

STOCK RETURN AND FINANCIAL RATIOS

- EVIDENCE FROM THE PORTUGUESE STOCK MARKET

Enio Lopes da Conceição Paquete

Dissertação de Mestrado em Finanças

Orientada por

Elisabete Fátima Simões Vieira

Natércia Silva Fortuna

2016

Nota bibliográfica do candidato

Enio Lopes da Conceição Paquete is originally from São Tomé and Príncipe. In 2013, he finished the Bachelor Degree in Finance of the Institute of Accounting and Administration of the University of Aveiro (ISCA-UA). Soon, after the Bachelor he enrolled a six month internship at the Bank of New York Mellon, SA/VN, Amsterdam Branch, in the documentation team and one semester exchange at the Avans School of International Studies (ASIS). In 2014, he stated the Master in Finance of the Economics Faculty of the University of Porto (FEP) which he is currently undertaking as well as a fulltime position in the PSA group.

Agradecimentos

If I have seen further it is by standing on the shoulders of Giants.

Isaac Newton

I quoted Isaac Newton to express my deep gratitude for both my Supervisors Professors Elisabete Fátima Simões Vieira and Natércia Silva Fortuna for their impact on this master dissertation. It might be said that without their support it would not exist at the current state.

To my parents Apolinário and Cristiana, my brother, sisters, friends and co-workers for their eternal support giving me strength and motivation through this challenging process of working and studying and have to reconcile altogether.

Resumo

O objetivo desta dissertação é verificar se existe alguma relação entre a rendibilidade de mercado e os rácios financeiros de rendibilidade económica, do investimento, do *cash flow*, do endividamento, do desempenho bolsista e de liquidez, de modo a entender até que ponto estes rácios poderão explicar a rendibilidade de mercado das empresas cotadas na Euronext Lisbon. Para o efeito, foi considerada uma amostra dessas, no período compreendido entre janeiro de 2000 e Dezembro de 2015, com recurso à metodologia de dados em painel. Os resultados mostram a existência de uma relação estatisticamente significativa entre a rendibilidade de mercado e os rácios do investimento, de liquidez, do *cash flow*, desempenho de bolsista e do endividamento. Sendo que, os rácios do *cash flow*, do investimento, de liquidez e endividamento tem relação positiva, e os rácios do desempenho bolsista têm relação mixa (positiva e negativa) com a rendibilidade de mercado.

Palavras chave: redibilidade de mercado, rácios financeiros, dados em painel

JEL-Codes: G11, G12, G17, M48

Abstract

The goal of this dissertation is to analyze the relationship between the stock market return and financial ratios of profitability, investment, cash flow, leverage, market performance and cash holdings, in order to find out which extent these ratios might be stock markets return determinants for the Portuguese listed firms in the Euronext Lisbon. Therefore, we analyze a sample of listed firms on Euronext Lisbon from January 2000 to December 2015, using the panel data methodology. The results support the claims that there is predictability on the Euronext Lisbon, and we found a strong relationship between stock market return and investment, cash holdings, cash flow, market performance and leverage. Cash flow, investment, cash holdings and leverage ratios have positive sign, market performance ratios have mixed (positive and negative) signs in the relationship with the stock market return.

Key-words: Stock market return, financial ratios, panel data

JEL-Codes: G11, G12, G17, M48

Table of Contents

Nota bibliográfica do candidato i
Agradecimentos ii
Resumo iii
Abstract iv
Abbreviations vi
List of tables ix
List of figures ix
1. Introduction 1
1.1 Backgrounds and motivations 1
1.2 Research objectives and questions 3
1.3 Dissertation structure 3
2. Literature Review 4
2.1Theoretical background 4
2.2 Related empirical studies on stock return and financial ratios 15
3. Methodology and research design 26
3.1 Research Hypotheses 26
3.2 Empirical specifications 30
3.3 Data and variables 31
3.4 Estimation strategy, results and discussion 35
4. Conclusion 42
References 44
Annexes 54

Abbreviations

Δ	Variation
AMEX	American Stock Exchange
BL	Book Leverage
BM	Book-to-market ratio
CAPEX	Capital Expenditures
CAPM	Capital Assets Pricing Model
CBOTA	Cash-based profitability over total assets
CBP	Cash Based Profitability Ratio
CFLOW	Cash Flow Ratio
CFO	Operating Cash Flow
CFODM	Operating Cash Flow from Direct Method
CFOIM	Operating Cash Flow from Indirect Method
CHOLD	Cash Holdings Ratio
CI	Abnormal Capital Investments
COGS	Cost of goods sold
CRSP	Center for Research in Securities Prices
D/E	Debt to Equity Ratio
DY	Dividend Yield
EHM	Efficient Market Hypothesis
EPS	Earnings per share
EQ_OFFER	Equity Offer
EY	Earnings Yield
FA	Financial Assets
FL	Financial Liabilities
GDP	Gross Domestic Product
GP	Gross Profitability
INVEST	Investment Ratio
LEV	Leverage Ratio
LEVER	Leverage
LIFO	Last In First Out

LIQUID	Liquidity
LSDV	Least-square Dummy Variable
LT	Long term debt
ML	Market Leverage
MM	Modigliani and Miller
MRKT	Market Performance Ratio
NASDAQ	National Association of Securities Dealers Automated Quotations
NIBPD	Net Income Before Preferred Dividend
NPV	Net Present Value
NYSE	New York Stock Exchange
OL	Operating Leverage
OLS	Ordinary Least Square
Opr	Operating Profitability
PER	Price Earnings ratio
PhD	Doctor of Philosophy
PROFIT	Profitability Ratio
PSI	Portuguese Stock Index
R&D	Research and Development
ROA	Return on Assets
RW	Random Walk Hypothesis
S&A	Sales and administrative expenses
S&P	Standard and Poor’s
S&P 400	Standard and Poor’s Mid-Capitalization 400 Index
S&P 500	Standard and Poor's Large Capitalization 500 Index
S&P 600	Standard and Poor’s Small Capitalization 600 Index
SEC	Securities and Exchange Commission
SME’s	Small and Median Enterprises
SMR	Stock Market Return
TA	Total Assets
TSE	Tokyo Stock Exchange
TURN	Turnover

UK	United Kingdom
US	United States of America
USD	United States Dollar

List of tables

Table 1 - Table of the selected proxy variables, expected signs and abbreviations 35
Table 2 - Results for the base model of specification equations..... 37
Table 3 - Results for the second group of specification equations 39
Table 4 - Results for the third group of specification equations..... 40

List of figures

Figure 1- Conceptual model of the relationship between the financial ratios and stock market return..... 29

1. Introduction

1.1 Backgrounds and motivations

Today's society is known as "information society" and "knowledge society[1]" because of the impact of information on everyday activities and the need to understand more and more complex information and transform this same information into knowledge. In this society, valuable information and knowledge gathered from this information are key commodities for success in business as well as in the financial markets. We intended by valuable information, every information that might impact future cash flows of a business. Moreover, for any information to be valuable it has to allow individuals to take actions based on that information and there have to be a net benefit as a result of that decision Hirshleifer & Riley (1979). The present dissertation is based on information and the impact that this information and the knowledge gathered from it might impact stock market returns. In a recent study, Harvey, Liu, & Zhu, (2015) reviewed all the published and unpublished articles about the determinants of stock return literature, done to date, and they discovered that more than 300 factors have been found capable of predicting future stock market returns. Moreover, the authors presented a set of determinants of stock market return from accounting fundamentals (accounting ratios), macro and micro economic variables, behavioral indicators, and others. These variables are perceived as valuable sources of information. It would be a very challenging task to create a model with more than 300 variables and test all of them at the same time. Consequently, from that broad range of indicators and sources of information that might impact prices we opt for financial ratios as sources of valuable information. Since the financial ratios have the ability to be used as comparables for firms as separate entities as well as to compare the firm within the industry, the sector and the direct competitors. Additionally, the financial ratios we will use are previously disclosed by the firm in the financial statements and provide information about the firms' cash flow, market performance, economic profitability, investment levels, capital structure as well as short-term liquidity or cash holdings. Even, with the challenges associated with the test of the relationship between stock return and financial ratios, these studies might still be useful to the best understandings of the stock price behavior and the investment decision making process

[1] Drucker & Wilson (2001).

Fama (1991). Hence, our main motivation is to be able to provide some more insights and contribute for the best understanding of the link between the statics *accounting books* and the dynamic *financial markets*, based on a sample composed by the Portuguese companies listed in the Euronext Lisbon.

There have been studies made in Portugal using financial ratios to predict stock markets return, such as Almas & Duque (2008) and Correia (2009) and Rocha (2013). However, these studies are tests for market efficiency. Almas & Duque (2008), Correia (2009) or Rocha (2013), who replicates the empirical study of Ou & Penman (1989), lack a theoretical background of the signs as well as the theoretical reasons to include or exclude variables from the model. Our study, in contrast, will test the relationship between stock market returns and the financial ratios not as a test for the efficient market hypothesis, but as a way to find which ratios or which types of ratios better predict future stock markets return. Likewise, our choice of the best ratios will come from an *ex-ante* analysis of the logical connection between these ratios and the stock returns found in the existing literature. To the extent that the final results might help academics and practitioners choosing the most relevant ratios when doing the early stage valuation of Portuguese firms. In the initial stage of the valuation process, it is very common to the analyst to analyze accounting ratios, among them: cash flows ratios, economic profitability ratios, market performance ratios, investment ratios, leverage ratios and liquidity ratios, in order to forecast the future performance of the business.

The research in this field seams conclusive in developed markets such as the United States of America (US) or the United Kingdom (UK) for the separated financial ratios not totally combined. Others markets, alike the Portuguese stock market, still need further research even for the separate ratios in order to find conclusive evidence. So forth, our biggest motivation is to be able to provide new insights in the relationship between financial ratios and stock market return that could be used on a daily basis by academics and practitioners.

