Dividends and abnormal return

Can a change in the dividend corporate policy influence the stock's return?

A Master's Thesis By

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Abstract

The purpose of this thesis is to analyze the correlation between the abnormal returns and the dividend policy linked to the same security. The study will be addressed on an equity basket made up of the 500 largest capitalization companies known as S & P 500. The time span used will be that of the last twenty years in order to make our study current and possibly useful for future investigations.

The analysis will include other determinants related to the business sphere in addition to the specific one concerning the main variables above mentioned, in order to make it more complete. Two points of view will be considered, managerial and investor. The first will focus on the use of the dividend policy as a tool for channeling certain information from the company to the stakeholders and at the same time as through these policies, they can try to manage their stock price volatility. The second is linked to the theory of behavioral finance and the clientele effect, underlining how investors with their way of acting different from the market logic (misbehaving) and with well-defined preferences regarding dividends, influence in a certain way the management on the definition of company dividend policies. The starting hypothesis is that there is a positive correlation between changes in the dividend policy and the generation of abnormal returns, pointing out that within the financial markets there is no perfect incorporation of information. All this will be investigated through two linear regressions based on a previous study by Baskin (1989).

The results stemming from the analysis have been inconsistent with each other. Indeed the first regression has reported a positive correlation among the abnormal return and the

variable related to the dividend. On the other hand, the second regression refuted our initial hypothesis, with a negative correlation. The results are undermined by the narrowness and incompleteness of the sample. Hence, our analysis can be discuss qualitatively and further research can be useful to demonstrate empirically how the behavior of investor affect the management's decision concerning the definition of a dividend policy, and mostly, through a more complete sample and a more in-depth analysis, try to find another piece of the puzzle.

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"The harder we look at the dividend picture, the more it seems like a puzzle with pieces that just don’t fit together" (Black, 1976).

Chapter 1

Introduction

Despite the fact are decades that the academic world has focused its attention on the solution of what many call the "dividend puzzle", going through theoretical models and empirical research to arrive at a resolution, till today there are no theories or models that can adequately and satisfactorily explain the reasons behind this phenomenon.

The distribution of dividends, to meet the interests of shareholders is still a very common practice among listed companies, it is one of the most studied financial events on which there are conflicting opinions. Despite, "the percentage of firms paying out dividends decreased from 66.5% in 1978 to 20.8% in 1999, due in part to the changing characteristics of publicly traded firms"[1]. This changing trend is due to variation of the publicly listed firm's characteristics in the recent years. In fact, the increasing number of new listed firms in the US equity stocks market is mostly composed by small firms with high growth and investment opportunities that have a lower propensity to pay-out dividends. Moreover, in the Fama and French (2000) study, it is highlighted that due to the tax disadvantages of the dividends compared to the share repurchase even the mature firms that used to have a higher propensity to pay dividends had decreased their trend.

[1] Fama, French, "Disappearing dividends: changing firm characteristics or lower propensity to pay?", 2000

However, on the relevance of the practice of dividends considerable discussions and interpretations have been opened, the best known is the one attributable to the information they carry with them. The Signalling Hypothesis suggests that there is an information asymmetry between who is within the company, in this case the managers, and the users of this information, or the shareholders. Thus, to cope with this gap, managers utilize the dividends as a tool to transmit private information outside. The theories that have been developed through the years are many, but they can be divided into two main areas. The first one, which supports the irrelevance of the theory of dividends, theories that are placed in the mid-twentieth century and which are the precursors of studies on dividends. These theories are attributable to Modigliani and Miller and then to Black and Scholes, who laid the foundations for future research. While, the second, are those that defend the importance of dividend policies, and how they relate to and influence multiple key indicators of a company's performance, these are more recent theories that use new models for the study of this phenomenon, but which do not yet give a unique interpretation.

Historical background

The dividends were born about three hundred years ago in the Netherlands and in Great Britain, when the first travel companies sell "venture in parts" to their investors. Given the riskiness of trips that faced, the earning expectations were very high. The distribution of dividends occurred only through travel profits and was not affecting the firm's capital; it was immediately clear the importance of paying dividends for the satisfaction of the investors. This belief, however, led many managers of joint stock companies, to support the payment of

dividends despite not having enough resource to do it. Therefore, in 1720, the Bubble Act passed in Great Britain, which limited the establishment of new joint stock companies.

In the United States the phenomenon had grown rapidly after the American revolution. But at the beginning of the nineteenth century the dividend became a sort of liquidation rather than a distribution of profits. In the following years, many fraudulent activities by managers who wanted to keep high and constant the dividend stream continued to succeed, for that reasons, in the first half of the century, the first government statutes on dividend payments were promulgated and at the same time it became a common practice to limit the responsibility of shareholders. In this period the preferred stocks were born, which initially were used as a method for capital increase, thanks to the regulation and the definition of a set of precise characteristics, have evolved into securities.

After the end of the Civil War in the United States, the restored confidence and the flourishing recovery of the industrial sector caused investors to become more interested in securities and this allowed the trading market to expand. It is on this thrust of the market and due to the lack of other financially relevant methods that the valuation of a company, in that historical period, was based only on the dividend history, in this way, the dividends have acquired considerable importance.

Nevertheless, something changed at the turn of the twentieth century. In fact, the dividends were still the first source of assessment for a company in the absence of other resources, but for the first time the function of dividends, as a mechanism for transmitting information, failed, just behind the great crisis of the 1929. The increase in dividend payments was reflected in the increase in the stock price, but both did not go forward at the same pace, indeed the

dividend payments was higher than the earnings and so many companies were forced to resort to retained earnings until they were able to sustain these flows.

After the Second World War in the US despite the very high inflation, dividend payments and the same policies remained unchanged confirming their importance for the market.

Dividend

The dividend is that part of the profits of the year that the shareholders' meeting decides, on the proposal of the administrative body, to distribute to the shareholders. Therefore, it is a provision of part of the profits obtained during a fiscal year that, by virtue of a careful evaluation, the Board of Directors proposes to distribute to the shareholders. It is, together with the capital gain, a form of remuneration of the capital for the shareholders.

The company could also decide to not pay dividends, in order to seize particularly profitable investment opportunities, or to heal past losses, or to meet liquidity needs allocating the earning profits at the cash reserves.

The dividends can be of two types: ordinary and extraordinary. What differentiates them is the ability of the company to be able to guarantee them over the long term; this therefore means that ordinary dividends are those that the company believes it can provide in a stable and lasting manner to its shareholders, while the extraordinary dividends are linked to events that are generally unrepeatable or in any case not reasonably foreseeable, that shareholders can not be sure to receive in the future with regularity.

Therefore, it is clear that behind the decision to pay dividends there is a careful evaluation not only of the business context but also of the external environment; this is because the distribution of dividends is linked to an information capacity (Pettit 1997), directed to the main stakeholders of the company, which in the case of ordinary dividends is reflected in the company's ability to ensure a lasting dividend.

A company has two methods to distribute the money back to its shareholders: the dividends or the share repurchases.

The company can buy-back its own shares within the limits of the distributable profits and the available reserves resulting from the last regularly approved financial statements. The realization of a buy-back operation produces effects on the perception of the company by the market and can potentially convey a message that is, more or less consciously, transmitted outside: it is therefore essential that the company is aware of the scope of its decision from a strictly financial and communicative point of view. Hence, a purchase program of own shares must first of all constitute an efficient way of distributing excess liquidity of the company and must only be carried out following a careful analysis of the internal needs, taking into account:

- The liquidity necessary to the ordinary transactions;
- The functional liquidity needed to execute extraordinary acquisition transactions;
- Then, a portion of precautionary liquidity to deal with unexpected events and exceptional needs.

On the other hand, the company can distribute dividends to all the shareholders who are entitled to it. It concerns the distribution of the "excess" wealth of the company to the shareholders. The dividend distribution is normally implemented when the company does not

have investment opportunities with a return higher than the cost of capital, but it does sometimes happen even whether there are profitable investment opportunities, to give a signal to the external environment.

There are many types of dividends that differ mainly from the extent of the rights they grant to the owner. There are in particular two main categories of stocks which differs from the dividend rights that they give to their holders: the common stocks and the preferred stocks. The latter guarantee the owner a preferential treatment in terms of settlement and pre-emption in the payment (Horngren et al., 2011).

To conclude, the most important difference among these two methods of cash re-distribution is that they are usually taxed differently, as dividends are considered personal income while repurchases capital income. Indeed, usually the former has a higher taxation than the latter, thus having a financial advantage. As the stocks analyzed in this paper are listed in the US equity stock market and following the bilateral agreements to mitigate the problem of double taxation investors are subject to different regimes, in the literature, therefore, it will be assumed that the dividend is taxed more than capital gain.

Dividend Payment Process

There are four important dates in the process of paying a corporate dividend:

- *Declaration date*: This is the date on which the board of directors announces to the shareholders and the market that the company will pay a dividend.

- *Ex-dividend date*: This is the date on which the security is traded without its dividend. In order to have the rights for the dividend, an investor must purchase the security at least one day before this date. If, instead, the investor wants to sell a stock but do not want to lose the dividend, this is the first day to sell. The ex-dividend day is the second business day prior to the registration date.
- *Record date*: This is the date on which the company consults its records to know who its shareholders are. An investor must be registered as a "holder of record" to have the right to a dividend.
- *Payment date*: This is the date on which the company sends the dividend to the registered shareholder. This date is usually placed a week or more after the registration date, so that the company has enough time to make sure that all those who have the right are paid correctly.

In this paper the focus will not be in any of these moments, but the collection of data will be concentrated at the end of each months in a time frame of twenty years. In fact, the objective is to identify the overall trend of the dividend payments of each firm to detect, through the computation of specific ratios i.e. the dividend yield and the pay-out ratio, which of them tend to pay higher or lower dividends and the variation in these trends.

Research Question

As it has been said in the previous paragraphs, the dividend theories have always been an argument of discussion and a never-ending issue in the corporate finance matter. Particularly, there have always been different and contrasting theories regarding the dividend policy of a

company and its impact on the firm's value. In the recent years there is a tendency within the public listed companies to the increase of share repurchase to the disadvantages of the dividend payment due to its tax drawback. Nevertheless, there are still a large number of firms that keep issuing new dividends, why?

This paper will try to give an answer to this question, analysing the relevance and consistency of abnormal returns with a variation of the company's dividend policy. Thereby, whether an increase or decrease of the dividend payments could lead to a stock's return that exceed the one expected, computed through the CAPM model. Therefore, it will be taken into account the dividend policy applied and the risk linked to the stock, in accordance with Baskin (1989), managers can control the stock price volatility through an adequate dividend policy, while Allen and Rachim (1996) states that the pay-out ratio is the decisive determinant of the share price.

There have already been many studies that tried to identify a correlation between the dividend and the company's stock price. In particular, Amihud and Murgia (1997) and Asquith and Mullin Jr (1983) have pointed out that on the day in which the dividend is issued, information is already available on the market and the stock returns is above average not only on that day but also within 2/3 following days. This is in contrast with the market efficiency hypothesis (EMH), which emphasizes that all known information, even the most private, should be reflected in the price of a security. Therefore, it is assumed that investors can have the same opportunities to obtain information from listed companies. Abnormal returns should not exist for a long time. This is not the case in the real world. Some investors have specific information about particular companies and are able to get this before others. However, this

paper has focused its attention on the general level of the dividend payments of each firm and its variation, not on the specific event of a dividend issue.

Also, the information asymmetry, which is usually present in the real world between managers and stakeholders, entails that the dividend is often used by managers as a mean of communication in order to reflect the company's future expectations about growth, investment opportunities and profitability. Consistent with the signalling theory.

Moreover, this paper will try to explain the correlation between the change in the dividend policy and the company's abnormal stock return applying the "Behavioral finance theories". These theories seek to add psychological framework to the conventional economic theory to unfold investor irrational behavior that lead to "wrong" investment decision. These irrational behaviors are due to mental biases of which many investors suffer such as loss aversion and ambiguity aversion. Thus, these misbehave could have some effect even in the dividend policy theory, in fact, "it is argued that behavioral biases resulting from bounded investors rationality identified by descriptive decision theory may be a main determinant of corporate dividend policy, since firms adapt their policies in order to cater to investor demand" ("The behavioral foundation of corporate dividend policy a cross-country analysis"; Breuer, Rieger, Soypak, 2014). One of the main literature's contribution that goes in this direction is the "Bird in the hand theory", that asserts that some investors prefer to hold securities that pay dividends instead of those that reinvest within the company, so they tend to build portfolios with specific titles.

There are several objectives that aim to achieve this study by expanding a section of literature a little bare, providing to both the main characters, managers and shareholders, additional

information on dividend policies and all that is linked with them. The main objective is to reinforce the literature that assume a positive correlation among the dividend payment changing and the stock's abnormal return. In order to define the advantages of a well-structured dividend policy and how it can be used at specific times to address and channel implicit information to shareholders directly involved, thus confirming the signalling hypothesis.

Then, based on the Bird in the hand theory, the aim is to understand how accordingly to dividend policy, investors tend to change their preferences or not, in relation to the Clientele effect (Pettit). In particular, due to their behavioral biases, investors have different preferences on the kind of stocks. Thus, according to the theory it would be expected different clientele to prefer different companies in relation to the dividend policy practice that better suit their preferences. Therefore, it will be explored how companies would employ a specific dividend policy, keeping dividend pay-out ratio and dividend yield high and constant, to attract the kind of investors that for cultural aspects and irrational behave have preference on this type of stocks in this way ensuring an abnormal return on its stocks price.

In addition, following the study made by Michael Firth: "Dividend changes, abnormal return, and intra-industry firm valuation" (1996), our research will be implemented with a sector analysis to understand whether within the same sector there are specific correlation among the stock's abnormal return and the dividend payments variation.

Thus, taking into consideration all the above mentioned, the research question and the relative sub-questions that will try to be answered throughout this paper are:

- *Does a positive correlation between dividend policy variation and stock abnormal return exist? The positive correlation between the change in the corporate dividend policy and the stock abnormal return could be due to the clientele effect?*

    - *Could investors' misbehaviors have a role in this correlation? Psychological biases could influence their portfolio buildings making them pick up stocks with high dividend payments? Could this affect corporate dividend policy management?*
    - *Looking at the industry sector, is it possible that some sector due to its specific characteristics has a higher correlation between abnormal return and the dividend policy variation?*

To sum up, our study contributes to the literature on the correlation between the dividend policy and the realization of returns that deviate from expected returns (i.e. abnormal). The literature gap that it will be filled up is firstly temporal, because they will be used updating data from recent times on the US equity market (1996-2015). Secondly, it will be explored how this correlation could be used to implement a corporate strategy that relying on a well-structured dividend policy it is able to appeal the specific investors that guarantee a satisfied return on its stocks. In the end, they will be identified the differences among sectors in regard to the relationship between the abnormal return and the dividend payment variation.

