions for Target Book Leverage is $D_{t+1}/A_{t+1} = a_0 + a_1 V_t/A_t + a_2 E_t/A_t + a_3 RDD_t + a_4 RD_t/A_t + a_5 ln(A_t) + a_6 dA_t/A_t + a_7 L_t/A_t + e_{t+1}$ equation (3) page 25, and for Target Market Leverage is $D_{t+1}/A_{t+1} = a_0 + a_1 V_t/A_t + a_2 E_t/A_t + a_3 RDD_t + a_4 RD_t/A_t + a_5 \ln(A_t) + a_6 dA_t/A_t + a_7 L_t/V_t + e_{t+1}$ equation (4) page 26.

Table VIII *- Lintner model regression to explain variations in Dividend Targets*

Statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1;
Source: Author's constructions based on Fama and French (2002)

		(1)	(2)	(3)	(4)	(5)				(6)	(7)
	Variables	YA	DA	Daa	Lt/At	Lt/Vt	Constant	Observations	R-squared	SOA	TP
DDA	Coefficient	0.0026	-0.4426***	0.0041			0.0045***	305	0.2054	0,4426	0,00587438
	Standard Deviation	(0.8259)	(-8.5796)	-14.369			-45.691				
DDA	Coefficient	0.0024	-0.4545***	0.0036	-0.0058		0.0089***	305	0.2107	0,4545	0,00528053
	Standard Deviation	(0.7677)	(-8.7120)	-12.617	(-1.4271)		-27.656				
DDA	Coefficient	-0.0014	-0.5304***	0.0014		-0.0189***	0.0181***	305	0.2433	0,5304	-0,00263952
	Standard Deviation	(-0.4373)	(-9.5947)	(0.4999)		(-3.8760)	-49.851				

For this table the used regressions are Market Leverage, which is calculated by $(D_{t+1} - D_t)/A_{t+1} = a_0 + a_1 Y_{t+1}/A_{t+1} + a_2 D_t/A_{t+1} + a_3 d A_{t+1}/A_{t+1} + a_4 L_t/V_t + e_{t+1}$equation (8) page 27, and for Book Leverage, which is: $(D_{t+1} - D_t)/A_{t+1} = a_0 + a_1 Y_{t+1}/A_{t+1} + a_2 D_t/A_{t+1} + a_3 d A_{t+1}/A_{t+1} + a_4 L_t/A_t + e_{t+1}$equation (9) page 28. The speed of adjustment (SOA) is the symmetric of the average slope DA, i.e. Dividends at moment t /total Assets at moment t+1.

Table IX *- Fama and French Regression to understand the behaviour of Book and Market Leverage when they are a function of investment opportunities, profitability and volatility proxies*

Statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1;
Source: Author's constructions based on Bloomberg database and Fama and French (2002)

		(1)	(2)	(3)	(4)	(5)	(6)			
Variables		Vt/At	Et/At	DPt/At	RDDt	RDt/At	LN(At)	Constant	Observations	R-squared
BL	Coefficient	-0.2492***	-0.9500***	-0.3301	-0.0060	-40.759	-0.0074	1.0769***	305	0.5591
	Standard Deviation	(-13.5760)	(-8.3492)	(-1.0204)	(-0.2549)	(-1.4766)	(-1.4517)	-222.451		
ML	Coefficient	0.1281***	-1.3742***	-0.1605	-0.0412	-42.997	-0.0135**	0.7824***	305	0.2864
	Standard Deviation	-51.625	(-8.9350)	(-0.3671)	(-1.2869)	(-1.1524)	(-1.9698)	-119.561		

In this table the regressions used for Book Leverage are the following: $L_{t+1}/A_{t+1} = b_0 + b_1 V_t/A_t + b_2 ET_t/A_t + b_3 Dp_t/A_t + b_4 RDD_t + b_5 RD_t/A_t + b_6 Ln(A_t) + e_{t+1}$ equation (11) page 28, and for Market Leverage the $L_{t+1}/V_{t+1} = b_0 + b_1 V_t/A_t + b_2 ET_t/A_t + b_3 Dp_t/A_t + b_4 RDD_t + b_5 RD_t/A_t + b_6 Ln(A_t) + e_{t+1}$ equation (12) page 28.