1.2 Research objectives and questions

The main objective of this dissertation is to analyze the relation between financial ratios and stock market return for the Portuguese companies listed on Euronext-Lisbon[2]. In order to accomplish the main objective; first we will identify the main theories as well as the most relevant ratios that previous studies have found to be stock markets return determinants'. Next, with the selected ratios we will develop a multivariate regression model using panel data analysis. Finally, we will estimate the relationship between the financial ratios and stock return for Portuguese listed firms, in order to compare our results with previous studies and remark some conclusions. The objectives we aim to achieve results in the following research questions:

Question 1: Is there a relationship between financial ratios and the stock market return for the Portuguese listed firms?

Question 2: Which financial ratios are more valuable source of information that might be used as stock returns determinants' for the listed firms in the Portuguese Stock Market?

1.3 Dissertation structure

In the next section, we will present the literature review of the related theory and empirical studies, Section three (3) is dedicated to the data, the methodology and estimation techniques as well as our findings and Section four (4) presents the main conclusions.

[2] Euronext-Lisbon is the Portuguese stock market for large companies. In this study we do not include small and medium enterprises (SME's). Therefore, when we refer to the companies listed in Portugal our aim is to large listed entities. Hence, we will use the terms "listed in Portugal" or "listed in Euronext-Lisbon" interchangeably.

2. Literature Review

The studies on the relationship between stock return and financial ratios is more empirical than theoretical. For now, one cannot find a theory that fully explains the prices' behavior and the relationship between stock market return and the financial ratios. Nevertheless, it has been commonly accepted that the market is dependent on valuable (relevant) information that can impact the share price and consequently the stock market return. The theories in finance, relevant to this paper, that relate the stock market return and information are the efficient markets hypothesis, the behavioral finance, the information asymmetry and the signaling theory and the agency theory. Hence, in this section, we will present a short review of these theories and psychological issues we believe are closely related to the cross-section of stock return using financial ratios which attempts to explain the relationship between stock market returns and financial ratios. Furthermore, we will present the most relevant empirical studies of stock market return and profitability ratios, investment ratios, cash flow ratios, financing ratios, market performance ratio and liquidity ratios.

2.1Theoretical background

2.1.1 Rational (random walk hypothesis and the efficient markets hypothesis) versus irrational pricing (behavioral finance) theories

There is a long story about the financial markets and securities prices as well as a long list of books and papers written about the subject. Individuals work on a daily basis in the financial markets trying to predict what is the next move of the stock prices. But the market is full of surprises and after hundreds of papers, there is no conclusive evidence on price behavior. It might be because the market is based on heterogeneous expectations, because each market participant has their own way of valuing the businesses or because the prices cannot be predicted. The former hypothesis called the "random walk hypothesis" (RW) was proposed by Louis Bachelier on his PhD thesis, suggesting that the future return is a function of the past return plus a random factor. Bachelier (1900)[3] believed that past, present and even discounted future events are reflected in market price,

[3] The random walk hypothesis was introduced by Bachelier (1900) and was widely spread by Cootner (1964).

but often show no apparent relation to price changes. The main assumption is that prices (returns) changes are independent. The random walk approach suggested that returns cannot be predicted in advance, since the prices varies randomly from one period to another and that past prices does not carry out information to predict future prices. In effect, the theory was supported by prominent individual in academia, among them Fama (1965) and Samuelson (1965). After several testing it has been found the stock markets do not follow a random walk (Dimson & Mussavian, 1998).

Fama (1970) proposed a new paradigm, the efficient market hypothesis which states that an investor is unable to gain more than average return while supporting their decision making on private or publicly available information. Moreover, the degrees of market efficiency might be of weak form, whenever it is impossible to earn abnormal returns based the investment decisions on past information, semi-strong form if the investor is unable to earn abnormal return based their decision making on any publicly available information or strong form, when the investor cannot earn abnormal return grounding their decisions on private information, insider trading. The efficient market hypothesis has been widely tested throughout the years and countries and with different methodologies.

The tests of **semi-strong efficiency** using financial ratios is well developed in the US markets. Ou & Penman (1989), hereafter OP, were the first authors to use a comprehensive list of financial statements indicators to predict one year ahead stock return. The financial analysis performed was different from the traditional approach of the financial analysis that identifies ratios as “profitability”, “turnover”, “liquidity” and others. Instead, they tried to find measures related to firm value and predict payoffs of securities, meaning the future direction of stock prices. Furthermore, they chose the dividend discount model as a predictor of future firm’s value and a set of 68 descriptors (financial indicators) that should predict future dividends, and consequently returns. Unfortunately, the path on dividends was not the best one due to lack of data on dividend payout in the database would make it impossible to assess future dividends. Hence, to overcome this situation the conclusions of Ball & Brown (1968) that accounting earnings are valued positively by investors and the intuition that dividends are paid from earnings and instead of using dividend payout predictors they performed the estimation for one year ahead earnings as predictors for the future direction of prices. OP concluded that

there is much information on financial statements information (ratios) that predicts future stock returns (direction). For the sample period of 1965-1972, they found 16 financial indicators and for the period 1973-1977 they found 18 financial indicators, 6 of the indicators appears in both sample periods, which are the Δ in dividend per share, the % Δ in Capital expenditures (CAPEX)/total assets, the Return on Assets (ROA), the Repayment of Long term (LT) debt as % of total LT debt, cash dividend/cash flows and Operating income/Total Assets.

Holthausen & Larcker (1992) , hereafter HL, improved original OP model quality: first, by using average values instead of yearly values, when a variable included balance sheet items, second is to perform a return as predictor not a return benchmark predictor (e.g. earnings), the so called direct prediction model, and by using measures of excess return estimated through the Capital Assets Pricing Model (CAPM), the market-adjusted returns and the size-adjusted return, as an alternative of the original (indirect approach) using earnings as predictors of future return evolution. Still, both OP and HL share the same conclusions that "financial ratios" can be combined into one summary measure to yield insights into the future movements of prices and return.

Chung & Kim (2001) made a similar study to OP and HL with some innovations and in a different market (the Korean Stock Market). A valuation was made in order to predict the firm intrinsic value and not the direction of earnings or returns, like OP and HL did. Even though, using the same 68 indicators in the process, they divided the indicators into three groups (cash flow related, growth related and risk related indicators). Their findings suggest that their model output could predict the intrinsic values of the securities based only on the financial ratios.

Several studies support the claims of OP and HL outside the US. Their measure has been found to be effective in the UK (Charitou & Panagiotides, 1999), in South Korea (Chung, Kim, & Lee, 1999) and Chung & Kim (2001), in Europe (Giner & Reverte, 2003), in New Zealand (Goslin et *al*., 2012) and in Portugal (Rocha, 2013). Even thought, the studies of OP and HL was very successful, it raised criticism from others researchers. These critics are normally associated with the complexity of the model due to the use of more than 60 predictors which lacks special connections among them, as well as the reasons for being

those and not others, which was criticized by Lev & Thiagarajan (1993), Abarbanel & Bushee (1998), Piotroski (2000) and Nissim & Penman (2001), among others.

Lev & Thiagarajan (1993) presented an alternative financial analysis technique to OP and HP presenting what they named as *value drivers* for earnings, risk, growth and competitive advantages, and an agglomerate of ratios as formers did as well as the use of statistical models in order to find the most related ratios to stock return. Moreover, these ratios (value-drivers) were extracted from the Wall Street Journal and Barron's for made for 1984-90, Value Line publications, professional commentaries on corporate financial reporting and analysis and newsletters of major securities firms commenting on the value-relevance financial information. Furthermore, the financial analysis yielded 12 signals; inventory, accounts receivables, capital expenditures, research and development (R&D), gross margin, sales and administrative expenses (S&A), provision for doubtful receivables, effective tax, order backlog, labor force, LIFO, earnings and audit qualification. Although the authors did not perform a trading strategy based on their 12 signals, they created a new and more simplified line of research and supported the claims that the financial analysis does not meant to be complicated and that is was possible to create a simplified, with less variables, and still sophisticated model that positively correlate stock markets' return and financial ratios. Abarbanel & Bushee (1998) created a model to test the effectiveness of the former value drivers to explain future stock market return and found supporting evidence that these signals are able to predict future return. In practice, unfortunately the model has some draw backs due to the complexity of some signals' calculation internationally as well as due to lack of data. For instance, the LIFO is not used anymore in several locations, because this variable is not considered a financial ratio (Piotroski, 2000).

Piotroski (2000) advocates that to OP and HL studies presented a very "complex" approach as well as a large amount of ratios to make the connections. Therefore, to overcome the complexity, in his study, instead of using the large sample, he opts for using a much smaller number of variables and eliminate the statistical methods on the selection process, similar to Lev & Thiagarajan (1993). These measures increase the availability of data to perform the study. Furthermore, the end goal was to create a measure named F-score, composed by nine binary variables from the ratios of profitability (ROA, Operating Cash Flow (CFO), ΔROA, ACCRUALS), leverage, liquidity, sources of funds

(ΔLEVER, ΔLIQUID , EQ_Offer) and operating efficiency (ΔMARGIN AND ΔTURN). Moreover, the firm would be granted with +1 if it shows an improvement in the quality of financial ratios. Finally, the sum of the binary variables gives the F-score. Moreover, the sample was composed by firms with high book-to-market ratio (BM) similar to previous studies made by Rosenberg, Reid, & Lanstein (1985), Fama & French (1992) and Lakonishok et *al.* (1994). Furthermore, Piotroski (2000) advocate that the price deviations from fundamentals are due to market inefficiencies and not to rational investors' behavior.