Overview of the findings

The research question has been answered through the implementation of an analysis supported by two linear regression equations. Our starting belief has been just partially supported by the analysis. Indeed, the first regression results, without the control variables, are in accordance with the main hypothesis of the paper i.e. there is a positive correlation among the stock abnormal return and the increase of the dividend payments. While, the second regression presents betas' coefficients that are opposite to the first one, in fact they assumed a negative relationship between the two phenomena. These opposite results are due to the introduction of the control variables which with their influences on the dependent variables have modify the overall results. Anyway, the introduction of these variables has partially improved the ability of the model to explain the correlation among the phenomena under investigation.

Outline

This chapter has given an overview that introduces the main topic of the thesis and defines the limitations of the study. The remaining part of the work is structured as follow: the next chapter, Chapter 2, it will be presented the methodology with which the study has been dealt from a theoretical and empirical point of view, with an in-depth analysis of the regression model used. Then, the Chapter 3 delves into the literature related to the dividend puzzle, while the Chapter 4 discusses the collected data and the sample used. In Chapter 5 the results are analyzed through a comparison with the initial hypotheses and the literature. Next, in Chapter 6 the results are discussed and inquired. Finally, in chapter 7 the conclusions of our study are drawn.

Limitations

As can be seen from the results of our research, a fundamental determinant was the quality of the data collected. Therefore, the first limitation was to being able to rely only on a limited use of platforms from which to extract the necessary data, in some situations the fact to be bounded to them led to an incompleteness of the data that partially undermined our results.

To which is added a limit originated from the sample of data used by us, S & P 500, which represents the set of the 500 companies with the highest capitalization. In fact, the index does not optimally represent the basket of listed companies on which it could have been based the studio, for a more truthful and complete portrait.

For a more accurate and complete analysis, a fundamental point missing in the study is the presence of results from a survey on the perception and behavior of investors in front of their investments, to confirm the hypothesis made on the behavioral finance issue and give a more in-depth insight into the influence that they can make in determining dividend policies through their misbehaving and their social norms. This analysis can therefore empirically only shed a light on the power a dividend has on the return of a stock, not on how investors influence the market and corporate decisions with their irrational decision.

Chapter 2

Methodology

The main objective of the research is to investigate the relationship between stocks price's abnormal return and the variation of corporate dividend policy. Going more in depth the purpose is to explore what effect has an increase or a decrease in the dividend payment amount of a company on its stock's price. Therefore, to see how the investors react to a dividend policy changing and, whether, the agents' reaction influenced by their psychological biases could generate an abnormal return of the stocks.

Literature

The literature resources that have been employed in the research, were academic articles and university textbook or handbook. That kind of sources have been enough to collect all the information that were needed for the purpose of the analysis. Concerning the academic articles, they have been gathered mostly online from the CBS library and inter alia through the EBSCOhost research platform. Furthermore, the articles were all published in influential economics journal among which the *Journal of Finance*, the *Journal of Banking & Finance* and the *Journal of Financial and Quantitative Analysis*.

The main theoretical areas that have been master in the study are the Abnormal Return theories, the Dividend Policy literature and the Behavioral Finance theories. Regarding the first two doctrines, all the developed theories have been the results of decades of studies and empirical analysis, while for what concern the behavioral studies they are more recent, but

they also have a couple of decades of studies behind. Therefore, due to the extension of the literature and the limits of these thesis it was impossible to depth all the theories. Accordingly, in order to gain all the necessary knowledge and information to achieve the aim of the analysis, the focus of the paper has been on the main theoretical points of the literature mentioned before that have been studied and further developed.

Theoretical approach

The correlation between the variation of the dividend policy of a firm and the generation of stock's abnormal return has been approached from different angles through many theories. After having considered the studies and the empirical analysis that have been made about the abnormal return, the dividend policy and the behavioural finance theories, some hypothesis have been elaborated.

The main hypothesis of the study is opposed to the Irrelevance of Dividends theories developed by Modigliani and Miller and then by Black and Scholes (1974), that state that the firm's value is not connected to the corporate dividend policy. Conversely, it is aligned with the studies that support the idea of the Relevance of Dividends, such as the Bird-in-the-Hand theory (Gordon, 1963) and the Signalling Hypothesis, which assert the influence of dividends on the company's stock price. Moreover, the clientele effect and the psychological biases of irrational investors, theorized by the behavioral finance studies, have been elaborated and applied in the hypothesis development. In fact, it is argued that, keeping other variables constant, an increase in the dividends payments of a firm, should lead to a stock's return that is above the expected return calculated with the Capital Asset Pricing Model (CAPM) i.e.

generate an abnormal return. The reasons behind this hypothesis will be explicated further in the next chapters of the paper.

Quantitative method: Regression Analysis

In order to prove the truthfulness of the hypothesis i.e. to find out a possible positive correlation between the stocks abnormal returns and the increased dividend payment ratios, it has been chosen to develop a *quantitative analysis*. The quantitative kind of analysis has been selected because it serves as a useful evaluation instrument, that yield to reliable results. In particular, within the quantitative analysis area, it has been implemented a regression analysis. The regressions employed throughout this paper uses the Ordinary Least Square estimation method (OLS), which allows for an estimation of the unknown parameters in a linear regression model. The regression function will be explained in detail in the next paragraph.

The aim of this paper is to test the effects of these phenomena empirically. Therefore, they are necessary some variables to stand for the main factors under investigation i.e. the abnormal return and the dividend policy variation.

First, to assess the dividend policies variation, it has been taken into consideration two measures that will be explained more in depth in the following paragraphs: the *dividend pay-out ratio* and the *dividend yield*. These two variables have different merits and weaknesses, in fact they can be manipulated by firm's management or they can vary due to other factors

influences. Hence, it will be assumed that, despite the defects, these two measures are a good proxy for the variation in the dividend payments level.

Next, to measure the stock abnormal return, it has been employed the Capital Asset Pricing Model (CAPM). Thanks to this model's features it is possible to compute the stock's *alpha*, this parameter, if positive, indicates the presence of a stock's abnormal return. Even this variable will be explained more in details in the next pages.

To sum up, utilizing the variables listed before, the main hypothesis of the research claim that: an increase in the dividend yield or in the pay-out ratio of a firm should lead to an increase of the stock's abnormal return i.e. to an alpha that is major of zero.

Regression analysis set-up

Therefore, to perform a good and effective quantitative analysis, it has been developed a *multiple least square regression*. In fact, the regression analysis with its own characteristics is a useful tool that enables to relate the dependent variable of the function i.e. the abnormal return with the two main dividend policy variables i.e. the dividend yield and the dividend pay-out ratio. As a matter of fact, the dependent variable is the main variable which is trying to be understood, while the independent ones are the factors that it is thought to have an impact on the dependent variable. Thanks to the regression analysis is possible to sort out mathematically which is the impact of the predictor variables on the abnormal return. Indeed, through the estimation of the beta coefficients in the regression model is possible to analyze the effect of the variation of these two main variables on the stock's abnormal return.

Therefore, to unearth a positive or negative correlation between the independent and the dependent variables.

Summing up, there are three principal variables involved in the regression functions of which the analysis will try to find out the intercorrelations among each other's:

- *Abnormal return (Y_i)*
- *Dividend yield (X_1)*
- *Dividend pay-out ratio (X_2)*

Moreover, in addition to the two independent variables, following the recommendations explicated by Baskin (1989) in its model, some control variables have been added in a second regression function. Indeed, there are other factors that could have an impact on the share's abnormal return, thus, to catch the effects on the dependent variable of the latter that are not related with the dividend policy variation, other variables have been included. Embodying these variables in the regression function allow to estimate the real effect of the dependent variables under investigation.

The control variables that have been incorporated are:

- *Return on Equity (Z_1)*
- *Asset Turnover (Z_2)*
- *Firm size (Z_3)*
- *Long-Term debt (Z_4)*
- *Cash Ratio (Z_5)*

In short, two regression functions were run to see how the effect of the dividend payment variation on the abnormal returns varies which the inclusion or not of the control variables. The first regression was built-up including only the dependent variable and the two dividend policy variables (dividend yield and pay-out ratio), while in the second function were added the control variables. In this way it is possible to see how the beta parameters of the independent variables varies from the first to the second regression model.

Then, after the two regression were executed it has been elaborated a sector analysis. In particular, the second regression will be run separately for each sectors of the US market, following the *GICS* standard division. In this way, will be possible to identify the differences between the sectors regarding the relationship among the variables under studied.

In the end, a *correlation analysis* between the explanatory variables in the model has been run. This correlation analysis has been developed to analyze further whether the correlation between the independents and the control variables could be as high as to generate *multicollinearity*. In fact, in case of multicollinearity the ability of the "X" variables to predict the "Y" one decrease due to the high intercorrelation among the predictor variables. This could lead to a statistical inference that is not reliable, therefore, the regression coefficients may not be estimated precisely, and the standard error is likely to be high because the independent variables could not provide additional information on the dependent one. Hence, the analysis would lose significance.

Time frame of the analysis and the overfitting issue

The analysis has been implemented in a time frame of twenty years, from the 1st of January 1996 to the 1st of January 2015. The time frame was chosen as long in order to be able to gain an amount of data that is enough to develop a statistically significant analysis. Furthermore, the benefit to have a long-term period of analysis enable to avoid or, at least, to narrow the misleading effects of unexpected, exceptional or occasional events on the main variables under investigation. Indeed, macro-events such as global crisis, a sector crisis, a government tax reform or micro-events as the sales increase or the issuance of new debt can have a relevant effect on the company value and thereby on its stock's price i.e. abnormal return.

Moreover, the use of a sample of quite big dimension helps to avoid the *overfitting* issue. The overfitting is a statistical problem that arise when the model fit to much the set of data used for the analysis. It could lead to misleading *R-Squared* values, regression coefficients and *p-value.* For a relatively simple model as the one used in this study the over fit should not be a problem, but it is otherwise smart to have an enough big sample that could eliminate any chance of this issue.

Chapter 3

Literature Review

In the following chapter it will be analyzed the literature related to the dividend policy and the various implications and reflections it has on the main company dynamics and the most important indicators related to it.

The economic literature concerning dividends is very rich, the opinions on the usefulness and relevance are mixed and the fields of application in which the dividend or the dividend policy has been studied are many, but still the various researches on the subject did not create a common thought about its usefulness and use and above all how with it is possible to manipulate the information on the stock market.

The chapter will be structured in several sections each of which represents one of the macro categories in which the dividend policy has influence, each of them will report the most important economic theories in this regard. The aim is to create a theoretical base that will be the starting point to build the analysis that will enrich the existing literature thanks to the availability of more complete and recent data.

Irrelevance of dividend policy

The dividend theories have always been an argument of discussion and a timeless issue in the corporate finance matter. Particularly, there have always been different and contrasting

theories regarding the dividend policy of a company and its impact on the firm's value. There are two conflicting views on the dividend policy: the one lead by the irrelevance theory of Modigliani and Miller and Black and Scholes and on the other hand the branch of theories that support the relevance of the dividend policy.

Modigliani e Miller

The Modigliani-Miller theorem is one of the fundamental elements of modern economic theory. Their study was published when they were professors at the Graduate School of Industrial Administration (GSIA) of Carnegie Mellon University. The final result was a publication of an article in the American Economic Review in 1958, followed in the next years by a follow-up discussing some of these issues. In their article, they showed how the value of a company and the cost of capital would not have any relation to the financial structure. The underlying thesis is that regardless of the proportion between debt and equity there is a preservation of the value of investments[2]. Their theorem is based on four fundamental assumptions:

- *Perfect capital markets:* it assumes that all the investors are rational, they have access to free information, there are no floatation or transaction costs and no large investor to influence the market price of the share.
- *No taxes:* there is no existence of taxes. Alternatively, both dividends and capital gains are taxed the same.

[2] J. B. Williams, The Theory of Investment Value, Amsterdam, North Holland Publishing, 1938, pp. 72 – 73.

- *Fixed investment policy:* the company does not change its existing investment policy. This means that new investment that are financed through retained earnings do not change the risk and the rate of required return of the firm.

- *No risk of uncertainty:* all the investors are certain about the future market price and dividends. This means that the same discount rate is applicable for all types of stocks in all time periods.

Given these limitations to their method of study, the two scholars arrive at various conclusions, the one that most interests the following paper is that according to them dividends and capital gains are equivalent when an investor considers the return on investment, and the only thing that affects on the valuation of a company are the earnings, a direct consequence of the investment policy. Hence, according to this theory, investor decisions do not need any other information, such as the dividend history or notions on the dividend policy, apart from the investment policies of a company. M&M theory delves deeply into the situation where dividends are irrelevant to investors. Indifferently if a company pays dividends or not, investors are able to create their own cash flow through the sale of the stock they hold. Similarly, if an investor does not need cash, he can reinvest his dividends. The conclusion to this is that investor decisions are completely indifferent to the dividend policy. These results are linked to the macro section of the financial behavior theories that study the behavior of agents within the economy system and in business dynamics, these topics will be addressed in the following paragraphs. On the other side, the M&M theory comes to the conclusion that dividends are also irrelevant by the arbitrage argument, the dividend distribution is balanced by external financing. The distribution of dividends affects the price of the stock, decreasing it and nullifying the effect.

This is one of the most important theory regarding the irrelevance of dividends, which at the same time suffers due to the multiple limitations imposed by the assumptions made as a premise of their study.

Black and Scholes

About 10 years after the first publication of Modigliani and Miller, two researchers of the University of Chicago Booth School of Business, Fischer Black and Myron Scholes, still pursuing the line of the irrelevance of dividends, start a study on the relationship between dividend yield and the return of the stock so as to identify the effect of the dividend policy on the price of the stock.

Over the years there have been many attempts to understand whether or not dividend policy has any effect on the price of its shares, but nothing has been satisfactory. The most used methodologies were cross-sectional tests, in which were very complicated to handle variables different from the dividend policy and the accuracy of the estimates was not acceptable. The two researchers then decide to apply a new methodology to this study. First of all, the fact that the hypothesis about the dividend policy focuses too much on the price of the shares of the company taken into consideration was very difficult. Instead, they apply a new vision to the dilemma, focusing on expected returns, defined as the set of capital gains and dividends. Secondly, they decide to use the CAPM (Capital Asset Pricing Model) version, in which the original version represents the expected return of any security as a linear function of its own β (Beta):

$$E(\tilde{R}i) = R + \left[E(\tilde{R}m) - R\right]\beta \qquad (1)$$

$E(\tilde{R}i)$= the expected return on security *i*,

$E(\tilde{R}m)$= the expected return on market portfolio,

R = the risk free short term interest rate,

β= the covariance between $\tilde{R}i\ and\ \tilde{R}m$, divided by the variance of $\tilde{R}m$.

In subsequent tests over the years the two researcher adapt the aforementioned equation to their needs, first tie it to the dividend yield on stock i δi and the market δm, then Black decided to make a further change and replace the R parameter in the CAPM formula (1) with γ0, which is significantly higher than the short-term interest rate. Thus arriving to construct a new equation:

$$E(\tilde{R}i) = \gamma 0 + \left[E(\tilde{R}m) - \gamma 0\right]\beta i + \gamma 1(\delta i - \delta m)/\delta m$$

The application of this equation takes place in a set of 25 portfolios specifically built-up by the two researchers following precise guidelines in order to avoid any kind of distortion of the results and biases.