Piotroski (2000) was replicated throughout the world and successful found relationship between financial ratios and return in Portugal (Almas & Duque, 2008), and similar studies where done by Beneish, Lee, & Tarpley (2001) and Mohanram (2005). Beneish, Lee, & Tarpley (2001) focus the analysis on both value stocks and growth stocks but in separated groups and then found winners and losers in different groups using financial ratios (book based and market based) as signals. The usefulness of market based ratios was to identifying "potential" extreme price movements and accounted based ratios are more useful in separating the winners from the losers in each group. Mohanram (2005) created similar score adding measures to represent the naïve extrapolation and conservatism to augment the traditional fundamental analysis of profitability and cash flows (the G-SCORE), considering a sample based on low BM firms' ratio. Their conclusions supported the mispricing view over the risk approach and also that G-SCORE was not successful when applied to high BM ratio firms, as the F-SCORE is more successful when analyzing high BM firms' ratio. Therefore, the fundamental analysis of the BM is contextual and that intrinsic characteristic of the firm is very important to the accuracy of the analysis. Therefore, firms should be analyzed in similar groups, as practitioners usually do.

Finally, the studies for testing for semi-strong form of market efficiency cannot reject the hypothesis, since the even they have found that the prices did not reflect every available information they do not incorporate transaction costs and costs associated with gathering and treating the new information.

Tests of the **strong form of market efficiency** have resulted on the rejection of the hypothesis, such as the ones of Jaffe (1974), Finnerty (1976) and Givoly & Palmon

(1985). Jaffe (1974) analyzed insiders before and after the new regulation on insider trading the "the Security and Exchange Act of 1933-1934. The conclusions are that being an insider trading might pay-off despite the regulation in place, since the maximum fine under the Security and Exchange Act was USD 10.000,00 if they could prove the abnormal return earned based on the private information and the gains from some trading might go above this buffer.

Finnerty (1976) studied a population of thirty thousand insiders' traders and build portfolios of their buying and selling activities from January 1969 to December 1971. Their findings suggest that the market is not efficient in the strong form. Moreover, since insider trading which trading based on private information is illegal and the individuals who perform insiders trading might earn higher return but are also engaging in criminal activities.

The rational pricing hypothesis was built under the foundation of "joint hypothesis problem" or "bad model problem" built on the Fama (1970) which states that it might impossible to test the relationship between return and another variable simply because even the return calculation is based on assumptions of a model (e.g.: using the CAPM to test for market efficiency). Therefore, the variables are measured with error, profitability can proxy for model error and provide information about return (Ball, 1978).

The Efficient Market Hypothesis (EMH) and RW are rational expectations theories because they assume that all individuals are utility maximizers and risk averse, therefore every investment they make should provide a return that is *fair* for the risk associated to the security before making a decision. Nevertheless, there is a body of research that does not support those claims and advise that investors are irrationals and that their decision making process does not follow a rational expectation theory, but is biased instead toward several behavioral patterns. Furthermore, we will present three biases in the following section dedicated to behavioral finance.

2.1.2 Behavioral finance

On the opposite side of the rational pricing theory we have the behavioral finance, also known as the irrational pricing theory. The theorists of behavioral finance explain price deviation from fundamental not has risk return relationship, but as associated with *irrational behaviors and psychological factors associated to* investors. Their most

important argument is that the market is not efficient, and, consequently, financial ratios reflect the extent to which the market is overvalued or undervalued at a given point in time Kothari & Shanken (1997). So forth, when the security is underpriced, future returns (and thus true expected returns) will be high insofar as the undervaluation is likely to be corrected over the given horizon. Hence, markets participants suffer from *overreaction* (De Bondt & Thaler, 1985), this anomaly states that market participants overreact to information. Thus, investors and traders react disproportionately to new information about a given security. Consequently, the security's price will change, so that the price will not fully reflect the security's true (intrinsic) value immediately following the event.

Barberis, Shleifer, & Vishny (1998), Daniel, Hirshleifer, & Subramanyam (1998) and Hong and Stein (1999) shows that security prices tend to underreact to news such as earnings announcements. Their focus is on one particular behavioral bias (biases of conservatism, excess confidence, self-attribution or heuristic decision-making) to produce the empirically observed patterns in returns (continuation followed by reversal). If the news is good, prices keep trending up after the initial positive reaction; if the news is bad, prices keep trending down after the initial negative reaction. Moreover, Daniel, Hirshleifer, & Subrahmanyam (2001) states that some or all investors are overconfident about their abilities, and therefore overestimate the quality of information signals they have generated about security values (the so called overconfidence phenomenon). Therefore, price will deviate from fundamentals due to expectations grounded on one's *ego.* The overconfidence hypothesis is closely related to the *underreaction hypothesis.* Furthermore, the underreaction to new information and overconfince on each other's information might lead to a phenomenon named has post-earnings announcement drift (Jegadeesh & Titman, 2001). These three behavioral biases; overreaction, underreaction and overconfidence are a shortlist of a full body of literature on behavioral finance.

2.1.3 Information asymmetry and signaling

There is information asymmetry when managers (insiders) have information about the future cash flows prospectus of the business that diverges from the information outsiders possess. Under these circumstances, outsiders have to rely on signals send by insiders to take their decision. We will review some of the signals the firms might send to the market as well as related models to them in the contest of information asymmetry. These issues are related, namely, to the capital structure, dividend policy, investments, cash flow and

cash holdings. In order to mitigate the asymmetric information, managers send signals to the market though the quality of their future projects, the quality of the overall firm, the expected cash flows and also their sources of capital.

The level of investments in a firm is usually linked to corporate strategy and the future growth expectations. Therefore, a company invests in order expand the business in the future expansion of the business or to maintain current production levels. Thus, managers' decisions to invest should be taken in the best interest of the shareholders. So forth, the end result of investment in a new facility, market or product in the future should increase the stock price and consequently a higher return to the shareholders in the future. Moreover, the decision to invest will depend on the investment opportunities, as well as project available with a positive net present value (NPV). Hubbard (1998) studied the impact of capital market imperfections on investment levels and finds that *certeris paribus*, investment is significantly correlated with proxies for net worth or internal funds and the correlation is most essential for firms likely to face information related capital-market imperfections. He found that the investment levels of a firm are closely related to the capital market imperfections such as asymmetric information and agency problems, and, to the last extend, to financing decisions. Likewise, assuming that there are market imperfections such as information asymmetry or agency conflicts, lenders will charge higher interest rates has linked to the firms past return. In this view, the cost of information gathering as well as the agency conflict of managers and lenders due to the misallocation of the funds might cause the market to value investment decisions negatively due to a higher interest rate charged to the company by the lenders.

Debt might signal the firm's quality by connecting managers' compensation plan with the costs of financial distress (unsustainable levels of debt in the balance sheet), in a way that if the leverage effect does not work, managers will be jeopardizing their own wealth (Ross, 1977). Guedes & Thompson (1995) created a model based on Ross (1977) that the choice between fixed or floating-rate debt signals the quality of the firm. Moreover, their model implied that high quality firms will choose fixed-rate debt because it stabilizes earnings. While Guedes and Thompson model follow the *trade-off model* much evidence show that firms financing depends on a *pecking order*. Bhattacharya (1979) presented a model in which dividends are predictions for future cash flows, since the dividends are related to the liquidation value of the firm. So forth, the future value of the company is

dependent on the dividend paid today. John & Williams (1985) present a different overview of dividends as a signal of private information held by insiders. There is evidence that dividends have a signaling role. Moreover, the announcement of increases in dividends is associated with stock price increase and vice-versa. Dividends initiation is connected with increases in stock price, as previous studies have shown, such as Pettit (1972), Aharony & Swary (1980), Woolridge (1983) and Asquith & Mullins (1983, 1986). There is also empirical evidence that earnings change positively two years following a dividend increase (Nissim & Ziv, 2001).

Myers & Majluf (1984) present a model in which the firm should only issue new shares and invest if the combination of the realization value of the assets in place and the realization value of the project, if the gain to the old shareholders when investing is not lower than the utility captured by new shareholders. The lower the value of the assets in place and the higher the value of the of projects gain, the most likely the firm is to issue new equity in order to finance the new project. Krasker (1986) expanded the model of Myers and Majluf allowing firms to decide the size of the new investment project as well as the equity issue and find-out that the larger the equity issue, the worse the signal. Cooney & Kalay (1993) modified the Myers and Majluf (1984) model to be able to use negative NPV projects and found that there are combinations of assets in place and project value for which the value if the firm issued new shares and invested in a new project is larger than the value if the firm did not issue. So forth, the announcement of the issue would be associated with an increase in stock price. Stein (1992) exanimated the role of convertible bonds in the pecking order of capital structure in a model based on Myers and Majluf (1984), in which there were three types of firms (good, medium and bad)[4] needing funding to their project and external funding was the only source available for them. Stein also assumes that, the discount rate was zero, and the firm was entirely owned by the managers before the mixture of capital. Their findings suggest that high quality firms[5] will issue straight debt, medium quality firms will issue convertible debt and bad quality firms will issue equity to finance the project. Moreover, the issue of equity gives a sign

[4] The good, medium and bad firms are different we the respect to the degree of certainty of the future cash flows. Good firms have higher certainty in their future cash flows and bad firms has the lowest certainty in regard to future cash flow.

[5] The higher quality firms are the "good" firms, the firms with lower volatility on the future cash flows.

to the market that stocks are overvalued and in the opposite direction a buyback program signals undervaluation.

Information asymmetries make it harder to raise outside funds. Outsiders want to make sure that the securities they purchase are not overpriced, and consequently discount them appropriately. Since outsiders know less than management, their discounting may underprice the securities, given management's information (Myers and Majluf, 1984). In fact, outsiders may require a discount that is large enough that management find it more profitable to not sell the securities and reduce investment instead. Since information make outside funds more expensive. Therefore, driven from the conclusion of previous studies that under asymmetric information the costs of raising funds outside are higher and that those firms who suffer from higher asymmetric of information (Opler, 1999) and that information asymmetry is not stable through time (Myers & Majluf, 1984). It is advisable for the firm to build up cash when information asymmetry is higher. Opler et *al.* (1999)[6] present two main benefits from holding cash and cash equivalents (liquid assets) in the balance sheet. The first motive is the saving at transaction costs to raise funds outside or selling. The second motive, the firm can use liquid assets to finance its activities and investment if due market imperfections others sources of funds are nonexistent or excessively costly.

2.1.4 Agency theory

The agency theory in finance focus on the decision related to conflicts between managers and firm's shareholders and managers and conflicts between debtholders and shareholders regarding to recourses allocation or optimal decisions of investment, financing and dividend policy. The agency theory is related to the study of mechanisms that help reducing conflicts between managers and claimholders (shareholders and debtholders). In the economic literature, the agency theorists are concerned with designing the *optimal contract* to monitor managers' decision making in order to reduce the principal-agent problems. Here, we will review the literature on agency theory in

[6] Keynes (1934) describes the first benefit as the transaction cost motive for holding cash, and the second one as the precautionary motive. The costs considered in the literature have evolved from brokerage costs, in the classic paper by Miller and Orr (1966), to inefficient investment resulting from insufficient liquidity, emphasized in theoretical models such as Jensen and Meckling (1976), Myers (1977), and Myers and Majluf (1984), as well as in empirical papers that build on Fazzari, Hubbard, Petersen, Blinder, & Poterba (1988).

finance; namely ways to solve conflicts between managers and claimholders (shareholders and debtholders) on issues related to capital structure, dividend policy and investment decisions. The agency theory assumes the firm as a nexus of contracts with other stakeholders (among them employees, managers, shareholders, suppliers and the debtholders), in order for the managers (agent) act in the best interest of the shareholders (principal), the principal might incur in costs to ensure that the agent acts on his best interest (Jensen & Meckling, 1976). In this regard, Jensen & Meckling (1976) in their seminal paper, presented an overview of several models to reduce agency costs. Their final suggestion is that there no state of nature where the agency costs for bondholders is similar for the stockholders will be equally distributed. Therefore, there is no equilibrium point for both shareholders and debtholders. Moreover, shareholders have direct control over managers' activities through the corporate governance mechanisms (board of directors and monitoring) and debtholders have an indirect control exercise through the setting of covenants on loans. Managers might request capital for investing in a certain project and then shift their decision toward a totally different project with higher risk associated to the cash flows due to lack of control on managers' decisions by debtholders.

The agency costs theory suggests that debt is positive for the firms' shareholders due the pressure it creates on managers to invest in and earn enough cash flow to cover interest expenses. Finally, debt is seeing as positive for the firm future value to the limit of bankruptcy costs and the issuance of equity as a different sign.

At this point, we reviewed a broad literature for the accomplishment of this dissertation, analyzing sensitive subjects in the financial literature, which are the main discussion of academics and practitioners; the rational pricing theory and the irrational pricing theories. As we saw on the first part of the review, several studies have found past deviation of prices from fundamental and therefore claimed that the market was not efficient. Even though, the definition of market efficiency states that the prices should reflect the overall information publicly available (semi-strong) for efficiency, it also states that investors are unable to earn abnormal return derived from prices deviations from fundamentals, namely due to transactions costs and costs associated with extracting and handling information. Before, we claim that the market is or not efficient (what is not the goal of this dissertation). Further research that would account for the overall costs is needed.

Furthermore, some studies might have been biased toward finding profitability, by using a certain time period, named small[7] sample biased or statistical biases toward only selecting variables that would be related statistically to return (Ou & Penman, 1989; Holthausen & Larcker, 1992), basing their studies on these variables and estimation[8].

Asymmetric information, the signaling and the agency theory, provide valuable insights for the firms' level decisions concerning cash flows, investment, debt or equity financing, and dividend policy. However, there are several other theories we did not cover here that also present valid explanations for firms' decision making process relating to the overall financial decision making.

2.2 Related empirical studies on stock return and financial ratios

2.2.1 Profitability ratios

Profitability ratios are economic indicators that measure the difference between revenues and costs during a period of time, compared to the inputs needed to generate the different types of earnings, used to quantify the economic profitability of a firm during a certain time frame. They measure the efficiency in the use of the assets and the efficiency of the daily operations. An increase in most of these ratios is seeing as a positive sign for the firm, so, the higher the ratios, the most valuable the firm compared with others firms in the industry. Profitability ratios are the most commonly used ratios to evaluate a business evolution (activities).

There is no generally accepted theory that explains the relationship between stock return and profitability. Thus, several studies have been done in this field, finding mainly a positive relationship between the two variables, such as the studies of Abarbanel & Bushee (1998), Frankel & Lee (1998), Dechow, Hutton, & Sloan (1999), Piotroski (2000), Griffin & Lemmon (2002) and Lee, Ng, & Swaminathan (2003).

In 1968, Ball & Brown (1968) used the net income and earnings per share (EPS) in order to find in what extent the current net income carries information about future market returns, using the Ordinary Least Square (OLS) estimation for the listed companies in the New York Stock Exchange (NYSE). They found that the market was able to anticipate

[7] See Fama & French (1988) and Lewellen (2004).
[8] See Ball (1992).

future evolution in the income number in the 12 months prior the disclosure of the next report. Moreover, they show that the information that impacted the prices the most were new information that would impact the overall firm or the market as a whole instead of the firm specific variables. Finally, they conclude that in their model, the net income and the EPS outperformed cash flow measures.

Some studies after Ball & Brown (1968) found a positive relationship between return and profitability ratios, reporting also the possibility of building portfolios of ratios, such as Abarbanel & Bushee (1998). These authors based their work in current ratios that would signal future earnings evolution. Although they based their study on the OP work, using earnings as benchmark for returns, they went a step further by overcoming two shortfalls previously mentioned; the use of random variables into the model, lacking a previous analyses of the relation of the variables and the future earnings; and the use of a single summary measure of the overall performance and not the performance of the individual measures contributing to the model. Abarbanel & Bushee (1998) reported a positive relation between their profitability measures (percentage change in gross margin relative to sales, percentage change in sales and administrative expenses to sales and the percentage difference between sales growth and inventory of finished goods increase) and future expected earnings. Finally, the set of ratios performs better in firms with past negative information of their performance.

Fama and French (1992, 2006, 2008) present a set of explanations for the capabilities of profitability ratios to predict stock return is not solely based on rational but also on irrational behavior of investors. The rational pricing assumptions explains that profitability is mispriced due to *trade frictions like the limits to arbitrage and behavioral* aspects like, overconfidence, anchoring and herding.

Novy-Marx (2013) presented a predictive profitability measure that would predict stock return more accurately than net income. This measure, named growth profitability, is given by the revenues minus the cost of goods sold and selling costs. This new measure motivated Fama & French (2015) to create the five factor model to predict stock return. Moreover, due to the success of the profitability measure of Novy-Marx (2013), several institutional investor added *operating profitability* to their valuation models and the success of the measure was even widely diffused in the media.

Ball, Gerakos, Linnainmaa, & Nikolaev (2015) showed that the profitability measure of Novy-Marx (2013) could be improved and found another profitability measure that could predict the return for the next 10 years, the *operating profitability*[9].

Ball et *al.* (2015) present the two views, rational and irrational pricing theories, for the relation between profitability and stock markets return. The irrational pricing theory supports that profitability is mispriced due to several behavioral biases and market frictions such as limits to arbitrage , overconfidence, anchoring, confirmation bias, herding and hindsight bias (Barberis & Thaler, 2003). Moreover, the systematic underreaction to information of firms' profitability is corrected by arbitrageurs and other market participants then future returns will be increasing due to past profitability. Inversely, the systematic overreaction to information on the firm's profitability by irrational investors will excessively value high-profitability firm's and excessively decrease the value of those with lower profitability, at that point a reversal of the pattern similar to the overreaction (De Bondt & Thaler, 1985)[10]. The rational pricing hypothesis was built under the foundation of "joint hypothesis problem" or "bad model problem" based on Fama (1970), which states that it might be impossible to test the relationship between return and another variable simply because even the return calculation is based on assumptions of a model (e.g.: using the CAPM to test for market efficiency). Therefore, the variables are measured with error. According to Ball (1978), profitability can proxy for model error, providing information about return.

2.2.2 Investment ratios

We consider investment ratios, the financial ratios that calculates firms' investments expenditures. These investment expenditures might be assigned to investments in working capital (operating activities - inventories, accounts receivables and account payables), and capital expenditures (machinery, equipment and factories), research and development (R&D) and also to employee's demand. Although, the above mentioned investment expending's have their own impact on the firms' performance, our focus, in this study, will be on firm's investments on capital expenditures (CAPEX) and the impact

[9] The growth profitability of Novy-Marx (2013) is given by the difference between Revenues and Costs of goods sold, while Ball et al. (2015) make adjustments and deduct the Selling and administrative expenses as well as costs associated to research and development (R&D)

[10]For a more complete understanding of underreaction phenomena, see De Bondt and Thaler (1985)

that such investments have on the firm's capital market return. Titman, Wei, & Xie (2004) studied all domestic, primary stocks listed on the NYSE, American Stock Exchange (AMEX) and the NASDAQ, for a testing sample period starting in July 1973 and ending on June 1996. Their findings suggest that the market do not value investments that imply firms to grow in order to create an empire and found that there is a negative relation between return and investment, because these investments are not perceived as optimal, but as empire building. They also found that the increase in capital investments is usually related to high returns in the past as well as a less common seasoned equity financing.