There were three basic conditions that had to be verified: the constructed portfolio must had an expected return on the amount they wanted to estimate; the portfolios had to only use information that was available at that time; and the portfolios must had the least possible variance of returns. The portfolios consisted of securities listed on the New York Stock Exchange between 1926 and 1966.

The results of the study showed that in the different portfolios, composed of the aggregation of securities with similar dividend yield and beta, they do not allow to show that a difference in dividend yield leads to different stock returns. Then, they break down the results from the point of view of the investors and from the corporate point of view. Stressing as for the former, considering that taxes have not been taking into account in their studies, it is not essential to pay attention to dividends to maximize their expected returns due to the fact that dividends have not an impact on expected returns. From a corporate point of view, they concluded that there is more freedom for management in choosing a dividend policy, without affecting the stock price, using it at the same time in the period of scarcity of cash as a method to acquire new capital.

Relevance of dividend policy

The following paragraphs will present all the theories supporting the relevance of the dividend policy. The chapter will be structured in several sections.

In the previous paragraphs have been presented the two theories that have launched a branch of new studies regarding this matter. Over time, the techniques and the tests have improved and changed, bringing with them new and more complete conclusions to the dividend puzzle. In spite of this, there have not been still a clarification of their usefulness or relevance.

Based on the uncertainty of future dividends, The "Bird in the hand" Theory.

Investors and managers have different perspectives and information regarding the future of the company they are interested in, and their interests are not always aligned towards the same objective. All this results in an information asymmetry, which in turn transmits uncertainty and imperfect information regarding the dividends. Moreover, it was highlighted that investors have different attitudes and preferences regarding dividends and capital gains. This is confirmed by the Bird-in-the-hand theory faced and empirically demonstrated by Gordon[3] and Diamonds[4], which asserts that investors prefer a "Bird in the hand" or cash dividend, than "two in the bush" i.e. future capital gain. This is because investors need to have money in order to consume, so they will tend to prefer immediate cash. Thus, increasing the payment of dividends, ceteris paribus, ideally would lead to an increase in company value, because there is a better perception of the future flows. This theory has been much criticized by Modigliani and Miller (1961) and by Bhattacharya (1979), who focus their attention on the business risk, which in their opinion affects the level of dividends. According to the latter, in fact, the riskiness of company cash flows affects dividend payments, and an increase in dividends does not reduce the company's risk.

The research of Gordon (1959) was developed through a regression model using cross-sectional sample of data from four sectors: chemical, food, steel and machine tools. In its linear regression:

[3] Gordon, Myron J., 1963, Optimal Investment and Financing Policy, Journal of Finance 18, 264-272.

[4] Diamond, James J, 1967, Earnings Distribution and the Valuation of Shares: Some Recent Evidence, Journal of Financial and Quantitative Analysis 2, 15-30.

$$P_{it} = \alpha_0 + \alpha_1 D_{it} + \alpha_2 R_{it} + \varepsilon_{it}$$

He relates P, the share price, with D, the dividends and R, the retained earnings. Finding out that dividends have a greater impact on the share price than retained earnings. It subsequently head to another conclusions in its study, asserting that the required rate of return on a stock increases in fraction compared to retained earning, due to their future uncertainty. In a follow study conducted in 1963 it also states that a higher dividend payout decreases the cost of equity and the relative rate of return, likewise Fischer[5] (1961) comes to a similar conclusion.

However, the model was subjected to various criticisms that can be concentrated in four main points. The first, states that Gordon does not take into account the variation of the risk present in the four different sectors, since a high risk involves a low price and a low payout. Secondly, the model does not consider the growth financed through external financing. Then, in the short term the fluctuations in the income are reflected more in retained earnings, this affects the equation in favor of dividends. Lastly, the dividend measure is generally more precise than the one of the retained earnings, which is instead subjected to more approximation in the accounting measurement methods.

The weaknesses of this theory had been improved in the following years through the study of Diamond (1967), which introduced a ratio also for earning-prices. On a sample of 255 American companies, he applied the corrected Gordon model and concluded that it is not safe

[5] Fisher G.R. (1961), Some Factors Influencing Share Prices, Economic Journal 71,121-141.

to say that investors prefer dividends over retained earnings, and suggests a negative relationship between company growth and dividend payout[6].

Based on information content of dividends, The Signalling Theory

As it has been expressed earlier, one of the key points of market imperfection is the informational asymmetries that occurred between the various agents. This problem underlies three of the most important topics in which researchers seek an explanation for the dividend policy. In the signalling model, the information gap between managers and company owners uses unexpected changes in the dividend policy to try to address certain information. In the agency cost theory the dividend policy, on the other hand, is used to align the interests of agents with the one of the shareholders. While the two previous models are combined in the cash flow theory, as dividend payments decrease the funds available for investments, potentially damaging and potentially benefiting stakeholders.

In this section we will focus on the signalling model and the information contained within a dividend.

According to M&M[7], the share price is independent of dividend policies as the future flows and development opportunities should already be contained within the price. They were aware that changes in the payout would have influenced the price of a stock, associating this phenomenon precisely with the fact that dividends were sources and means of information.

[6] Fama and French (2001) found that firms with higher growth and investments tended to have lower payouts.
[7] Modigliani and Miller.

This shows precisely how there is a difference between private information within the company and those available on the market. Nevertheless, they supported the EMH[8] and therefore claimed that only unexpected information could have influenced the stock price. At the same time managers, who hold private information about the future of the company, are urged to release this information in the most anonymous and indirect way possible, in order to avoid any form of facilitation of competitors.

It is argued that a price reaction is rational to an announcement of a change in the dividend policy[9].

The studies that have taken place over the years have been multiple and have led to ambiguous and little delineated conclusions. A group of researchers such as Fama, Fisher, Jensen and Roll (1969), Pettit (1972, 1976), Griffin (1976), through separate insights, have come to affirm that abnormal returns have matured after unexpected announcements of changes in policies dividends.

Still, not of the same opinion have been the studies carried out by Ang (1975) and Gonedes (1978) who have failed to demonstrate the above-mentioned thesis. A totally different conclusions, instead, comes by Watts (1973) who asserts that transaction costs fully absorb the abnormal returns generated by dividend policies.

In support of the thesis that dividends perform the function of transmitting information, known internally to the company, towards the external audience, there are various studies,

[8] Efficient-market hypothesis: is a theory in financial economics that states that asset prices fully reflect all available information. A direct implication is that it is impossible to "beat the market" consistently on a risk-adjusted basis since market prices should only react to new information.
[9] Myers 1987.

one of the most valid in that regard is the one of the two professors P. Asquith and D. W. Mullins Jr.[10]. In the 1983 they published in the Journal of Business, a study on the impact of dividends on the wealth of the shareholders. They analyzed 168 companies divided into two basic categories, the first in which they placed the firms that had paid for the first time in their history a dividend, while in the second there are the companies that after a period of 10 years have resumed to paying out dividends. The aim was to investigate the relationship existing between the announcement of the dividend and the market reaction to this announce. The results showed an abnormal return much higher than all the previous studies, and at the same time positively related to the magnitude of the initial payment. Also, the payment of dividends after a 10-year break have been studied leading to the same results. It is therefore their opinion that previous studies have underestimated the effect of the increase in dividends. Moreover, given their results, they argued that both the first and the subsequent dividends are consistent with the version that they transmit valuable and important information to investors.

Another very relevant study for the literature is the one conducted by Amihud and Murgia (1997)[11] who, similarly, on a sample of 200 German companies listed on the Frankfurt Stock Exchange, examine the reaction of the stock price to a dividend announcement. In their analysis they make a comparison with the condition of the US, in which dividends are taxed more than in Germany, they provide the basis for a plausible explanation of their informative

[10] Asquith, Paul, and David W. Mullins, Jr., 1983, The impact of Initiating Dividend Payments on Shareholders' Wealth, Journal of Business 56, 77-96.

[11] Amihud, Yakov, and Maurizio Murgia, 1997, Dividends, Taxes, and Signaling: Evidence from Germany, Journal of Finance 52, 397-408.

value, since they are still widely distributed to shareholders. What instead opposed in Germany, where the dividend is not commonly used. Nevertheless, the result of their study confirms the validity of the dividends in transferring information to the outside, signal of a future prospect of the company.

Recently, likewise, Travlos, Trigeorgis and Vafeas (2001), studying an emerging market, contributed to the hypothesis of reporting dividends. They used a sample of 41 announcements of cash dividend increases and 39 announcements of dividends in shares for companies listed on the Cyprus stock exchange for the period 1985-1995, and examined the market reaction. Travlos et al. have found a positive and significant anomalous returns both for cash dividend increases and for dividend announcements in shares, interpreting their results as more consistent with the reporting hypothesis.

Abnormal return to support the Signalling Theory

In support of the signalling theory, another section of the literature deal with the relationship between changes in the dividend policy and the generation of stock's abnormal returns on the market. This association is rationalized by the acceptance of the dividend announcement or payment in general as a means of transmitting information.

One of the most significant and recent studies has been carried out by Firth M., published in the Journal of Financial and Quantitative Analysis in 1996, in which he examines how a revelation of information through a dividend change announcement influences the earning and the evaluation of the same company and if there are also implications among the competitors belonging to the same sector. The methodology applied by the researcher

consisted in calculating the abnormal returns of companies announcing an unexpected payment of dividends and calculating at the same time any abnormal returns that occurred in the same sector but in other companies. Yet, to make sure that the observation was valid, it had to satisfy certain types of criteria[12]. The observations were collected between the 1980 and the 1991. Starting from a total of 1115 observations, with the skimming process lead by the criteria of validity the sample was reduced to 649, in turn divided between increase and decrease of dividends. To investigate the magnitude of the information transferred he adopts a cross-sectional regression.

The results eventually indicate how unexpected dividends translate into stock price adjustments. In particular, the increase in dividends results in abnormal positive results, supporting the signal hypothesis.

Then, a substantial portion of the research is focused on the impact of a company's announcement on the stock return of the other peers companies. The results indicate that there is a slightly positive information transfer.

Another relevant study that investigated the impact of a dividend announcement on the stock price, which has supported the thesis on dividend signalling is the research conducted by Suwanna T. entitled the "Impacts of Dividend Announcement on Stock Return" , published in the 2012. He studied the impact of these announcements in a sample of 60 Thai companies listed on the Stock Exchange of Thailand during the period 2005-2010. What differentiate this research from the previous ones is the fact that the focus is on a broader range of time, in

[12] Dividend Changes, Abnormal Returns, and Intra-Industry Firm Valuations, Michael Firth *The Journal of Financial and Quantitative Analysis* Vol. 31, No. 2 (Jun., 1996), pp. 189-211

particular on the forty days around the announcement of the payment. Thus, he noted that the price of the stock has moved up significantly after the announcement of the dividend. And that in the same way the abnormal returns and the cumulative abnormal returns from the market model are statistically significant. These results confirm the information content role of the dividends and the impact on the share price.

Based on Agency Cost and Cash Flow Theory

The agency cost issues, i.e. the rising of costs attributable to the misalignment among the company's management and the company ownership, arose from the earliest corporations and forms of ownership fragmented into shareholders, the most ancient were born three hundred years ago and the problem still persist nowadays.

Under the M&M theory about the perfection of the capital market, the presence of a conflict of interests between managers and shareholders was not contemplated, but obviously this assumption is very disputable in reality. When the property is separate from management, the managers are always imperfect agents for their principal (shareholders). This is the basis of the agent cost problem, in which the interests of the managers are not aligned with that of the owner ones, thus causing extra costs, such as the costs associated with monitoring the behavior of the agents.

Modern agency theory tries to explain the corporate capital structure as the result of minimizing agency costs. These costs are lower in the realities in which the managerial ownership shares are high and therefore their interests are better aligned with the company

objectives. Dividend payment can be a means by which to align interests and mitigate agency costs.

Another source of agency costs could be the transfer of wealth between bondholders and shareholders through the acceptance of a high risk and high return project by managers, whose remuneration is linked to certain company objectives, or the consumption of in excess.

Dividend policies can influence these relationships in two ways. As for the exposure to the conflict between shareholders and bondholders, it can be resolved through agreements that regulate the priority of the claim[13]. The payment of a large amount of dividends could also undermine the selection of positive NPV projects[14]. Therefore there is a need for agreements in which maximum dividend payment ceilings are established in order not to undermine the transfer of wealth between bondholders and shareholders. Although as Kalay (1982) suggests, it is not the payment of dividends that is the greatest source that damages the wealth of bondholders. Another way in which the dividend policy contributes to the reduction of agency costs is through increased capital market control. The payment of dividends decreases the funds available for investment opportunities, forcing managers to seek financing within the capital market. The efficient function of monitors by capital markets allows a reduction in costs that are not appropriate and at the same time the costs relating to the control of ownership unbundling.

[13] Jensen (1983a, 1983b)
[14] Myers (1977)

In support of this thesis two very important studies have been carried out one year after the other. The first Holder, Langrehr and Hexter (1998)[15] examined 477 American companies in the decade between 1980 and 1990, concluding that ownership and dividend policy are significantly and negatively correlated, while at the same time the number of shareholders positively influences the payout.

In another study published a year later proposed by Saxena (1999)[16], the researcher examines a sample of 235 unregulated and 98 regulated companies listed on the NYSE in the period between 1981 and 1990 going to confirm the results of his colleagues and therefore support more the thesis of the agency cost hypothesis and highlighting how it is a determinant in defining dividend policies.

The aforementioned hypothesis is connected to another strand examined by many researchers, that of cash flow theory. According to which managers operating in the best interests of shareholders should invest in all projects with profit opportunities. However, this does not always happen, in fact, the inefficient use or excess waste of excess had already been observed by Berle and Means (1932). Funds that advance after considering all possible opportunities to positive NPV are a source of conflict of interests between managers and shareholders. Therefore, the payment of dividends and interest on debts reduces the funds available to managers, limiting their ability to invest in projects with marginal profitability or for expenses that are not in line with company objectives.

[15] Holder, Mark E., Frederick W. Langrehr, and J. Lawrence Hexter, 1998, Dividend Policy Determinants: An Investigation of the Influences of Stakeholder Theory, Financial Management 27, 73-82.

[16] Saxena, Atul K., 1999, Determinants of Dividend Payout Policy: Regulated Versus Unregulated Firms, Working Paper, (State University of West Georgia).

The Clientele Effect

Starting from the considerations of M&M (1961), who in their study had noted that the clientele effect could play a fundamental role under some assumptions. They point out that the choice of investors' portfolios could be influenced by some market imperfections, such as the different taxation and transaction costs, so as to induce them to prefer mixes of capital gains and dividends in the construction of their portfolios. They then underline how investors pay close attention to the composition of the portfolio in order to minimize these market imperfections. They also identify a certain tendency for investors to be attracted to stocks that pay dividends. Allen et al. (2000) defines a model according to which institutional investors are attracted to dividends because they are taxed less than retail investors[17]. Despite the fact that M&M argued that the clientele effect could influence dividend policies in order to attract a certain type of clientele, in their assumptions they envisaged a perfect market in which an "as good as another" clientele, therefore, is the company's valuation that the dividend policy was irrelevant.