Moreover, several articles present a different or complementary view on the relationship between investment and return. Also, several theories as been presented in order to justify the relationship between the variables. Anderson & Garcia-Feijóo (2006) made a compressive study on the different theories that explain the relationship between stock return and investment. In their final conclusion, they assumed that the relationship between return and investment is associated with time-varying risk, a hypothesis refuted by Cooper, Gulen, & Schill (2008). Fama & French (2006) added the investment to a newly created factor model and found a negative relation between return and investment, using the dividend discounted model. They conclude that the negative relationship is because the funds used to invest will reduce the money available for the shareholders.

So forth, when a company invest with the aim of empire building, the market return will underperform (Cooper et *al.*, 2008), because empire building investments are perceived as driven by managers' *ego*. There is much evidence that the market underreact to investment decisions or asset expansion such as acquisitions, public equity offerings, public debt offerings, and bank loan initiations than to divestitures/*assets contraction* through spinoffs, share repurchases, debt prepayments, and dividend initiations (Cooper et *al.*, 2008). The authors, suggest that the negative relation found in previous studies are due the different measures of investments and that the investment is closely related to the financing decisions and suggest that a more studies should be performed on the relationship between stock return and investment that includes financing part.

Aharoni et *al.* (2013) found that the relation documented by Fama and French (2006) was dependent on the variable they used to represent return using per share level instead of using firm-level measures that would perform better. The measure of Aharoni et *al*.

(2013) was consistent with the most literature available and present a negative relation between return and investment.

2.2.3 Cash flow ratios

Cash flow measures are financial measures of cash stream generated by the firm. The free cash flow is a cash flow measure that is given by the difference between cash inflows and cash outflows of a given firm in a certain financial period. A positive free cash flow means that the firm is able to generate sufficient cash to overcome its cash expenditures. Therefore, they will have cash generated internally to finance its investments or to payout dividends to shareholders, mitigating the negative impact of asymmetric information. In finance "cash flow is king"[11] when one wants to analyze the real value creation capabilities of a company or project. Following this approach, several studies have been made in order to find if there is a relationship between stock return and cash flow based ratios. In the early 80's, the cash flow was a primitive concept (Wilson, 1986). The earnings multiples dominated the research on the relation between stock market returns and accounting ratios. Later, realizing that earnings multiples were unable to capture the overall information, Beaver & Dukes (1972), Patell & Kaplan (1977), Wilson (1987) and Ijiri (1978) started to analyze of the impact of accrual as information providers to investors and further the incremental information of earnings plus depreciations and funds after controlling for earnings. They have found that jointly the accruals and funds components of earnings had significant association with the stock market return. However, these conclusions could not be extrapolated to explain the relationship between cash flow and return separately from accruals, so further research was needed. Wilson (1986) study the information of accruals and cash flow from operations and working capital for the 300 randomly chosen manufacturing firms from 1981 to 1982, with focus on the last quarter of the year (the fourth quarter) assuming that it is when most information is revealed about the firm and the analysts can gather more information and improve their prediction models. Their findings advocate that cash flow components (working capital from operations) had stronger explanatory power than earnings. Bernard & Stober (1989) found that the study of Wilson (1986) was very contextual and they were unable to find the same strong relationship between cash flow and stock market returns.

[11] This is an allusion to the widely used expression "cash is king", from Pehr G. Gyllenhammar former CEO of the Swedish Volvo Group.

Later, Chan, Hamao, & Lakonishok (1991) study the cross-section of stock market return and the cash flow to price, firm size, earnings yield, and the book-to-market ratio for the Japanese Stock Market[12]and found that the book-to-market ratio and the cash flow yield is strongly positively related to expected stock markets return. The data is composed by the stocks listed in the Tokyo Stock Exchange (TSE) from January 1971 to December 1988.

Lakonishok, Shleifer, & Vishny (1994) find that high cash flow-to-price ratios generate higher returns due to a non-optimal behavior of typical investors, using a sample between April 1963 and April 1990 for the overall stocks in the NYSE and the AMEX. Sloan (1996) documented that accruals (non-cash component of earnings)[13] anomaly stating that companies with higher level of accruals where perceived by investors to have higher stock return. Moreover, Sloan also show that cash-based components of earnings are more persistent and consequently provide highly qualitatively measures of return than accruals. Hou, Karolyi, & Kho (2011) found that the cash flow to price ratio can predict return in global markets using a set of 27,000 stocks over 49 countries. Furthermore, they found evidence that cash flow was a better predictor of return than economic profitability, which result are similar to the ones of Foerster, Tsagarelis, & Wang (2015), who inspired his recent study on the works of Nissim & Penman (2001), Novy-Marx (2013) and Ball et *al*. (2015) on earnings that relied on the "cleanest" (purer) measure of profitability to test the relationship with stock market return. The direct cash flow template was the chosen path to derive this “clean” measure of the net operating cash flow[14] and yielded better results than the commonly used indirect cash flow template. The sample includes the S&P 1,500[15] and data from October 1994 to December 2013.

[12] At the time the Japanese Stock Market was the second largest in the work after the US Stock market and both markets combined accounted for 67% of the world’s stock market capitalization. (Chan et al., 1991)

[13]The timely difference between cash flow and earnings cannot be sonly explained by accrual. Other cash receivables and payables shocks (payments made by customers or to suppliers that does not either before or after the end of the current fiscal period Dechow (1994).

[14] The direct method for estimating cash flows starts from sales following the deduction of operating cash outflows and the addition of the operating cash inflows. The indirect cash flow method for estimating the net cash flow from operations starts with the net income following by the deduction of the cash outflows and the inclusion of the cash inflows from operating activities. Both calculation methods are detailed presented in the annexes.

[15] The S&P 1500 is the combination of the S&P 500 (large capitalization companies) , the S&P 400 (mid capitalization companies) and the S&P 600 (small capitalization firms).

Ball, Gerakos, Linnainmaa, & Nikolaev (2016) created the cash-based profitability, a measure of cash flows and earnings excluding accruals. They reported that non-cash components of earnings (accruals) were unable to explain the returns and that only the cash components of earning was able to do so.

2.2.4 Financing ratios

The financing ratios are based on company's sources of financing (shareholders or debtholders) or the capital structure. One of the first studies of the implications of leverage in the firm value was made by Modigliani & Miller (1958), followed by Miller & Modigliani (1961, 1963) with the assumption that, under perfect market conditions [16], the level of leverage was indifferent for the firms' value and that the existence of debt-tax shields was a source of value creation and would enhance the firm value. The main question was to find under what is the source of fund that is more valuable for the firm (debt or equity). As we mentioned above, the choice for financing using equity or debt send a signal to market and impacts stock prices positively or negatively, according to the market perceptions. Bhandari (1988) studied the relation between leverage and future expected stock return using the debt/equity ratio as a risk measure and found that there is a positive relationship between leverage and expected future return, controlling for market beta and firm size. They used data from COMPUSTAT, Center for Research in Security prices (CRSP) and two sample periods 1948-1949 and 1980-1981. Later, Fama & French (1992) studied the impact of leverage, size, book-to-market equity and earnings to price ratios for the non-financial firms in the NYSE, AMEX and NASDAQ stock exchanges, collecting data on the CRSP and the COMPUSTAT databases for the period from 1962 to 1989. They found a negative relation between leverage and expected market return, though puzzling with Bhandari (1988). The difference was attributable to a *relative distress* which is captured in the calculations of the difference between the book and the market equity or assuming leverage component of the book-to-price ratio (Penman, Richardson, & Tuna, 2007).

[16] Under the perfect market there is no market frictions such as: taxes, transaction costs, bankruptcy costs, lending and borrowing costs are the same, there is no asymmetry of information. However, real markets are imperfect and there are frictions and MM tried to relax some of the assumptions by including taxes and bankruptcy costs in the analysis.

Johnson (2004) developed an option-based model that used analyst forecast dispersion as a source of informational risk and found a weak positive relation between stock return and leverage but not after controlling for volatility (a firm specific variable). Penman et al. (2007) studied the negative relationship found by Fama and French (1992) and Johnson (2004), suggesting that this result is due to the fact that leverage is associated to risk and the rational pricing expectations theory claims that the higher the risk the higher the expected return. Therefore, the negative relation between leverage and stock return was anomalous. Penman et *al*. (2007) study this anomalous behavior in more depth by dividing the book-to-price ratio into two components on risk, the operation risk and the financing risk, showing the existence of a non-linear relation between the book-to-price ratio and the net operating assets (operating assets minus operating liabilities) due to the existence of leverage. Moreover, they assumed that the main reason for the negative relation between market price leverage and stock market return is the mispricing of leverage by the market. Obreja (2013) studied the effect of the leverage in the stock markets return through the book-to-price ratio. The results show that stock return is negatively related to market leverage ratio and positively related to the book leverage ratio. Furthermore, the impact of book-leverage is irrelevant to the equity premium because both high and low book leverage firms can have high equity premium. Thus, the focus should be in the operating leverage, because without operating leverage, the value premium is negative.

2.2.5 Market performance ratios

Market performance ratios measure the overall performance of the business in the stock market, thus, this measures can only be calculated for publicly traded companies (Jaffe, Westerfield, & Ross, 2013). Market performance ratios compare the book value and the market value of the securities in order to check which companies are the best, the middle and the worst performers. Among several ratios that one could use to forecast or predict future behavior or stock prices or return, the most consistently used in academia are the book-to-market ratio, the dividend yield and the earnings yield.

Basu (1977) uses the **Price to Earnings Ratio** (PER) as an indicator of future investment, in order to test for market efficiency, considering a sample of industrial firms in the NYSE between September 1956 and August 1971. The findings suggest that firms with low PER tend to have higher risk adjusted return for the period April 1957 to March 1971. Even

though, they were able to find a negative relation between the PER and the excess adjusted average return compared to the market. However, the study could not advocate for market inefficiency due to the use of a "bad model" or a *joint-hypothesis* in their study. Ball (1978) and Basu (1983) corroborate these conclusions.