The client effect theory explains how the price of a company's shares varies with the demand and the objectives of investors reacting to different conditions of taxes, dividends, other changes in internal policies or from behavioral preference. Moreover, all this theory supports how a specific investor is attracted by different company policies according to their needs and that as the latter changes they will adjust their stock accordingly. Shefrin and Thaler (1988)

[17] Allen, Franklin, Antonio E. Bernardo, and Ivo Welch. 2000. A theory of dividends based on tax clienteles. Journal of Finance 55:6, 2499–536.

argue that investors' personal life-cycle considerations determine the predilection for dividends: Older investors favor dividend-paying stocks because they substitute for a regular employment income.

In practice, investors always face different types of taxation depending on dividends or capital gains, and in the trading of securities in the form of transaction costs or other types of fees. For this reason, different types of investor customers are created. Dhaliwal, Erickson, and Trezevant (1999) and Seida (2001) find empirical evidence that supports the existence of tax-based clientele for dividend.

Based on a managerial survey, Brav, Graham, Harvey, and Michaely (2005) reports that managers consider their investor preferences towards dividends when making dividend-related decisions. In fact, companies that operate in high growth sectors tend to pay low dividends by attracting investors who instead prefer price fluctuations, so they prefer capital gains to dividends.

Specifically, if we talk about taxes, we can identify two types of investors on equal terms, those that are in a low tax brackets and with a regular and fixed income which will tend to be attracted by stocks that pay high dividends[18]. On the other hand, investors who are part of a high tax bracket may find it advantageous to prefer companies that instead hold back their capital. Elton and Gruber (1970) also present the case of completely indifferent customers, i.e. those exempt from rates.

[18] Han, Lee and Suk, 1999, Dhaliwal, Erickson and Trezevant, 1999, and Short, Zhang and Keasey, 2002.

As far as transaction costs are concerned, the dividend policy can influence different clients that change the allocation of their portfolios incur these costs. Small investors who rely on dividend revenues for their consumption will certainly prefer stocks that pay dividends regularly, as the costs associated with selling stocks may prove to be significant for them. On the other hand, there are investors who do not need liquidity, prefer to build portfolios with low payouts in order to avoid the transaction costs incurred in reinvesting dividends[19].

Another effect of transaction costs that affects dividend policies is that companies often need funds to finance new investment opportunities, so they have to issue new equity or finance with other debt, but the costs for these two forms of funding are very high, so very often we tend to opt for retained earnings, limiting the issue of dividends. Fazzari, Hubbard and Petersen (1988) reported that, over the period of 1970 to 1984, the retained earnings amounted to 71.1 percent of the total retention ratio of 60 percent.
The ambiguity underlying the dividend clientele Hypothesis is all reflected in the empirical results tested in the literature that have produced very different results.
One of the most relevant papers on this time is certainly the one published by Pettit in 1977, which investigates the extent to which transaction costs and taxes affect investors' portfolios. In his study he uses the current positions of portfolios and demographics. What will result will be that the variables that influence investors' choices will be the age and the difference in the taxation of dividends and capital gains. In the model that develops Pettit two types of data are aggregated, the set of portfolios of 2500 bank accounts between 1964 and 1970, with all the movements that took place in those years. At the same time the owners of these accounts are

[19] Bishop et al., 2000

given a questionnaire to determine their demographic characteristics and their method of making investment decisions, and their performance expectations. Thus, it constructs a linear regression using the investor's time preferences, tax rates, and portfolios as variables, putting them in relation to the replies of the questionnaire. Pettit found a positive relationship between the age of investors and the return on dividends in their portfolios to a negative relationship between the dividend yield and the income of investors. So this suggests to us as older investors with low income tend to prefer portfolios that allow them to meet their expenses, carefully avoiding transaction costs. At the same time, portfolios that have a low systemic risk prefer a high payout, corroborating the hypothesis the tax-induced clientele effect.

Using the same database Lewellen et al. (1978) found only very weak supportive evidence of the clientele effect hypothesis. Scholz (1992) developed an empirical model to test the DCH directly by examining individual investor portfolio data. He found that differential tax treatment of dividends and capital gains influences investors' decisions in choosing between higher-or-lower-dividend yield portfolios, consistent with dividend/tax–clientele hypothesis.

As we have seen so far no model or empirical analysis has completely managed to define and give a well-defined explanation of the phenomenon of dividends, a multitude of fields have opened and discovered over the years leading to results that somehow bring us closer to a truth . Very often, however, we tend not to consider a fundamental subject in these analyzes, the investor, his perceptions, his feelings, his beliefs and his ways of behaving. In the next section, we will delve into this aspect and how their behavioral and cognitive aspects influence their own decisions and economic agents closely.

Behavioral Finance

Investors' behavior is influenced by their attitude and social norms[20]. And until recently this aspect had been ignored by many scholars because of the difficulty of introducing these issues into purely empirical models[21].

Ordinary investors are subject to uncertainty, a lack of judgment and a sense of objectivity (Knight, 1964). They are oppressed by the constructs of society and this leads them to errors in judgment and trading securities, not following a true logic. In confirmation of this, a large group of investors in some way affects the aggregate activities of the market (Shiller, 1984). Dividend policy is inconsistent with maximizing shareholder wealth and is best explained by the addition of a socio-economic behavioral paradigm in economic models. Dividend payment can be seen as the socio-economic repercussion of evolution the corporate asymmetric information between managers and shareholders causes dividends to be paid to increase the attractiveness of equity issues[22].

Behavioral finance argues, unlike the traditional economics models, that financial phenomena can be better understand assuming that agents are not *homo economicus* i.e. not fully rational. In some occasions they act irrationally.

Instead, the traditional economics theories are using models in which agents are “rational”. Thereby, they have clear preferences and they always choose to perform the action with the

[20] Shiller, Robert J., 1984, Stock Prices and Social Dynamics, Brooldngs Papers on Economic Activity, 457-510.
[21] Arbel, Avner, Steven Carvell, and Erik Postnieks, 1988, The Smart Crash of October 19th, Harvard Business Review, 66, May-June, 124-136.
[22] Frankfurter, George M. and William R. Lane, 1992, The Rationality of Dividends, International Review o f Financial Analysis, 1, 115-129.

optimal expected outcome for themselves from among all feasible actions. In this way when they receive new information for example a dividend policy changing they follow Bayes' law updating immediately their belief correctly. These theories after years of application have started to have some weaknesses and it has become clear that events about the aggregate stock market and the individual trading behavior are not lightly understood in this framework. (Barberis, Thaler, 2003)[23]

The behavioral finance theories are based on two main building blocks: cognitive psychology and limits to arbitrage. Cognitive refers to the way the people think. People make errors in the way they think, and this led to distortions. Limits to arbitrage refers to the circumstances in which is possible for investor to make an arbitrage and in which one it is not feasible.

- *Limits to arbitrage*

If the agents are rational, the securities' price are right, they equal their "fundamentals value" i.e. Efficient Market hypothesis (EMH). In this situation no investors can earn an abnormal return.

The behavioral finance theory stated that "some features of asset prices are most plausibly interpreted as deviations from fundamental value, and that these deviations are brought about by the presence of traders who are not fully rational". Moreover, these deviations could not be re-adjusted immediately by the rational agents as Friedman said because it is hard that these mispricing are quickly disclosed by investors.

[23] Barberis N., Thaler R., "A survey of Behavioral Finance", Handbook of the Economics of Finance, 2003

Even if the market is inefficient this does not necessarily mean that there are any abnormal return taking for granted. Thaler and Barberis in their research have found out a series of financial market phenomena that can be addressed as mispricing, some of them persistent. These phenomena are: “twin shares”, “index inclusions” and “internet carve-outs”. Also, due to the fact that the observed mispricing have not quickly disappeared and they remained constant in the long time, the researchers have concluded that there are limits to arbitrage because otherwise the mispricing would have been cancel out by the investors arbitrage actions.

- *Cognitive biases*

Behavioral finance models explicated many psychological biases that influence people’s *belief* and *preferences*. Next, they will be exploited just the principal cognitive biases that lead to misbehaving.

- *Overconfidence*: investors tend to be overconfident about their beliefs. Agents think their estimates regarding the future and their estimation of probabilities to be always correct, but this led them to evaluation errors.
- *Heuristics*: are rules of thumb for example the 1/N rules that help to make decision easier but could lead to biases.
- *Optimism and wishful thinking*: “most people display unrealistically rosy views of their abilities and prospects” [Weinstein (1980)].
- *Mental accounting*: agents tend to divide decisions that should be combined.

- *Conservatism*: when there are changing factors, some people tend to react slow to the changes because they are anchored to the normal state of things. So, investors tend to underreact to change.
- *Representativeness*: "People underweight long-term averages. Agents tend to put too much weight on recent experience. This is sometimes known as the ''law of small numbers.''"(Ritter J. R., "Behavioral finance", Pacific-Basin Journal of finance, 2003).
- *Anchoring*: people when have to make estimates lay on a starting value that successively adjust. Kahneman and Tversky (1974) have underlined that these adjustments are insufficient because often agents "anchor" too much on the initial value.
- *Framing*: framing refers to the way in which an issue is posed for the decision maker. In fact, the same matter exposed in different words, graphs etc. can have different effect on the agent's final decision.
- *Ambiguity aversion*: investors are afraid of circumstances in which they do not have a clear approximation of the distribution of the probability of an event.

After having deepened all these psychological biases and taking into consideration the limits to arbitrage, it will be listed a series of investors behaviors that are quite common in the financial market nowadays.

- *Insufficient diversification*: as explicated in the Thaler and Barberis (2003) study there are a large part of investors that hold a number of shares fewer than what is recommended by the literature in order to have a good diversification effect. In fact, investors are subjected to the "home bias" effect i.e. agent prefers to keep stocks of its own country, mostly due to their

ambiguity aversion because investors find national shares more familiar. Nevertheless, another explication for the home bias phenomena as suggested by the research of Coval and Moskowitz (2001) could be the less cost of get information for local firms comparing to the foreign ones. However, the ambiguity aversion remains a valid explanation to this misbehave.

- *Naïve diversification*: Bernartzi and Thaler (2001) discover that even when investors diversify, they do it in a wrong way. In fact, people tend to follow heuristic strategies of diversification such as the *1/n* rule of thumbs.

- *Excessive trading*: "Barber and Odean (2000) analyze the trading activity from 1991 to 1996 of a group of investors and they found out that, taking into consideration the transaction costs, the average return of the sample was below the benchmark. Thus, the underperformance is due to excessive trading and the transaction costs. An explanation of this phenomenon is relative to the overconfidence of the investors, because " people believe that they have information strong enough to justify a trade, whereas in fact the information is too weak to warrant any action."[24]

- *The selling decision*: different studies underlines that agents are reluctant to sell stocks trading at a loss relative the purchase price. The prospect theory and framing could be two possible explanations of this investor's behavior.

The buying decision: Odean (1999) states that agents in the buying decision do not tend to examine through all the listed shares but they tend to buy a stock that has caught their attention due to their "extreme" past performance, good or bad. Therefore, they are mislead by these extreme performance that catch their attention.

[24] Barberis N., Thaler R., "A survey of Behavioral Finance", Handbook of the Economics of Finance, 2003

Behavioral finance and dividend policy. ***Why firms pay dividends?***

In the last two decades, as shown by Fama & French (2000), the number of firms paying out dividends have decreased. In fact, historically dividends have been taxed at a higher rate respect the capital gain, therefore shareholders should prefer share repurchase comparing to dividends. Nevertheless, there are still many companies that prefer this method to payback their shareholders. Thus, why investors seem glad to receive a considerable part of their return in the form of dividends? [25]

To answer to these questions Shefrin and Statman (1984) in their research tried to address a behavioral explanation. Firstly, they stated that investors prefer dividend in order to manage to have a *self-control* on their spending. A second possibility was based on mental accounting, indeed by setting up a dividend payment, firms help the agents to separate the gains from the losses and thus to increase their utility. By making this segregation of the overall gain or losses into different components, the utility for investors increase. In the end, Shefrin and Statman state that dividends payment helps investors to avoid the regret of action that can led to more desirable outcome. In our case the regret could be the selling of a stock to finance an investment, but in the next period the share's price has a rise of value.

Then, Baker and Wurgler (2002b) assert that variation in dividend policy could be due to changing investor sentiment about dividend-paying firms. For example, when agents become more risk averse they prefer firms paying out an higher amount of dividend because they think that these firms are less risky ("bird in the hand" theory). Thus, whether the managers want to maximize the short-run value they could change their company dividend policy in order to

[25] Barberis N., Thaler R., "A survey of Behavioral Finance", Handbook of the Economics of Finance, 2003

satisfy the investor will. Also, Baker and Wurgler found some supportive evidence to their hypothesis. In fact, they managed to demonstrate this phenomenon quantitatively through the employment of some specific measures.

Corporate dividend policies vary substantially among different countries and among different kind of firms within the same nation. The main reason traditionally addressed to these diversities were explained by distinct tax systems, differences in the relevance of informational asymmetries and cultural aspects.

However, in the last years, different academic researchers as Breuer, Rieger and Soypak have started to argue about behavioural biases due to the irrationality of some investors that could had have an influence on the changing corporate dividend policy.

Impact of dividend policy on share price volatility and on firm risk

As we have noted so far, the dividend policy and the implications of the changes applied to it, have been much deepened in the literature trying to solve the many theories and distortions in the market such as the agency cost, signalling theory, birth in the hand and the clientele effect.

Similarly to the debate on the influence of the dividend policy on the price of a stock was added a school of thought that analyzed and studied the relationship between dividend policy and share price volatility or business risk.

The volatility of a share price is the systemic risk[26] that an investor faces in owning such an action within his investment portfolio. Investors by nature are risk averse and therefore volatility is an important parameter as it measures the risk to which an investor is exposed. The riskiness of their investments can influence the valuation of a company's actions over the long term. This makes the price volatility of an important stock both for the company and for the investor.

It is on these new relationships that a new branch of studies develops, the most important of which will be presented below.

M. Rozeff (1982) presents a model that allows to establish the optimal level of dividend payout according to which increasing the dividends decreases the agency costs but increases the transaction costs related to external financing. So he builds this model, through a cross-sectional test, which reports dividend payout according to the equity held by internal investors, past and future revenue growth, the company's beta and the number of common stockholders. The results show that the dividend payout is negatively correlated to all the variables except for the number of common stockholders, for which it is positively correlated. In addition, it is noted that a higher beta involves a smaller dividend payout, since it involves transaction costs for the acquisition of higher external financing and consequently less cash availability and therefore for the distribution of dividends.

J. Baskin published in 1989 in the Journal of Portfolio Management a study entitled "Dividend policy and the volatility of common stocks" in which he investigates the dividend policy as a

[26] Systemic risk is the possibility that an event at the company level could trigger severe instability or collapse an entire industry or economy.

determinant of the volatility of the price of a security. The regression model developed by him was basically based on the risk relationship of a security with two main dividend measures, the dividend yield and the dividend payout ratio, to which he added control variables such as earnings volatility, firm's size, debt and growth. He then applied this model to 2,344 American companies in the period between 1967 and 1986 reporting a significant negative correlation between the dividend yield and the stock price volatility. He suggests that the dividend policy can be useful in controlling the risk of the share price. He said that if the dividend yield increases by 1%, the annual standard deviation of the stock price movement decreases by 2.5%. But it can not be concluded that the dividend yield has a direct effect on volatility.

In 1996 a study published by Allen and Rachim[27] based on 173 listed Australian companies, in the period between 1972 and 1985, following the same model of Baskin, has opposite results reporting a positive relationship between the stock price volatility and payout ratio. Asserting that the payout ratio is one of the determinants of the price risk of an action.
In 2011, in support of Allen and Rachim's findings, a study was published by Hussainey et al. Using the Baskin model, he examines the UK market, with which he confirms the results obtained by their colleagues. Volatility and payout ratio. Has a negative relationship between the share price and the volatility of the stock price, and has a significant positive impact on the share price volatility.

[27] Allen, E. D., and S. V. Rachim. "Dividend Policy and Stock Price Volatility: Australian Evidence." Journal of Applied Economics 6 (1996): 175-188.

Chapter 4

Data and Sample

The analysis is focused on the US stocks market and how the firms' stocks price, listed on it, react to the changing dividend policies. The choices of the US market it is not casual but is due to its specific characteristics. In fact, the companies listed on it tend to have a history of dividend payers, moreover the data of the US market are more easily available because companies have more obligations regarding the publication of their financial statements and related documentations.

The data sample needed to implement the regressions analysis and the correlation function are *secondary data*. Indeed, all the data necessary to the analysis purposes were gathered from two databases:

- *Compustat – Capital IQ* database;
- *CRSP* database.

These databases are taken from the *Wharton Research Data Services* (WRDS)[28] website which update its data daily, making it possible to gain a sufficient amount of data, reliable and up-to-date.

[28] *Wharton Research Data Services* (WRDS), University of Pennsylvania

Concerning the data collection, the data have been collected with a monthly frequency, on the last working day at the end of the month. Therefore, all the detections made to compute the financial ratio refer to that period.

More specifically, to compute the *Alpha* i.e. the abnormal return it has been utilized the CAPM market model with the following features: the length of the *Estimation window* to compute the betas' coefficients was settled out as 48 months with a *minimum window* of 24 month.

WRDS DATA	
Databases	*Data Tools*
- CRSP - Compustat-Capital IQ	- WRDS Beta Suite - WRDS Financial Ratio Suite

Table 1 Data Sources

Standard & Poor's 500

In order to create a truthful and broad representation of the US publicly traded companies, the Standard & Poor's 500 index components were selected as a sample of the study. The S&P 500 is an American stock market index that represents the stocks issued by the 500 firms with the largest market capitalization listed on the NYSE or on the NASDAQ. Hence, through the choice of this index is it possible to have a good representation of a large and diversified portfolio of the United States' equity stocks market.

The original sample of the Standard & Poor index includes 505 stocks issued by 500 large-cap companies. They have been picked-up the firms' stocks that were present in the index at the 30th May 2018. Of these 505 stocks just 268 were left in the sample, in fact some adjustments were done.

First, the companies that operates in the financial sector as depicted by *GICS* (Global Industry Classification Standard)[29] i.e. banks, insurance companies and diversified financials were excluded from the sample due to their own specific regulations on the dividend payments that could have led to misleading results.

Moreover, it has been necessary a further data cleaning to mitigate the effect of market noises and missing data. Therefore, the companies in the sample must have the following characteristics to be included in the model:

- The firms must not operate in the financial sector because, as it has been mentioned before, the firms due to their core business have many limitations on their dividend policy management and they have to follow strict parameters;
- The stocks have to be present in the index for at least five years, in this way the firm's value has not fluctuated as much as to lead to misinterpretation of data;
- Each firm presented in the sample must have been listed in the Nasdaq or in the Nyse for at least ten years.

The database is indexed through the Ticker symbol of the company. There have been some issues because the ticker symbol is not unique and sometimes it varies in time, thereby it has

[29]The Global Industry Classification Standard (GICS) was developed in 1999 by MSCI and S&P Global

been added the PERMNO[30] identification number, that is a unique identification code that CRSP assigned to the companies' stocks. The companies in the sample are listed in the Table 1 in the "Appendix".

To conclude, it has to be considered that the S&P 500 index is not a perfect sample because it only considers the largest assets from the U.S. stocks market, thus this gives origin to a geographical and firm bias.

Dividends and Control variables Data

As it has been mentioned above, the principal stocks and firms' characteristics needed to reach the research's goals, thus the fundamental variables involved in the regression analysis are: the stocks abnormal return and the firm's' dividend policies features i.e. the dividend payout ratio and the dividend yield.

Regarding the first variable i.e. the stock abnormal return, the data were gathered from the *WRDS Beta Suite* database, that is an effective tool that Wharton provides in order to calculate stock's loadings on different risk factors. To the study's purpose it was chosen the monthly return frame, that allow to compute the stock's beta through the Capital Asset Pricing Model (CAPM).

Secondly, to get the data necessary to calculate the dividend payments variables and the other control variables, it was employed the *WRDS Financial Ratio Suite*. The Financial Ratio Suite is

[30] PERMNO is a unique permanent security identification number assigned to CRPS to each security. The PERMNO neither changes during an issue's trading history, nor it is reassigned after an issue of ceases trading.

a collection of data regarding the principal firm's ratios makes available by the Wharton website. The data are constantly updating, and they are gathered from both the universe of CRSP Common Stock and S&P 500 Index Constituents in the Compustat database.

Descriptive statistics

In this section they will be listed the principal descriptive statistic of the main variables that are employed in the analysis. In this way it is possible to have a good representation of the sample that will be analyzed through the use of brief descriptive coefficients that summarize the main characteristic of the dataset.

Descriptive Statistics	**Alpha**	**Dividend Yield**	**Payout Ratio**
Mean	0.0084	0.0149	0.3389
Median	0.0066	0.0095	0.1630
Mode	0.0030	0.0000	0.0000
Standard Deviation	0.0163	0.0401	1.7891
Variance	0.0003	0.0016	3.2010
Range	0.3230	3.6800	175.8420
Min	-0.1168	0.0000	-6.7130
Max	0.2062	3.6800	169.1290
N	67305	67305	67305

Table 2 Summary output: Descriptive statistic

The multiple least square regression models

The regressions model that have been implemented in this paper, have been executed through the data analysis extension of Microsoft Excel. The model that has been applied to this paper is a *time series* regression function that examines the same variables over multiple time periods, in this case twenty years.

The regressions employed throughout this analysis uses the Ordinary Least Square estimation method (OLS), which allows for an estimation of the beta coefficients in a linear regression model. In the setting up of the model some assumptions have been made to simplify and make the analysis clearer.

1) A fundamental assumption is that does not exist autocorrelation between any two variables. In fact, in case this assumption is violated an underestimation of the variance will rise leading to a less reliable significant tests that in this case become useless.

2) Moreover, it has been assumed that the regression intercept passes through the origin, therefore the intercept term is zero, in this way it is possible to avoid the multicollinearity issue.

For this study, it has been chosen a significance level of 95% that will serve as the level to estimate the statistically relevance of the analysis' results. The significance level of 95% is generally the most used and accepted level in the statistical and economic studies.

In the following paragraphs, they have been presented the two multiple least square regression and the sectors analysis that have been implemented for the paper purposes.

1st regression model

$$y_i = \beta_0 + \beta_1 DIV\ YIELD_i + \beta_2 PAY\text{-}OUT_i + \varepsilon_i$$

The first regression function is a multiple least square regression build up to see how the stock abnormal returns are correlate to the two main dividend variables: the dividend pay-out ratio and the dividend yield. The function is structured as follow:

- Dependent variable:
    - *Abnormal return*: it is measured monthly as the difference between the *expected price* and the *actual price*. As a proxy of the abnormal return it has been used the "α" factor computed from the CAPM model through the *WRDS Beta Suite* database. In fact, alpha is a technical risk factor that is used as a measure of performance. It indicates the *excess return* of a stock on what should be its expected return.

- Independent variables:
    - *Dividend pay-out ratio*

The payout ratio shows the dividends as a fraction of the net income. It is computed dividing the dividend per share for the earnings per share (earnings before extras) for each year, utilizing the year's end value. It is taken directly from the *WRDS Financial Ratio Suite* database. This ratio takes in consideration the variation of the dividend payments in relation to the amount of earnings, thereby it does not consider the dividend payment alone, but it relates the payment to the variation of the amount of earnings.

- *Dividend yield*

This ratio indicates the dividend rate as a fraction of the share price. It is computed dividing the dividend per share for the share's price. Thus, it displays the value of the dividend payment in percentage of the share price using the price average during the year. The ratio has been gathered from the *WRDS Financial Ratio Suite* database.

2nd regression model

$$y_i = \beta_0 + \beta_1 DIV\ YIELD_i + \beta_2 PAY\text{-}OUT_i + \beta_3 ROE_i + \beta_4 DEBT_i + \beta_5 CASH_i + \beta_6 ASSETT_i + \beta_7 SIZE_i + \varepsilon_i$$

The second regression function is an upgrade of the first one. In fact, they have been inserted in the function some control variables to catch the effects of other factors on the main variables under studied.

These variables have been plugged in the model to analyze and, at the same time, to cancel out the misleading effect of other market or firm factors that could have an impact on the corporate dividend policies or on the shares' abnormal return.

Thanks to the regression coefficient of these variables, it is possible to obtain an estimate of the impact of these other variables on the stock abnormal return and on the corporate dividend policies. Moreover, with the introduction of these new variables it is possible to see how the effects of the two main dependent variables vary respect to the first regression function.

Thereby the model is constructed as follow:

- Dependent variable:
    - *Abnormal Return*

- Independent variables:
    - *Dividend pay-out ratio*
    - *Dividend Yield*

- Control variables:
    - *Return on Equity*

The return on equity variable is calculated as the "net income as a fraction of average Book Equity based on most recent two periods, where Book Equity is defined as the sum of Total Parent Stockholders' Equity and Deferred Taxes and Investment Tax Credit".[31] The ROE measures the profitability of a company. The stock return and the divided policies could be influenced by the firm's' profitability variation. Therefore, it was introduced in the model a control variable to account for the companies' profitability.

- *Asset turnover*

The asset turnover ratio measures the efficiency of a company to generate sales or revenue from its total asset investment. Hence, the ratio is computed considering the sales as a fraction of the average total assets based on the most recent two periods. The dividend policy of a company it is correlated with its investment and growth opportunities; thus, a growing asset turnover rate could lead to a positive change of the firm's dividend policy (whether this is in line with the firm strategy). For these reasons this variable was plugged in the regression function.

- *Firm' Size*

In its study, Baskin (1989), suggests a correlation between the firm's size and the stock price volatility; hence, a size variable was embedded in the model. In order to have a variable that could be a good proxy for the firms' size, it was chosen the company

[31]WRDS Industry Financial Ratio

market value. Therefore, this variable is calculated multiplying the monthly price per share by the total number of ordinary shares outstanding issued by the company.

- *Long-term Debt*

The long-term debt variable indicates the corporate's total long-term debt in relation to the corporate's invested asset. A variable that counts for the level of corporate leverage has been included because the corporate level of debt is a fundamental risk factor thereby it influences the corporate return. Thus, this variable, as computed by *WRDS Financial Ratio Suite,* consists of all the interest-bearing financial obligation (excluding the current debt i.e. due within one year) divided by the total invested capital.

- *Cash ratio*

The cash ratio is calculated by *WRDS Financial Ratio Suite* as the cash and short-term Investments as a fraction of current liabilities. This ratio assesses the liquidity position of the company, thus, its ability to repay current debt but it also evaluates the firm cash reserve and its capacity to pay out dividends. Therefore, a firm that desire to pay out dividends constantly should have a low liquidity risk and accordingly a high cash ratio.

Variable category	**Variable name**	**Regression coefficient**	
Dependent Variable	*Abnormal Return*		Y_i
Independent Variable	*Dividend Pay-Out* *Dividend Yield*		X_1 X_2
Control Variable	*Return on Equity* *Asset Turnover* *Firm Size* *Long-Term Debt* *Cash Ratio*		Z_1 Z_2 Z_3 Z_4 Z_5

Table 3 Regression Variables

Sector Analysis

To conclude the analysis, it has been implemented a *sector analysis*. Thus, the second regression function was executed more times keeping separately the different sectors in which the firms operate. In other words, a regression analysis was run for each sector.

The analysis per sector allow to see how the correlation among the stock abnormal return and the dividend policy variation ranges with the different sectors. Hence, make it possible to understand in which sectors the thesis hypothesis work better and where they are not suited in the contest.

In order to identify the main sectors in which develop the analysis, it was utilized the *GICS* (Global Industry Classification Standard) standard division. The sectors analysed in the study can be found below in table 2.

GICS code	Sector	Nr. Stocks in the sample
10	Energy	25
15	Materials	21
20	Industrials	49
25	Consumer Discretionary	46
30	Consumer Staples	26
35	Health Care	28
40	Financials	1
45	Information Technology	39
50	Telecommunication Services	3
55	Utilities	27
60	Real Estate	3

Table 4 GICS sectors

In the following chapters the analysis will be developed in depth and the regression results will be shown and further studied and analyzed.

Chapter 5

Analysis

Aim of the analysis

The aim of the study is to assess the relationship between the stock abnormal return and the variation of the corporate dividend policy. Going more in depth, the analysis' purpose is to understand how the changing dividend policy of a firm impacts on the stock's return; in particular, whether this variation could be correlated with the rise of a stock's abnormal return. Therefore, the study seeks to find a relation, positive or negative, between the abnormal return and the dividend payment. In an attempt to give an explanation of this intercorrelation not only through the traditional dividend theories such as the signalling theory, the bird in the hand model and the Modigliani & Miller theorem. But also, analysing the correlation between these variables utilizing psychological and behavioral aspects of the human kind, i.e. the *Behavioral Finance Theories*. Unluckily, this part of the analysis will be indagated just theoretically because developing a quantitative analysis on this theme will be too much complex.

Also, the study analyses this phenomenon through the differentiation by *industry sector,* taking in consideration the intra-industry transfer of information studied by Firth (1996). Therefore, researching for the same correlation between abnormal return and dividend policy but dividing the companies in their reference sectors. In this way, it is allowed to do a regression analysis per sectors and see how the researched correlation varies across different

sectors. Thus, they have been identified 10 different sectors (table 2) and the regression analysis have been repeated 10 times.

Furthermore, the research, with the help of the regression analysis results, will try to prove if there are any possibilities for a company's management to organize its dividend policy strategy with the aim to attract specific segments of investors that due to their psychological biases tend to prefer stocks that pay out more dividends instead of have the same return through the capital gain or the share repurchase.