Litzenberger & Ramaswamy (1979) studied the effect of the **Dividend Yield (DY)** and the systematic risk on the before-tax expected rates of return for the period January 1952 - December 1977 using the CAPM and found a positive relationship between the before tax expected returns and dividends yields of common stocks. Moreover, Fama & French (1988) presented evidence that the dividend forecast power increases the return horizon.

The **Book-to-Market ratio** (BM) has more evidence in the past literature on the cross-section of stock return than DY and Earnings Yield (EY). The strong positive relation between BM, named the *value effect*, and the stock market return has two main explanation: (i) the rational pricing theory of Fama & French (1992) states that the value premium is associated to the risk aversion of investor who request an higher premium for higher and assume the BM as a proxy for the risk of the firm; (ii) there is irrational reasons for the existence of the value effect, namely due to the overreaction effect (De Bondt & Thaler, 1985; Piotroski, 2000; and Griffin & Lemmon (2002). The irrational pricing theory states that the existence of the value premium is related to the underreaction of investors to new information and also due to the fact that they neglect past losers.

Although, the positive relationship between stock return and the book-to-market ratio was previously evidenced in the existing literature (Stattman, 1980; Rosenberg et al., 1985; Chan et al., 1991), it emerges together with size and market risk premium as a three factors model that would compete with the existent CAPM (Fama & French, 1992). Further studies of Daniel & Titman (1997), Brennan, Chordia, & Subrahmanyam, (1998) and Fama & French, (2006; 2015) support the claims that firms with high BM tends to perform lower BM firms. However, Griffin & Lemmon (2002) found evidence that firms with larger risk of financial distress show largest return reversals nearby earnings publications and Mohanram (2005) present empirical evidence supporting a negative BM effect.

Lewellen (2004) states that the dominance of these ratios is due the fact that these ratios conjoint several features. First, they measure stock prices relative to fundamentals (each

denominator should be positively related to returns), so, the ratios are low when stocks are overpriced; they predict low future returns as prices return to fundamentals (mispricing view). Second, they track time variation in discount rates: the ratios are low when discount rates are low and high when discount rates are high; they predict returns because they capture information about risk premium (rational pricing). Monthly EY, DY, BM have autocorrelations near one and most of their movement is caused by price changes in the denominator. Lewellen found a relationship between stock market returns and the DY but lack finding evidence for the others two ratios. Furthermore, it has been found that the sample size impact severely the results, corroborating Fama & French (1988) findings that largest samples are more likely to find predictability.

2.2.6 Liquidity ratios (short-term solvency/excess cash holdings)

Liquidity ratios or short-term solvency ratios provide information about firm's cash holdings or net cash in the balance sheet. Traditionally, the main concern was the firm's ability to pay its bills over the short term without unjustifiable concern, so, the focus is on current assets and current liabilities (Jaffe et al., 2013). In a more dynamic approach the cash holdings are a source of capital for future investment in challenging market conditions and firms' characteristics are not favorable for outside financing, e.g. in the presence of asymmetries of information.

Based on the results of Opler et *al*. (1999) and Harford (1999), we can see the determinants of cash holdings and the reasons for holding cash in the balance sheet. The main reasons for holding cash in the balance sheet are related to stronger growth opportunities, riskier cash flows and limited access to capital markets.

Pinkowitz & Williamson (2002) examine the value of cash holdings for shareholders, focusing on the change in investment opportunities and found that shareholders of firms with a better growth prospectus and more volatile investment opportunities place higher values on the firm's cash than a firm with lesser or stable growth opportunities. Claimed to be the first article to check the value given to cash by markets participants they studied all firms in COMPUSTAT database from 1955 to 1999 excluding financial and utility firms. Moreover, investors place value to cash holdings under assumptions hereafter presented. Faulkender & Wang (2006) followed the same methodology considering the period 1971-2001, and excluding also financial and utility firms. Their findings suggest

that additional (marginal) cash is more valued in firms with low cash holdings' level, low leverage and who faces constraints when gathering capital in the stock market. This implied a positive relationship between cash holdings and future expected return.

Huang & Wang (2009) used and investment-based assets pricing model to test the effect of investments on cash holdings on stock return from January 1964 to December 2006 and their results show that stock returns are driven by cash holdings decisions, firms' capital investment and future productivity. In addition, they found that the cash holdings will increase the return on physical capital as well as the future expected stock market's return.

Simutin (2010) studied the cash holdings determinants for the American firms from 1960 to 2006. The results show that cash holdings are positively related to stock return. The author also found that cash holdings are positively related to firms' level of investment in the future, meaning that firms increase their cash holdings has an attempt to finance future projects. Hence, high excess cash firms exercise their growth options as is evidenced by their dramatically higher investment spending in years to come. These results are consistent with previous research that have found a negative relation between the investment and stock return (e.g., Titman et *al*., 2004; Cooper et *al*., 2008). Finally, excess cash might be used as proxy for growth options, larger betas and greater investments expenditures.

Palazzo (2012) analyzed the relation between cash holdings and expected returns for the US public companies, presenting supportive evidence for a positive relationship between cash holdings and stock market return and a stronger relation for firms with less valuable growth options. Moreover, he also found that riskier firms tend to increase cash holding in order to mitigate possible shortfalls of funds in the future and higher transaction costs of debt.

In sum, the previous studies show evidence of a positive relationship between profitability, cash flows and cash holdings ratios and market performance ratios and a negative relationship between investments ratios and mixed evidence financing ratios and the stock markets return.

3. Methodology and research design

In this Section, we will present the empirical part of the dissertation. It is divided in four Sub-sections. In Sub-section 3.1 we will develop the hypothesis to be tested, Sub-section 3.2 presents the specifications for panel data model, sub-section 3.3 is the data and variables and in Sub-section 3.4 we will present the estimation strategy, results and the discussion.

3.1 Research Hypotheses

3.1.1 Profitability ratios and stock market return

Profitability ratios measure the economic profitability of the firm over a period of time. A profitable firm is able to have higher revenues than costs. It is often to use the *net income* as an ultimate level of firm's profitability as a measure of profitability. More recent empirical research findings' suggest the deeper we go into the income statement, the more "polluted" is the measure of profitability (Nissim & Penman, 2001; Novy-Marx, 2013; Ball et *al*., 2015, Fama & French, 2015 and Ball et *al*., 2016). Since, the true profitability is given by the firms' operating activities[17]. Moreover, studies found a positive relationship between profitability and the stock market return. Hence, in accordance with previous research results, we formulated the following hypothesis:

H1: There is a positive relation between profitability and stock market return.

3.1.2 Investment ratios and stock market return

The investment ratios are related to investments that the firms make in order to exercise its growth opportunities in the future. Therefore, the current investment should be associated with a further increase in stock prices and stock market's return consequently. However, the theory of information asymmetry and the agency theory suggest that the market perceives investment decisions by the company in a negative sign, usually related to the later entrance on the market or overinvestment possibly made by the management, which motivation is empire building and not shareholders' value maximization. Research has found systematic negative relation between stock market return and investment ratios (Titman et al., 2004; Anderson & Garcia-Feijóo, 2006; Cooper et *al*., 2008; Aharoni et

[17] Revenues/Sales – Cost of Goods Sold and Selling and administrative expenses.

al., 2013; Fama & French, 2015). Based on previous studies, we present the following hypothesis:

H2: There is a negative relation between investment and stock market return.

3.1.3 Cash flow ratios and stock market return

In the same way profitability ratios measure the economic profitability, cash flow measures the financial profitability. In the presence of a positive net cash flow, the firm earned more money than it disbursed. In simple terms, the higher the net cash flow, the better the company's financial result. Research on the cross-section of stock return market has been debating which ratios, profitability or cash flow better predicts stock market's return. Net cash flow has been found to be positively related to stock market return, as the results of several studies show, such as the ones of Chan, Hamao, & Lakonishok (1991), Lakonishok, Shleifer, & Vishny (1994), Sloan (1996), Hou, Karolyi, & Kho (2011), Foerster, Tsagarelis, & Wang,(2015) and Ball, Gerakos, Linnainmaa, & Nikolaev (2016), or even as a more accurate measure of the stock market return than profitability ratios. Therefore, we will present two hypotheses related to the cash flow:

H3: There is a positive relation between cash holdings and stock market return.

H4: Cash flow ratios explain the stock market's return better than profitability ratios.

3.1.4 Leverage ratios

The agency theory defends that debt is good due to the disciplinary effect it imposes on the management team (Jensen & Meckling, 1976) to engage in activities that would provide a positive cash flow and ensure that the firm does not face the risk of financial distress. The asymmetry of information theory on debt has found that the type of external sources of financing (debt or equity) has an impact on shareholders' perceptions of the future endeavors of the firm and the current share price. Debt is perceived as having a positive impact on shares price and equity financing has a negative connotation (Myers & Majluf, 1984). Therefore, if the company issues more shares, the market perceives that the shares are overvalued and the decisions to buy back stock signals that stocks are undervalued. Moreover, the relationship between stock market return and financing ratios has been puzzling in the literature of the cross-section of stock return. Other studies found a negative link between the stock market return and the financial ratios while more recent

studies have found a positive, but weak relationship, such as the ones of Fama & French (1992), Johnson (2004), Penman et *al*. (2007) and Obreja (2013). Based on these points of view, we present the following hypothesis:

H5: There is a positive relation between debt and the stock market return.