The next paragraphs will be organized as follow: first it will be briefly explained how the analysis has been conduct, the statistical instrument and the data used to develop it. Then, will be explicated a summary of the research questions and the relative hypothesis that have been formulated to answer the questions. After, they will be listed the expectations about the regression coefficients signs (positive or negative). At the end, the results of the analysis will be showed i.e. the summary statistics of the regression functions, making it possible to compare the expectations with the actual results. Then, the sector analysis will be explicated. At the end, a brief conclusion about the research results will be developed to give a broad overview of the final conclusion of the study.

Briefing of the research questions

The aim of this study is to achieve satisfactory and complete answers to the research question and the sub-questions that were deepened in the first chapter of the paper. The questions can be briefly summarized as follow:

- *Does a correlation between dividend policy and abnormal return exist? What is the correlation between the change in the corporate dividend policy and the stock abnormal return? Consequently, how dividend policy changing impact stock prices?*

- *Could investors' misbehaviors have a role in this correlation? Psychological biases could influence their portfolio buildings making them pick up stocks with high dividend payments? Could this affect corporate dividend policy management?*

- *Looking at the industry sector, is it possible that some sector has a higher correlation between abnormal return and the dividend policy variation?*

Analysis development

As it has been described in the chapter regarding the methodology, in order to develop the analysis, they were built-up two multiple square regression functions to elaborate on the correlation between the dependent variable (abnormal return) and the independent variables (dividend yield and dividend pay-out). The data needed to execute the regressions were gathered from two different *WRDS tools*[32] that draw their data from the Compustat – Capital IQ and the CRPS database. Concerning the abnormal returns and the other variables they are all monthly data.

[32] *WRDS Financial Ratio Suite and WRDS Beta Suite* database

At the beginning, the first regression without the control variable was run to gain information on the correlation between the three main variables alone (abnormal return, dividend payout and dividend yield). Then, the second regression with the control variables was executed to analyse the impact of other variables on the dependent one and to see how the regression coefficient changes from the first to the second function. To conclude, the industry sectors analysis was built-up to master the differences between the sectors' reactions to a change in the dividend payments and therefore its impact on the stock abnormal return.

Hypothesis

In order to elaborate the thesis' hypothesis, as it was deeply explained in the literature overview chapter, they have been studied in depth the traditional dividend theories, inter alia the "*Signalling hypothesis"*, the "*Bird-in-the-hand"* theory (Al-Malkawi 2007) and the "*clientele effect*". Moreover, the relation among the abnormal return and the dividends has been analyzed employing the *Behavioral finance* theories; particularly, the psychological biases, that influence the investment decision-making of the agents, theorized by Breuer, Rieger and Soypak (2014) and by Barberis and Thaler (2003).

Therefore, through the examination of the traditional and non-traditional theories some expectations about the researched questions have been elaborated and the following hypothesis, regarding the analysis, have been produced:

1) It is argued that a correlation among a change in the dividend policy and the stock's abnormal return exists, and it is a positive correlation. In fact, it is expected that an

increased in the dividend payout ratio or in the dividend yield should lead to a return that exceed the one expected. This positive correlation between the dependent and the independent variables is due to the clientele effect that arise because some investors, not rational, prefer to construct portfolio made by shares that guarantee higher dividend payments. For that reason, the investor is willing to pay more for that kind of shares.

2) The second hypothesis starts from the assumption that not all investors are rational, indeed some agents are driven by mental biases in their investment decision. Hence, some investors have a preference for the firms that tend to pay higher dividends to their shareholders. In this case, the demand for these kinds of shares will remain constant over time even if, rationally, other companies would be more attractive due to their higher capital gain or share repurchase. Because of that, the corporate management of firms with certain characteristics, such as mature companies could hold their level of dividend constant and high over time to attract that investors and secure a certain level of stock return.

3) It is discussed that maybe within some sectors the interrelation among the variables is stronger due to the characteristics of the companies in that sectors. In fact, maybe there are sector in which the investment opportunities are fewer and the firms have more capital to pay-out as dividends.

Expectations about the regression coefficients

The hypothesis that have been elaborated in the previous paragraph, in addition to the deepening of the relevant theories, allow to make estimates about the variables that are included in the regression functions. Particularly, it is possible to have some expectations about the regression coefficients i.e. whether the correlation between the dependent and the independent variables is expected to be positive or negative.

The expectations are the following:

- *Dividend payout*: it is expected a positive correlation between the dividend pay-out ratio and the stock's abnormal return. Indeed, an increase in the ratio indicates an increase in the dividend payments. Thereby, according to *clientele effect, that kind of stocks should be more attractive for the investors that due to their mental biases such as loss aversion prefers* higher dividend payers' firms. Also, due to the signalling hypothesis, an increase in the ratio could be a positive signal for the investors. For all these reasons agents are willing to pay more than the necessary to have in their portfolio these shares, giving rise to an abnormal return.

- *Dividend yield*: the coefficient of this ratio it is expected to be positive as well. In fact, as in the case of the dividend payout ratio, a raise of the dividend yield could be a signal for an increase in the dividend payment. Thus, due to the same causes mentioned before, the relation expected with the dependent variable is positive.

- *Return on Equity*: following the results of the analysis done by Diaraya, Pagalung, Habbe and Damayanti (2017) in their study, and La Porta et al. (2000) that was asserting that more profitable firms tend to pay-out more dividends to send a signal of their quality, the expected correlation between the ROE and the abnormal return is positive.

- *Asset Turnover*: the asset turnover together with the ROE is another profitability ratio. Many researchers have found a positive correlation between the asset turnover and the stock abnormal return. Inter alia, it was considered the study made by Abdolreza Ghasempour and Mehdi Ghasempour (2013).

- *Firm Size*: one the most known financial market anomaly, is the *size anomaly* originally documented by Banz (1981)[33]. It states that small-firms (lower capitalization) have on average higher returns than the large one. "Even when returns are adjusted for risk using CAPM, there is still a consistent premium for the smaller-sized stocks"[34]. Hence, the expected coefficient sign is negative, because with the increasing size the abnormal return should decrease.

- *Long-Term Debt*: there is a clear effect of a rise of debt on the stock's return and accordingly to the abnormal return. The effects of an increase in the long-term debt are dual in the research that have been implemented so far. However, we lean forward

[33]Rolf Banz, "The relationship between return and market value of common stocks", Journal of Financial Economics (1981)

[34]Bodie, Kane, Marcus, "investments", Global Edition, 10th, Mc Growth Hill Education

the ECKBO (1986)[35] version, in its study he states that there is a small but positive correlation among the straight debt issuance and the stock's abnormal return. Therefore, it is expected a negative correlation between the variables.

- *Cash Ratio*: also for the cash ratio the expectations are ambiguous. Therefore, it is not possible to find a clear relationship that links the dependent variable with the cash ratio one. Hence, for this variable there is not an expected sign for the regression coefficient.

After having set out the expectations regarding the variables under investigation, in the next paragraphs they will be presented the actual coefficients of the regression analysis that have been produced through the analysis. In this way, it is allowed to see whether the assumptions made in the hypothesis are aligned with the quantitative analysis developed. Thus, they will verify the veracity of the hypothesis thought.

Results

In the following paragraphs, they will be presented and discussed the statistical results of the different regression functions that have been implemented for the analysis' purposes. In this section, the quantitative data produced will be analyzed, taking into consideration the underlying theories, in order to understand whether the research questions could be answered through the hypothesis that have been constructed.

[35] B.E. ECKBO, "Valuation effects of Corporate Debt Offerings", Journal of Financial Economics 15 (1986)

In order, they will be shown and commented the results from the first regression function, the second regression function and finally the sector analysis results.

1st regression function results

The summary output of the first regression can be observed the table 2 and 3. The statistical results confirm the previous expectations. In fact, looking at the regression coefficients in the table 3 they are both positive. Going more in details, it is clear that the positive correlation between the dividend yield and the abnormal return is greater than the one among the dependent variable and the payout ratio. The beta's coefficient of the dividend yield is about 0.2, indicating that an increase of 1 in the yield should imply an increase of a factor of 0.2 in the stock's return. Moreover, its p-value is lower than .001 meaning a high level of significance. Regarding the second independent variable, the payout ratio, its value is positive but is close to zero, entailing that the abnormal return is almost uncorrelated to it. Also, the p-value is quite high, indicating a low significance of the coefficient.

Regression Statistic	
R multiple	0.2604
R^2	0.0678
R^2 *adjusted*	0.0678
Standard Error	0.0115
Observation	41942

Table 5 First Regression: Summary Output

However, observing the statistical global indicators, the low value of the R multiple and the R Squared factors entails that the linear regression model is not well fitted in the scattered plot of the observations. Indeed, a R Squared of about 7% indicate that the independent variables are not able to explain significantly the variance of the dependent one. This could be due to the low correlation between the dependent and the independent variables, to a not completed sample construction because of the data missing or to the fact that just two explicative variables are not enough for the model.

	Coefficients	*Standard error*	*t-stat*	*p-value*
Intercept	0	#N/D	#N/D	#N/D
Dividend Yield	0.1185	0.0023	52.2185	0.0000
PayOut Ratio	4.9E-05	3.5E-05	1.4E+00	0.1601

Table 6 Results of the First Regression

	Lower 95%	*Upper 95%*
Intercept	#N/D	#N/D
Dividend Yield	0.1141	0.1230
PayOut Ratio	0.0000	0.0001

Table 7 First regression, lower and upper significance level

2nd regression function results

In the second linear regression they have been added some control variables in order to investigate the effect of profitability, liquidity and financial structure factors on the correlation between the main variables of interests.

The regression results are going against the initial hypothesis of the paper which was assumed a positive correlation among the dividend variables and the abnormal return. Indeed, in the second model with the control variables the betas' coefficients signs are negative for both the dividend yield and the payout ratio, and they are both statistically significative because the p-value is close to zero. Notwithstanding, the pay-out ratio coefficient is almost null as in the first regression, confirming the supposition of a possible low correlation among the latter and the stock's abnormal return. Concerning the dividend yield, the inverse relationship that has emerged could be due to the effects of the control variables. In fact, the positive relationship that was present in the first regression has been cancelled out and reversed by the latter.

As can be observed in table 4, the summary parameters of the regression improved compared to the first one. In fact, the R multiple, the R^2 and the R^2 adjusted has increased, while the standard error decreased, indicating a better explanatory power of the model that is not just due to the higher amount of independent variables used. Therefore, the variability of the dependent variable is better explained by the variation of the predictors one. However, the R squared of 25% is still not enough high, indicating that the relation among the dividend policy variation and the stock abnormal return is not as strong as depicted by the paper's hypothesis.

Regression Statistic	
R multiple	0.4998
R^2	0.2498
R^2 *adjusted*	0.2497
Standard Error	0.0104
Observation	41942

Table 8 Second Regression. Summary Output

Regarding, the control variables parameters the results are in accordance with the expectations unless for some exceptions. The ROE, the Asset Turnover and the cash ratio are slightly positive correlated with the dependent variable, while the long-term debt that was expected negative, is positive but close to zero. The firm size instead seems to be uncorrelated with the generation of abnormal returns going against the size anomaly study developed by Banz (1981). To conclude, all the coefficients are statistically significant i.e. the p-value are lower than 0.005.

	Coefficients	*Standard error*	*t-stat*	*p-value*
Intercept	0	#N/D	#N/D	#N/D
Dividend Yield	-0.1196	0.0035	-34.6448	0.0000
PayOut Ratio	-0.0002	0.0000	-5.1493	0.0000
ROE	0.0005	0.0001	4.9146	0.0000
Debt Ratio	0.0112	0.0002	46.4122	0.0000
Cash Ratio	0.0018	0.0001	24.5454	0.0000
Asset Turnover	0.0025	0.0000	50.5858	0.0000
Size	0.0000	0.0000	16.5858	0.0000

Table 9 Results of the Second Regression

	Lower 95%	*Upper 95%*
Intercept	#N/D	#N/D
Dividend Yield	-0.1264	-0.1128
PayOut Ratio	-0.0002	-0.0001
ROE	0.0003	0.0007
Debt Ratio	0.0107	0.0116
Cash Ratio	0.0016	0.0019
Asset Turnover	0.0024	0.0026
Size	1.4699E-14	1.8639E-14

Table 10 Second regression, Upper and lower level of significance

Regression functions per sectors

In the sector analysis, it has been executed exactly the same regression model that has been applied before. The regression has been run ten times, one for each sector, in this way was possible to further analyzed the differences among sectors and to understand how the relation between the variables under investigation varies depending on the type of sector. Indeed, each company within the same sector has its specific characteristics and its own investors that follow their preferences based on their risk aversion, psychological biases and other factors.

Sector Analysis Summary Output					
Sectors	10	15	20	25	30
R multiple	0.6694	0.6332	0.5244	0.6462	0.5798
R^2	0.4481	0.4010	0.2750	0.4175	0.3362
R^2 *adjusted*	0.4470	0.3998	0.2743	0.4169	0.3351
Standard Errors	0.0108	0.0104	0.0093	0.0098	0.0072
Observations	4026	3903	8451	6921	4611
Intercept	0	0	0	0	0
Dividend Yield	-0.1773	-0.3934	-0.1650	-0.2460	-0.0583
PayOut Ratio	0.0000	0.0001	-0.0011	00000	-0.0001
ROE	0.0484	0.0260	0.0043	-0.0002	-0.0007
Debt Ratio	0.0134	0.0043	0.0055	0.0046	0.0077
Cash Ratio	0.0035	0.0056	0.0019	0.0098	0.0109

Asset Turnover	0.0004	0.0045	0.0033	0.0038	0.0000
Size	0.0000	0.0000	0.0000	0.0000	0.0000
Sectors	35	45	50	55	60
R multiple	0.6443	0.5212	0.6683	0.7132	0.8825
R^2	0.4151	0.2716	0.4466	0.5087	0.7787
R^2 *adjusted*	0.4141	0.2703	0.4395	0.5079	0.7455
Standard Errors	0.0089	0.0126	0.0053	0.0064	0.0027
Observations	4387	4103	620	4843	77
Intercept	0	0	0	0	0
Dividend Yield	-0.3393	-0.3771	-0.0446	-0.1921	-0.0024
Payout Ratio	0.0001	0.0001	0.0001	0.0001	-0.0009
ROE	0.0208	0.0336	-0.0079	0.0273	0.0303
Debt Ratio	0.0109	-0.0038	0.0260	0.0180	0.0115
Cash Ratio	0.0022	0.0006	0.0025	-0.0048	-0.0027
Asset Turnover	0.0011	0.0040	-0.0269	0.0022	-0.0168
Size	0.0000	0.0000	0.0000	0.0000	0.0000

Table 11 Summary output. Sectors Analysis

In table 8 are summarized the statistical results of the sector analysis, they are highlighted the principal regressions parameters. First, it is observed that the R^2 values are higher, entailing that the statistical model, held separate for each sector, fit better the co-movements of the variables, the explanatory variables variation can better explain the dependent variable movements. Regarding the other parameters the tendency is similar to the overall one, the

dividend yield coefficient that is negative in all the sectors and the payout ratio that is positive but almost null. Still, the negative relationship among the dividend measures and the abnormal return is stronger in some sectors i.e. the materials (15) and the information technology (45). While, in the Consumer Staples (30) and in the Real Estate (60) sector the relation seems to do not exist.

Correlation analysis

As it has been explained in the "Methodology" chapter, in the implementation of a regression analysis there is the risk to the impend of the multicollinearity phenomenon among the predictor variables. In case of multicollinearity, the relationship between the explanatory variables is almost perfect and this imply a difficulty in the estimate of their individual coefficients. Multicollinearity will result in incorrect conclusion about the relationship among the dependent and the dependent variables, making the analysis lose its statistical significance. Consequently, in order to detect the presence of this issue, it has been built-up a correlation matrix. The correlation matrix highlights the correlation among each predictor variables, in this way it is possible to observe the magnitude of the relation that links each pair of variables and, whether this is too much strong, eliminate the variable that generate multicollinearity.

Observing the correlation matrix in table 9, it can be concluded that there is not presence of multicollinearity among variable under investigation because the absolute values of the

correlations among the variables are sufficiently low. Indeed, the correlation coefficients between the variables are in the norm.

Correlation Matrix							
	Dividend Yield	*Payout Ratio*	*ROE*	*Debt Ratio*	*Cash Ratio*	*Asset Turnover*	*Size*
Dividend Yield	1						
Payout Ratio	0.1328	1					
ROE	-0.0050	-0.0225	1				
Debt Ratio	0.3705	0.0781	0.1005	1			
Cash Ratio	-0.0933	-0.0161	0.0344	-0.3433	1		
Asset Turnover	-0.2874	-0.0429	0.0563	-0.2888	-0.1037	1	
Size	0.0322	-0.0033	0.0451	-0.1556	0.1032	-0.0490	1

Table 12 Correlation Matrix

Brief review of the analysis

The results of the analysis have not been aligned with the initial expectations, therefore the hypothesis have been confuted. Indeed, the results of the two regression functions are contrasting with each other. While the first regression seems to confirm the paper's hypothesis with the positive beta coefficients of both the dividend yield and the payout ratio, the second one has produced negative dividends' coefficients, assuming a possible inverse relationship between the abnormal return and the dividend policy variation.

To conclude this chapter, it has been implemented a sector analysis. However, even the latter, notwithstanding the fact that has highlighted many differences it has not produced any evidence in favor of the principal hypothesis under investigation.

Chapter 6

Discussion

The findings of this paper demonstrate that the correlation among the changing of the dividend policy and the stock abnormal return is not as strong as it was supposed. Moreover, the second regression that seems the model that best fit the statistical phenomenon, shows a slightly negative relation between the dividend payments and the abnormal return, going against the thesis' main hypothesis of a positive relationship among the explanatory and the outcome variables.

The thesis was assuming that, following the behavioral finance theories in particular the bird-in-the-hand theory by Gordon, there are some investors that due to their psychological biases such as loss aversion and ambiguity aversion prefer to buy firms' stocks which ensure a constant and high level of dividend payments. In this way the dividend payment could satisfy the investors willingness and alleviate their "fears" because as Baker and Wurgler (2002) stated, the firms that pay-out dividends are seen less risky by irrational investors. Through this mechanism, they come to create group of clients (Clientele effect, Pettit, 1977) that due to their preferences for higher dividend payers' firms are willing to pay more than the necessary for that kind of share. Namely, these investors are pricing the stocks more than their effective value, generating an abnormal return. Because of this mechanism, the firms that have few investments opportunities and have more capital to pay as dividend could choose a high-level of dividend policy strategy to try to capture the above-mentioned niche of the market, in

which stay the irrational investors, in order to guarantee themselves a higher stock return. Hence, putting in effect this dividend policy even the companies that operates in more mature sectors in which there are less investment opportunities could keep their company value at a high-level.

Still, while the first regression coefficients are in accordance with the paper hypothesis, showing a positive correlation between the dividend yield and the abnormal return; the second one seems to be contrasting with the thesis' solution to the research question. Indeed, the second regression presents a negative beta for the dividend yield parameter, leading to a possible contrast with the paper main hypothesis. As if the investors see the dividend payment increase as a negative signal and following the signalling hypothesis they consider an higher amount of dividends as a decrease in the investment and growth opportunity of the firm.

Nevertheless, both the models produced a *R-multiple* and *R-squared* coefficient that are quite low, indicating that the correlation among the explanatory and the dependent variable is weak as if the two phenomena were almost uncorrelated. This effect can be observed also in the two scatter-plot outlined in the graphs 1 and 2. In fact, the graphs show that for both the dividend yield and the payout ratio there is not a clear relationship with the abnormal return variable.

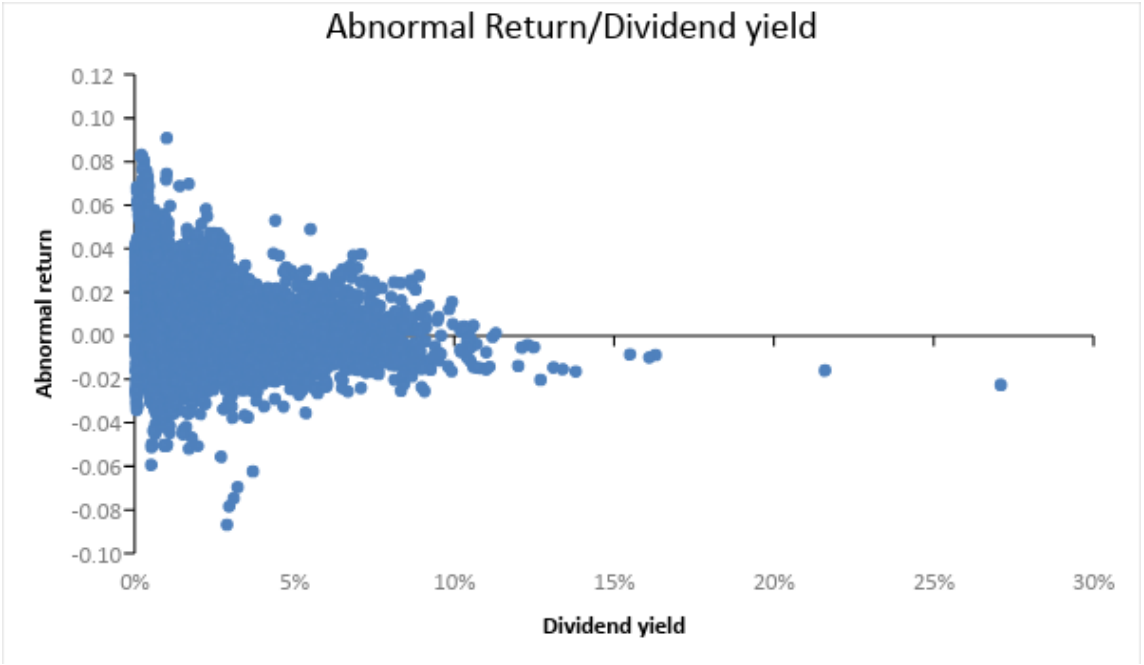

Figure 1: Scatter plot: Dividend Yield and Abnormal Return

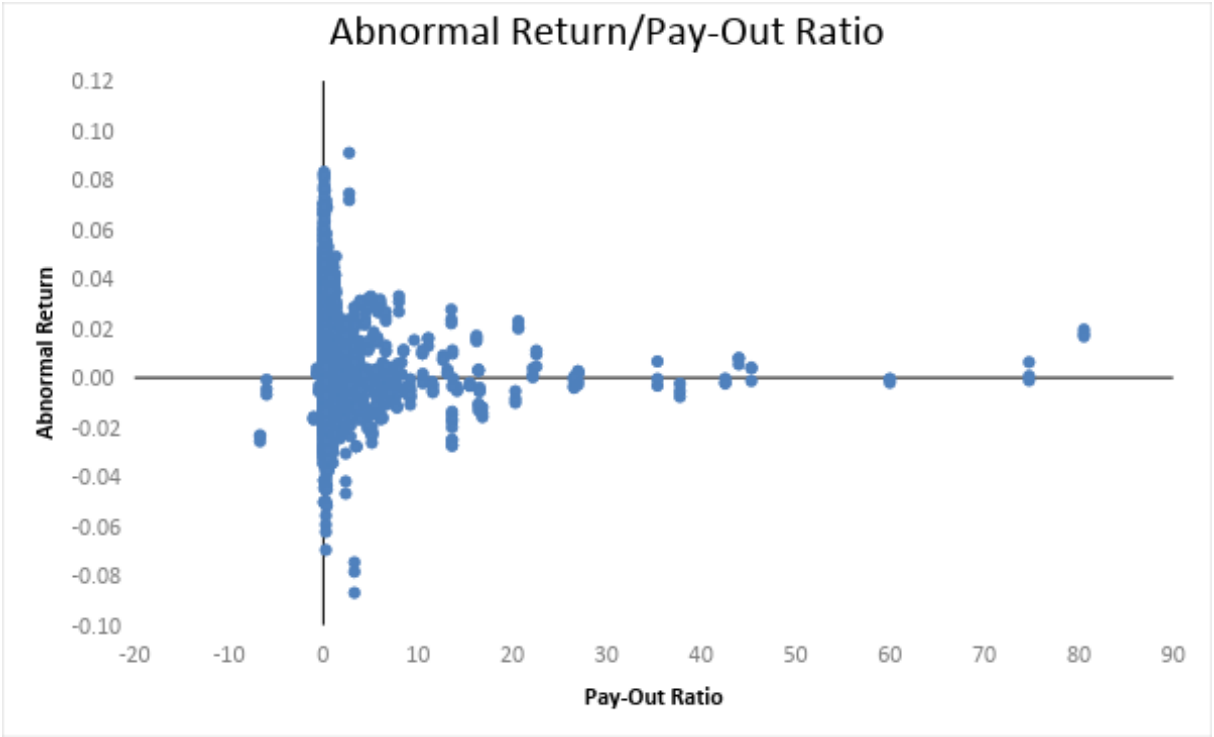

Figure 2: Scatter plot: Payout Ratio and Abnormal Return

Also, the third hypothesis linked with the differences among the sectors due to their various characteristics seems to not be validated. In fact, looking at the sectors analysis, the results are similar, showing that in the various sectors with few exceptions the relations among the dividend and the return are thin. Thus, the companies that keep a constant and high dividend payments policy, measured by the dividend yield and the payout ratio, do not benefit from the investors misbehaving.

However, another interpretation of the results can be developed. Indeed, these results do not exclude the positive effect of a well-structured corporate dividend policy on the firms' value. The bird-in-the-hand theory, the clientele effect and the other behavioral finance hypothesis have not been discredited by this paper analysis. Their influences on the stocks return could have been cancel-out or at least undermined by the rational investors actions. That is, this corresponds with the efficient market hypothesis (EMH), the market is able to reflect all the information almost immediately in the shares price i.e. the generation of consistent abnormal return is not possible. Therefore, the other investors buy and sell actions could offset the misbehave of the irrational agents.

Chapter 7

Conclusion

The objective of our thesis was to shed light on the relevance of abnormal returns that are generated by changes in the corporate dividend policy, at the same time theoretically analyze, through a parallelism with the theory, the behavior of investors in their irrational way of approaching the investment market. Empirically, specifically, if an increase or decrease in the payout ratio can affect the expected return of the stock. The starting point was the main hypothesis asserting that there is a positive correlation between the abnormal returns and the changes in the dividend policy, a hypothesis on which two regression models were built, following the model built by Baskin (1989). The literature presented to support this topic is very broad, dividing into two major branches, those supporting the irrelevance of dividend policies, theories that were developed by early researchers and that somehow paved the way for future studies, and those that support the relevance of the dividend policy in influencing the market and investor choices.

Our analysis has been based on a model consisting in two linear regressions, where from a simpler regression that employs a relationship between abnormal return and two variables as dividend yield and dividend payout, it has been made more complete adding other control variables as Return on Equity, Asset Turnover, Firm size, Long-term debt. They have given mixed results only partially supporting our thesis. The first regression demonstrates a positive correlation between abnormal return and the two dividend variables, with a p-value lower

than .001 indicating a great relevance of the results. Otherwise, in the second regression, in which other variables have been added, the results are discordant, there is no positive correlation for the variables related to the dividends, although they are statistically significant, given the p-value close to zero. However, parameters such as R^2 or R^2 adjusted, while increasing between the first and second regressions, has resulted not enough high to explain the data, this can be interpreted by an incomplete and limited sample of data. At the end of the research, we can see how the thesis supported by us at the beginning was partially refuted by the results of our regressions, which adds another piece to the puzzle that is not yet complete.

Although the research is based on a sample that does not take into account all the possible scenarios of the market, being restricted to a niche of it, and despite the fragmented data collected, this research could be the starting point for future researches that want to deepen the correlation between abnormal returns and changes in the dividend policy, so that the latter can be used at the corporate level as a tool to channel certain information to the market, while from the investor's point of view, an evaluation criterion of a more valid and more consistent stock.