3.1.5 Market performance ratios and stock market return

The market performance ratios compare the overall performance of a given firm in the stock market. Hence, these measures combine both, accounting (book) indicators and market indicators. The most widely used accounting ratios are the BM, the EY and the DY. Moreover, the research has two main explanations for possible price deviations for these ratios. On the one hand, the rational expectations theory assumes these ratios as risk indicators and therefore they should be positively correlated with future stock market return (Fama & French, 1992). On the other hand, the *irrational* pricing theory (behavioral finance) states that these ratios represent to what extent the firm is undervalued or overvalued in relation to its current book value (De Bondt & Thaler, 1985; Piotroski, 2000; Griffin & Lemmon, 2002). The information asymmetry (John & Williams, 1985) and the signaling literature suggest that dividends have a dilution effect on the stock price as well as that dividends news signal the market that the firm does not exercise its growth option (Myers & Majluf, 1984). The value effect, one of the most discussed anomalies in the capital markets, supports the claim that the firms with a high book-to-market ratio outperform those with low book-to-market ratio (Fama & French, 1992; 2006; 2008; 2015). Under the previous evidence, we present the following hypothesis:

H6: There is a positive relation between EY and BM, and the stock market return.

3.1.6 Cash holdings ratios and stock market return

Agency theory suggests that holding cash increase the agency costs for shareholders because the management team might expend the cash in a non-optimal way (Jensen, 1986). Information asymmetry theory suggests that in the presence of higher level of information asymmetries, it would be advantageous for the company to hold cash in the balance in order to face future cash needs and avoid excess or prohibited transaction costs with outside finance under these circumstances (Opler et *al*., 1999). Thus, we arrive to

the point where the firm should only hold cash in the balance sheet if its future growth opportunities and positive net present value projects' rate of return are higher than the opportunity costs of holding cash in the balance sheet. In the opposite situation, investors might be in a better position if the firm pays dividends in the absence of future investment opportunities with net positive cash flow as suggested by the agency theory. Furthermore, past research found a positive relation between cash holdings and stock return, such as the studies of Pinkowitz & Williamson (2002), Huang & Wang (2009), Simutin (2010) and Palazzo (2012). Under these assumptions, we formulate the last hypothesis:

> *H7: There is a positive relation between cash holdings and the stock market return.*

3.1.7 Conceptual Model

In the conceptual model (figure 1), we intend to present a visual presentation of the signs we expect from the different classes of ratios. Furthermore, this conceptual model is a summary of the discussion which involved the theory and the empirical papers as we were unable to find a total consensus within the theories and between the theories and the empirical evidence, these signs are based on the hypothesis we will study.

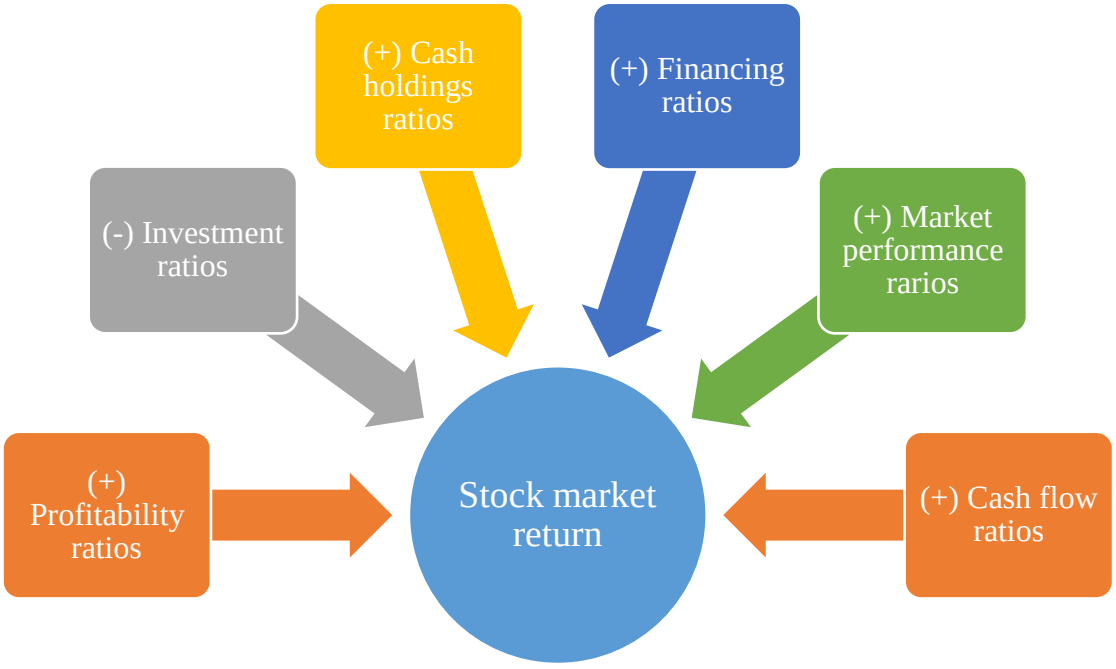


Figure 1- Conceptual model of the relationship between the financial ratios and stock market return

3.2 Empirical specifications

In this section, we will present the model's specification that will be used to test our hypothesis. Longitudinal or panel data analysis approach will be applied. Panel data analysis allows for the investigation of the individuals change throughout the year. Moreover, combines both time series and cross-section data analyses in a single equation. The basic framework for the regression model is:

$$y_{it} = \mathbf{x}'_{it}\boldsymbol{\beta} + \boldsymbol{z}'_i\boldsymbol{\alpha} + \varepsilon_{it}.$$

There are *k* regressors in $\boldsymbol{x}_{it,}$ not including the constant term. The individual effect or heterogeneity is $\boldsymbol{z}_i\boldsymbol{'\alpha}$ where $\boldsymbol{z}_i$ contains a constant term and a set of individual group specific variables all of which are taken to be constant over time *t*. The three most commonly used models to estimate regressions with panel data (cross-section variables which are time-varying) are: **pooled regression**, **fixed effects** and **random effects**. **Pooled regression** is applied if $\boldsymbol{z}_i$ contains only a constant term, then ordinary least squares (OLS) provides consistent and efficient estimates of the common α and the slope vector $\boldsymbol{\beta}$. **Fixed effects** is applied if $\boldsymbol{z}_i$ is unobserved, but correlated with $\mathbf{x}_{it}$, then the least squares estimator of $\boldsymbol{\beta}$ is biased and inconsistent as a consequence of an omitted variable. However, in this instance, the model

$$y_{it} = \boldsymbol{x}'_{\boldsymbol{it}}\boldsymbol{\beta} + \boldsymbol{\alpha}_i + \varepsilon_{it},$$

where $\alpha_i = \boldsymbol{z}_i\boldsymbol{'\alpha}$, embodies all the observable effects and specifies an estimable conditional mean. This fixed effects approach takes α_i to be a group-specific constant term in the regression model. It should be noted that the term "fixed" as used here indicates that the term does not vary over time, not that it is nonstochastic. **Random Effects** is used if the unobserved individual heterogeneity, however formulated, can be assumed to be uncorrelated with the included variables, then the model may be formulated as:

$$\begin{aligned} y_{it} &= \mathbf{x}'_{\boldsymbol{it}}\boldsymbol{\beta} + \mathrm{E}\left[\mathbf{z}'_{\boldsymbol{i}}\boldsymbol{\alpha}\right] + \left\{\mathbf{z}'_{\boldsymbol{i}}\boldsymbol{\alpha} - \mathrm{E}\left[\mathbf{z}'_{\boldsymbol{i}}\boldsymbol{\alpha}\right]\right\} + \varepsilon_{it} \\ &= \mathbf{x}'_{\boldsymbol{it}}\boldsymbol{\beta} + \alpha + u_i + \varepsilon_{it}, \\ &= \mathbf{x}'_{\boldsymbol{it}}\boldsymbol{\beta} + \alpha + v_{it}, \end{aligned}$$

that is, as a linear regression model with a compound disturbance that may be consistently, although inefficiently, estimated by least squares. This random effects

approach specifies that u_i is a group-specific random element, similar to ε_{it} except that for each group, there is but a single draw that enters the regression identically in each period. Again, the crucial distinction between fixed and random effects is whether the unobserved individual effect embodies elements that are correlated with the regressors in the model, not whether these effects are stochastic or not. Since, the goal of the analysis is to understand which determinants of the stock market return might be applied to our sample, and also due to the context[18] in which the data has been extracted, fixed effects might be the best estimation model. Even though, we will perform tests in Section 3.5 in order to decide which specifications to use.

3.3 Data and variables

Next, in order to answer to our two main research questions and to test the seven identified hypothesis mentioned in Sections 1 and 3.1, respectively, we extracted data for dependent, independent and control variables for testing the relationship between them from the following databases: *Datastream and Pordata*.

The data used in this study comprise daily stock prices, financial ratios, balance sheet, income statement and cash flow statement variables of 43 firms from PSI-GERAL, for the period January 2000 and December 2015. Banks were excluded from the sample due to different accounting practices and high leverage. The fiscal year end is assumed to be 31th of December. The selected firms have been continuously trading since the first year of inclusion until the last year. Our data set is unbalanced because we do not have data for all firm years. The data for ratio calculation has been extracted from *Thomson Reuters DataStream* and the data real Growth Domestic Product (GDP) in Portugal from the *Pordata* database.