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Appendices

Appendix A

Table A1: list of the stocks utilized in the analysis, ordered by ticker symbol

Ticker	Global company key	Company name	GICS sector
A	126554	AGILENT TECHNOLOGIES INC	35
AAP	145977	ADVANCE AUTO PARTS INC	25
AAPL	1690	APPLE INC	45
ABBV	16101	ABBVIE INC	35
ABC	31673	AMERISOURCEBERGEN CORP	35
ABT	1078	ABBOTT LABORATORIES	35
ADBE	12540	ADOBE SYSTEMS INC	45
ADI	1632	ANALOG DEVICES	45
ADM	1722	ARCHER-DANIELS-MIDLAND CO	30
ADP	1891	AUTOMATIC DATA PROCESSING	45
ADSK	1878	AUTODESK INC	45
AEE	10860	AMEREN CORP	55
AEP	1440	AMERICAN ELECTRIC POWER CO	55
AES	24216	AES CORP	55
AET	1177	AETNA INC	35
ALB	29751	ALBEMARLE CORP	15
ALK	1230	ALASKA AIR GROUP INC	20
AMAT	1704	APPLIED MATERIALS INC	45
AME	1598	AMETEK INC	20
AMGN	1602	AMGEN INC	35
AOS	9771	SMITH (A O) CORP	20
APA	1678	APACHE CORP	10
APC	11923	ANADARKO PETROLEUM CORP	10
APD	1209	AIR PRODUCTS & CHEMICALS INC	15
APH	14282	AMPHENOL CORP	45
ATVI	180405	ACTIVISION BLIZZARD INC	45
AVY	1913	AVERY DENNISON CORP	15
AWK	179437	AMERICAN WATER WORKS CO INC	55
BA	2285	BOEING CO	20
BAX	2086	BAXTER INTERNATIONAL INC	35
BBY	2184	BEST BUY CO INC	25
BLL	1988	BALL CORP	15
BMY	2403	BRISTOL-MYERS SQUIBB CO	35
BR	176928	BROADRIDGE FINANCIAL SOLUTNS	45
BWA	28742	BORGWARNER INC	25
CA	3310	CA INC	45
CAG	3362	CONAGRA BRANDS INC	30
CAH	2751	CARDINAL HEALTH INC	35
CAT	2817	CATERPILLAR INC	20
CCI	113490	CROWN CASTLE INTL CORP	60

CF	163946	CF INDUSTRIES HOLDINGS INC	15
CHD	3026	CHURCH & DWIGHT INC	30
CHRW	65609	C H ROBINSON WORLDWIDE INC	20
CL	3170	COLGATE-PALMOLIVE CO	30
CLX	3121	CLOROX CO/DE	30
CMCSA	3226	COMCAST CORP	25
CMI	3650	CUMMINS INC	20
CMS	3439	CMS ENERGY CORP	55
CNP	5742	CENTERPOINT ENERGY INC	55
COG	20548	CABOT OIL & GAS CORP	10
COL	144066	ROCKWELL COLLINS INC	20
COO	3504	COOPER COMPANIES INC	35
COP	8549	CONOCOPHILLIPS	10
COST	29028	COSTCO WHOLESALE CORP	30
CPB	2663	CAMPBELL SOUP CO	30
CSCO	20779	CISCO SYSTEMS INC	45
CSX	2574	CSX CORP	20
CTAS	3062	CINTAS CORP	20
CTL	2884	CENTURYLINK INC	50
CVS	7241	CVS HEALTH CORP	35
CVX	2991	CHEVRON CORP	10
D	4029	DOMINION ENERGY INC	55
DAL	3851	DELTA AIR LINES INC	20
DG	4016	DOLLAR GENERAL CORP	25
DGX	64166	QUEST DIAGNOSTICS INC	35
DHR	3735	DANAHER CORP	35
DIS	3980	DISNEY (WALT) CO	25
DOV	4058	DOVER CORP	20
DPS	179700	DR PEPPER SNAPPLE GROUP INC	30
DRI	31846	DARDEN RESTAURANTS INC	25
DTE	3897	DTE ENERGY CO	55
DUK	4093	DUKE ENERGY CORP	55
DVN	14934	DEVON ENERGY CORP	10
ECL	4213	ECOLAB INC	15
ED	3413	CONSOLIDATED EDISON INC	55
EFX	4423	EQUIFAX INC	20
EIX	9846	EDISON INTERNATIONAL	55
EL	61567	LAUDER (ESTEE) COS INC -CL A	30
EMN	29392	EASTMAN CHEMICAL CO	15
EMR	4321	EMERSON ELECTRIC CO	20
EOG	16478	EOG RESOURCES INC	10
EQT	4430	EQT CORP	10
ES	7970	EVERSOURCE ENERGY	55
EXC	8539	EXELON CORP	55
EXPD	4494	EXPEDITORS INTL WASH INC	20
EXPE	126296	EXPEDIA GROUP INC	25
FAST	14225	FASTENAL CO	20
FBHS	188255	FORTUNE BRANDS HOME & SECUR	20
FCX	14590	FREEPORT-MCMORAN INC	15
FDX	4598	FEDEX CORP	20
FE	8099	FIRSTENERGY CORP	55
FIS	165993	FIDELITY NATIONAL INFO SVCS	45

FL	11584	FOOT LOCKER INC	25
FLIR	28477	FLIR SYSTEMS INC	45
FLR	4818	FLUOR CORP	20
FLS	4108	FLOWSERVE CORP	20
FMC	4510	FMC CORP	15
FOXA	12886	TWENTY-FIRST CENTURY FOX INC	25
GD	5046	GENERAL DYNAMICS CORP	20
GE	5047	GENERAL ELECTRIC CO	20
GIS	5071	GENERAL MILLS INC	30
GLW	3532	CORNING INC	45
GM	5073	GENERAL MOTORS CO	25
GPC	5125	GENUINE PARTS CO	25
GPN	141913	GLOBAL PAYMENTS INC	45
GPS	4990	GAP INC	25
GT	5234	GOODYEAR TIRE & RUBBER CO	25
GWW	5256	GRAINGER (W W) INC	20
HAL	5439	HALLIBURTON CO	10
HAS	5518	HASBRO INC	25
HBI	175319	HANESBRANDS INC	25
HCA	22260	HCA HEALTHCARE INC	35
HD	5680	HOME DEPOT INC	25
HES	1380	HESS CORP	10
HFC	5667	HOLLYFRONTIER CORP	10
HII	186310	HUNTINGTON INGALLS IND INC	20
HLT	5643	HILTON WORLDWIDE HOLDINGS	25
HOG	12389	HARLEY-DAVIDSON INC	25
HON	1300	HONEYWELL INTERNATIONAL INC	20
HP	5581	HELMERICH & PAYNE	10
HPQ	5606	HP INC	45
HRB	2269	BLOCK H & R INC	25
HRL	5709	HORMEL FOODS CORP	30
HRS	5492	HARRIS CORP	20
HSY	5597	HERSHEY CO	30
HUM	27914	HUMANA INC	35
IBM	6066	INTL BUSINESS MACHINES CORP	45
IFF	6078	INTL FLAVORS & FRAGRANCES	15
INTC	6008	INTEL CORP	45
INTU	27928	INTUIT INC	45
IP	6104	INTL PAPER CO	15
IPG	6136	INTERPUBLIC GROUP OF COS	25
IRM	62374	IRON MOUNTAIN INC	60
ITW	5878	ILLINOIS TOOL WORKS	20
JBHT	5783	HUNT (JB) TRANSPRT SVCS INC	20
JNJ	6266	JOHNSON & JOHNSON	35
JNPR	121718	JUNIPER NETWORKS INC	45
JWN	7922	NORDSTROM INC	25
K	6375	KELLOGG CO	30
KLAC	6304	KLA-TENCOR CORP	45
KMB	6435	KIMBERLY-CLARK CORP	30
KMI	6310	KINDER MORGAN INC	10
KO	3144	COCA-COLA CO	30
KR	6502	KROGER CO	30
KSS	25283	KOHL'S CORP	25

KSU	6335	KANSAS CITY SOUTHERN	20
LB	6733	L BRANDS INC	25
LEG	6649	LEGGETT & PLATT INC	25
LLY	6730	LILLY (ELI) & CO	35
LMT	6774	LOCKHEED MARTIN CORP	20
LNT	11554	ALLIANT ENERGY CORP	55
LOW	6829	LOWE'S COMPANIES INC	25
LRCX	6565	LAM RESEARCH CORP	45
LUV	9882	SOUTHWEST AIRLINES	20
M	4611	MACY'S INC	25
MA	160225	MASTERCARD INC	45
MAR	28930	MARRIOTT INTL INC	25
MAS	7085	MASCO CORP	20
MAT	7116	MATTEL INC	25
MCD	7154	MCDONALD'S CORP	25
MCHP	27965	MICROCHIP TECHNOLOGY INC	45
MCK	7171	MCKESSON CORP	35
MDLZ	142953	MONDELEZ INTERNATIONAL INC	30
MGM	14418	MGM RESORTS INTERNATIONAL	25
MKC	7146	MCCORMICK & CO INC	30
MLM	29733	MARTIN MARIETTA MATERIALS	15
MMM	7435	3M CO	20
MO	8543	ALTRIA GROUP INC	30
MOS	162129	MOSAIC CO	15
MPC	186989	MARATHON PETROLEUM CORP	10
MRK	7257	MERCK & CO	35
MRO	7017	MARATHON OIL CORP	10
MSFT	12141	MICROSOFT CORP	45
MSI	7585	MOTOROLA SOLUTIONS INC	45
MU	7343	MICRON TECHNOLOGY INC	45
NBL	7912	NOBLE ENERGY INC	10
NEE	4517	NEXTERA ENERGY INC	55
NEM	7881	NEWMONT MINING CORP	15
NI	7974	NISOURCE INC	55
NKE	7906	NIKE INC	25
NOC	7985	NORTHROP GRUMMAN CORP	20
NOV	63892	NATIONAL OILWELL VARCO INC	10
NRG	135990	NRG ENERGY INC	55
NSC	7923	NORFOLK SOUTHERN CORP	20
NTAP	61591	NETAPP INC	45
NUE	8030	NUCOR CORP	15
NVDA	117768	NVIDIA CORP	45
NWL	7875	NEWELL BRANDS INC	25
OKE	8151	ONEOK INC	10
OMC	4066	OMNICOM GROUP	25
ORCL	12142	ORACLE CORP	45
OXY	8068	OCCIDENTAL PETROLEUM CORP	10
PAYX	8402	PAYCHEX INC	45
PCG	8264	PG&E CORP	55
PEG	8810	PUBLIC SERVICE ENTRP GRP INC	55
PEP	8479	PEPSICO INC	30
PFE	8530	PFIZER INC	35
PG	8762	PROCTER & GAMBLE CO	30
PH	8358	PARKER-HANNIFIN CORP	20

PKG	128978	PACKAGING CORP OF AMERICA	15
PKI	4145	PERKINELMER INC	35
PM	179621	PHILIP MORRIS INTERNATIONAL	30
PNW	1075	PINNACLE WEST CAPITAL CORP	55
PPG	8247	PPG INDUSTRIES INC	15
PPL	8455	PPL CORP	55
PSX	170841	PHILLIPS 66	10
PVH	8551	PVH CORP	25
PX	25124	PRAXAIR INC	15
PXD	14359	PIONEER NATURAL RESOURCES CO	10
QCOM	24800	QUALCOMM INC	45
RHI	2312	ROBERT HALF INTL INC	20
RL	64891	RALPH LAUREN CORP	25
RMD	31887	RESMED INC	35
ROP	24925	ROPER TECHNOLOGIES INC	20
ROST	9248	ROSS STORES INC	25
RSG	112168	REPUBLIC SERVICES INC	20
RTN	8972	RAYTHEON CO	20
SBUX	25434	STARBUCKS CORP	25
SCG	9445	SCANA CORP	55
SEE	9555	SEALED AIR CORP	15
SHW	9667	SHERWIN-WILLIAMS CO	15
SNA	9778	SNAP-ON INC	20
SO	9850	SOUTHERN CO	55
SRE	8272	SEMPRA ENERGY	55
SWK	10016	STANLEY BLACK & DECKER INC	20
SWKS	1327	SKYWORKS SOLUTIONS INC	45
SYK	10115	STRYKER CORP	35
SYMC	15855	SYMANTEC CORP	45
SYY	10247	SYSCO CORP	30
T	9899	AT&T INC	50
TAP	3505	MOLSON COORS BREWING CO	30
TGT	3813	TARGET CORP	25
TIF	13646	TIFFANY & CO	25
TJX	11672	TJX COMPANIES INC	25
TMK	10614	TORCHMARK CORP	40
TSCO	29736	TRACTOR SUPPLY CO	25
TSN	10793	TYSON FOODS INC -CL A	30
TSS	10631	TOTAL SYSTEM SERVICES INC	45
TXN	10499	TEXAS INSTRUMENTS INC	45
TXT	10519	TEXTRON INC	20
UAL	10795	UNITED CONTINENTAL HLDGS INC	20
UHS	11032	UNIVERSAL HEALTH SVCS INC	35
UNH	10903	UNITEDHEALTH GROUP INC	35
UNP	10867	UNION PACIFIC CORP	20
UPS	10920	UNITED PARCEL SERVICE INC	20
UTX	10983	UNITED TECHNOLOGIES CORP	20
V	179534	VISA INC	45
VAR	11115	VARIAN MEDICAL SYSTEMS INC	35
VFC	11060	VF CORP	25
VIAB	165675	VIACOM INC	25
VLO	15247	VALERO ENERGY CORP	10

VMC	11228	VULCAN MATERIALS CO	15
VZ	2136	VERIZON COMMUNICATIONS INC	50
WDC	11399	WESTERN DIGITAL CORP	45
WEC	11550	WEC ENERGY GROUP INC	55
WM	14477	WASTE MANAGEMENT INC	20
WMB	11506	WILLIAMS COS INC	10
WMT	11259	WALMART INC	30
WY	11456	WEYERHAEUSER CO	60
WYNN	149318	WYNN RESORTS LTD	25
XEC	150699	CIMAREX ENERGY CO	10
XEL	7977	XCEL ENERGY INC	55
XLNX	22325	XILINX INC	45
XOM	4503	EXXON MOBIL CORP	10
XRAY	13700	DENTSPLY SIRONA INC	35
XYL	189491	XYLEM INC	20
YUM	65417	YUM BRANDS INC	25
ZTS	13721	ZOETIS INC	35

Appendix B: Full regressions results

Table B2: First regression: Variance Statistics

VARIANCE ANALYSIS					
	df	*RSS*	*MS*	*F*	*F significance*
Regression	2	0.4055	0.2027	1525.3276	0.0000
Residual	41939	5.5745	0.0001		
Total	41941	5.9799			

Table B3: First Regression: Betas' coefficients and other

	Coefficients	*Standard error*	*t-stat*	*p-value*
Intercept	0	#N/D	#N/D	#N/D
Dividend Yield	0.1185	0.0023	52.2185	0.0000
PayOut Ratio	4.9E-05	3.5E-05	1.4E+00	0.1601

	Lower 95%	*Upper 95%*
Intercept	#N/D	#N/D
Dividend Yield	0.1141	0.1230
PayOut Ratio	0.0000	0.0001

Table B4: Second Regression: Variance Analysis

VARIANCE ANALYSIS					
	df	*RSS*	*MS*	*F*	*F significance*
Regression	7	1.4958	0.2137	1994.6560	0.0000
Residual	41935	4.4924	0.0001		
Total	41942	5.9882			

Table B5: Second Regression: Betas' coefficients and other

	Coefficients	*Standard error*	*t-stat*	*p-value*
Intercept	0	#N/D	#N/D	#N/D
Dividend Yield	-0.1196	0.0035	-34.6448	0.0000
PayOut Ratio	-0.0002	0.0000	-5.1493	0.0000
ROE	0.0005	0.0001	4.9146	0.0000
Debt Ratio	0.0112	0.0002	46.4122	0.0000
Cash Ratio	0.0018	0.0001	24.5454	0.0000
Asset Turnover	0.0025	0.0000	50.5858	0.0000
Size	1.6669E-14	1.0050E-15	1.6586E+01	1.3884E-61

	Lower 95%	*Upper 95%*
Intercept	#N/D	#N/D
Dividend Yield	-0.1264	-0.1128
PayOut Ratio	-0.0002	-0.0001
ROE	0.0003	0.0007
Debt Ratio	0.0107	0.0116
Cash Ratio	0.0016	0.0019
Asset Turnover	0.0024	0.0026
Size	0.0000	0.0000

Appendix C: Alpha computation

WRDS Beta suite compute the *alpha* coefficient through the CAPM market model as follow:

$$\alpha_i = R_i - E(\tilde{R}i)$$

α_i = abnormal return on security *i;*

R_i = actual return on stock *i;*

$E(\tilde{R}i) = r + [E(\tilde{R}m) - r]\beta$;

$E(\tilde{R}i)$ = the expected return on security *i*;

$E(\tilde{R}m)$ = the expected return on market portfolio;

r = the risk-free short-term interest rate;

β = the covariance between $\tilde{R}i$ *and* $\tilde{R}m$, divided by the variance of $\tilde{R}m$.