Our dependent variable, SMR, was calculated using daily closing prices for individual stocks, the daily returns were annualized multiplying the daily return to the sum of trading days the paid dividend divided by the market capitalization. We presume this is the best

[18] As we will see in the next section, the Portuguese stock market is a rather small market and our sample is very close to the population. Therefore, the same effects of our sample is very likely to be replicated to the overall population.

measure of return because it includes both measures of value creation for the shareholder of a listed firm, the capital gains and the dividends in spirit (Lewellen, 2004):

$$STR_{it} = \frac{Capital\ gains_t + Dividends_t}{Market\ closing\ price_{(t-1)}} \quad (1)$$

Profitability ratio variable

Two alternative measures for the economic profitability based on previous research. Our two profitability measures are the traditional ROA which has been found related to the stock return to the studies of OP, LT, and others and the Gross Profitability of Novy-Marx (2013) with some adjustments[19], another interesting measure which could proxy for profitability is the Operating Profitability (OPR) of Ball et al. (2015), but due to lack of data for the sales and administrative expenses as well as for the Research and Development, we were unable to calculate the measure and the variable was dropped. Gross Profitability is given by the Net Sales or revenues (Sales) minus the Costs of Goods Sold over TA. The ROA in given by the Net Income Before Preferred Dividends (NIBPD) divided by the average TA of the periods *t* and *t*-1. These ratios are both expected to be positively correlated with the stock market return. In summary, the ratios used are:

$$ROA_t = \frac{NIBPD_t}{[(TA_t - TA_{t-1})/2]}, \quad (2)$$

$$GP_t = \frac{(SALES_t - COGS_t)}{[(TA_t - TA_{t-1})/2]}. \quad (3)$$

Investment ratio variable

Our measure for the investment ratio is the Abnormal Capital Investment measure similar to Titman et *al.* (2004). This variable measures the capital expenditures of the firm in a certain year dividend by the average capital expenditures of the three previous years. It should measure the capital investments changes over the year and should capture when the investment levels are related to maintain current activities and when the investments in capital changes abnormally, given the sign that the firm is investing in a new project by exercising its growth opportunities. As mentioned before, this measure is expected to

[19] The adjustments we made is the use of average total assets between *t* and *t*-1 instead of the total assets in time period *t*, as used by Novy-Marx (2013).

be negatively correlated with the stock market return, our dependent variable, since the market, presumably assumes that this project might not create value to the business due to asymmetries of information and empire building decisions of managers. The variable was determined by the following formula:

$$CI = \frac{CAPEX_t}{\left[\frac{CAPEX_{t-1} + CAPEX_{t-2} + CAPEX_{t-3}}{3}\right]}. \quad (4)$$

Cash Flow ratio variable

The proxy for the cash flow used is the same that in the paper of Foerster et *al*. (2015). The authors considered two methods for the operating cash flow determination. The first method is the direct method for operating cash flow estimation (CFODM). The second method is the indirect method for operating cash flow estimation (CFOIM). The calculation for the model net operating cash flow measure is in the Annexes 1 and 2. CFOIM was the chosen proxy for the cash flow.

Financing ratio variable

The proxy for leverage is the Total Leverage ratio (*TL*) which is given by the Total liabilities over TA, this measure will capture to overall yearly change in the liabilities of the firm. Also, the measure might be contaminated because it combines both, debt from operations and debt from financing activities. The proxy was determined by the formula:

$$TL_t = \frac{Total\ liabilities_t}{TA_t}. \quad (5)$$

Market performance ratio variable

We have selected two variables that act as proxies for the firms' Market performance; the *BM*, and the Earnings Yield (*EY*). *BM* is given by the Book value of equity over the Market capitalization. *EY* is given by the NIBPD over Market capitalization. The next formulas are for the selected variables:

$$BM_t = \frac{Book\ value\ of\ equity_t}{\text{Market capitalization}_t}, \quad (6)$$

$$EY_t = \frac{\text{NIBPD}_t}{\text{Market capitalization}_t}. \quad (7)$$

Cash holdings ratio variable

Our proxy measure for the cash holdings (cash and cash equivalents/short-term investments) will capture the yearly change in the cash holdings of the firm. A yearly increase in cash holdings is seeing positively in the case of asymmetries of information due to the reduction of costs associated with external financing, however, assumed to be negatively correlated by the agency theory, since managers will have more money available to invest in projects that might have a negative net present value (NPV). We assign a positive relation between cash holdings and future return due to current findings in the literature the support the claims that the market value cash positively. The Cash holdings ratio is given by the Increase/Decrease in cash/short term investments (ΔCASH) divided by TA. The formula for the change in cash holdings calculation is given below:

$$CNGCASH = \frac{\Delta CASH_t}{TA_t}. \quad (8)$$

The control variables are size and crisis. *Size* is a controlling variable that will control for possible "size" effect in the sample (Fama & French, 1992) the size of the firm tends to be negatively related to the stock return. Therefore, small firms tend to outperform large firms. The proxy variable for the firm's size is the logarithm of TA, as in the formula below:

$$Size = \ln(TA_t). \quad (9)$$

CRISIS this variable will control for the macroeconomic environment for the different years. The dummy variable will take the value 1 if the GDP growth is positive and 0 otherwise.

In summary, the following Table 1 condenses all the variables defined above with the expected sing.

Hypothesis/Variable	*Proxy Variable*	*Abbreviation*	*Expected Sign*
H1 – Profitability ratio	Return on assets	*ROA*	+
	Gross Profitability	*GP*	+
H2 – Investment ratio	CI/TA	*CI*	-
H3 – Cash flow ratio	CFOIMOA / TA	*CFOIMOTA*	+
H4 – Cash flow ratio	Cash-based profitability / TA	*CBPOTA*	+
H5 – Leverage ratio	Total Leverage / TA	*TL*	+
H6 – Market performance ratio	Book-to-market ratio	*BTM*	+
	Earnings Yield	*EY*	+
H7 – Cash holdings ratio	(Cash and short-term investments /TA	*CHOLD*	+
SIZE	Log (TA)	n/a	-
CRISIS	Dummy (1 if change in GDP is positive and 0 otherwise)	n/a	-

Table 1 - Table of the selected proxy variables, expected signs and abbreviations

3.4 Estimation strategy, results and discussion

In order, to find the best model that would fit our sample, we performed the "redundant fixed effects" tests, which test for the pooled regression versus fixed effects model, the results yielded, so the evidence is in favor of a firm specific effect in the data. Moreover, we performed the Hausman test of that would test the applicability of the fixed effects model over the random effects model, the test suggests that the individual effects are not uncorrelated with the other variables in the model. Both, tests corroborated our preliminary expectations that the fixed effects would be the better choice. Therefore, below we will assume fixed effects.

We will state the models that were estimated:

$$SMR_{it} = \alpha_i + \beta_1 PROFIT_{it} + \beta_2 INVEST_{it} + \beta_3 CFLOW_{it} + \beta_4 LEV_{it} + \beta_5 MRKT_{it} + \beta_6 CHOLD_{it} + \beta_7 SIZE_{it} + \beta_8 CRISIS_{it} + \varepsilon_{it},$$

$$i = 1, 2, \dots, 43 \;\; t = 1,2, \dots, 16 \;\; (A),$$

$$SMR_{it} = \alpha_i + \beta_1 CBP_{it} + \beta_2 INVEST_{it} + \beta_4 LEV_{it} + \beta_5 MRKT_{it} + \beta_6 CHOLD_{it} + \beta_7 SIZE_{it} + \beta_8 CRISIS_{it} + \varepsilon_{it}$$

$$i = 1, 2, \dots, 43 \;\; t = 1,2, \dots, 16 \;\; (B),$$

where:

α_i	stands for the parameter that embodies all the observed effects and specifies an estimable conditional mean, this unknown intercept for each firm will absorb the impacts of the time-invariant variables in the equation as well as any heterogeneity in the data;
SMR	stands for the stock market's return;
PROFIT	stands for the economic profitability;
INVEST	stands for the investment ratio;
CFLOW	stands for the cash flow ratio;
LEV	stands for the leverage ratio;
MRKT	stands for the market performance ratio;
CHOLD	stands for the cash holdings ratio;
SIZE	stands for the firm size;
CRISIS	stands for a dummy, which assumes 1 if the real GDP growth is positive and 0 otherwise;
CBP	stands for the cash-based profitability;
ε_{it}	stands for the error term.

Base Model

Taking into account the Table 2, we concluded that the investment is statistically significant at 1% o and has a positive relationship with the *SMR*, meaning when the firms abnormally increase their investments the stock market return will also increase. Leverage is statistically significant at 10% and has a positive relationship with thee *SMR*. However, the significance does not hold if the proxy for market performance is the *BM*, in which case the variable is not statistically significant. Cash flow is statistically significant at 1% and has a positive impact on the *SMR*. Cash holdings variable is statistically significant at 1% and has a positive relationship with *SMR*. The market performance ratio is statistically significant and has a negative relationship with *SMR*, when the proxy is *BM*. The *EY* is not statistically significant in none of these equations. *Size* and *Crisis* are both statistically significant at the 1% level of significance. *Size* has a negative relationship and *Crisis* has a positive relationship with *SMR.* Furthermore, the *F-test* shows that the variable *BM* is appropriate. The *EY* is a redundant variable in model, since the null

hypothesis is not rejected. Therefore, the better proxy for the market performance is the *BM*. The mentioned improvement might be seen from equation (1) to (2) and from equation (4) to (5).

		Specification equations					
Dependent Variables	***Expected Sign***	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***
Constant		17.41523 (3.841663)***	16.58916 (3.797212)***	17.13778 (3.881729)***	17.08207 (3.851289)***	16.19823 (3.810875)***	16.98005 (3.848413)***
ROA	+	1.374902 (1.290176)	1.783369 (1.307543)	0.409813 (1.938229)			
GP	+				2.222853 (1.933664)	2.260605 (1.925552)	1.957105 (1.992745)
TL	+	1.291996 (0.771404)*	0.092473 (0.912245)	1.294809 (0.771499)*	1.341959 (0.751774)*	0.215536 (0.881254)	1.287597 (0.751354)*
CI	-	0.119700 (0.041908)***	0.110560 (0.041563)***	0.118231 (0.041866)***	0.120094 (0.041963)***	0.112701 (0.041646)***	0.115936 (0.042001)***
CFOIMOTA	+	2.482378 (0.615207)***	2.528723 (0.624873)***	2.532550 (0.620514)***	2.789797 (0.477894)***	3.000709 (0.487219)***	2.459017 (0.534388)***
CNGCASH	+	4.951065 (1.069215)***	4.730810 (1.066611)***	4.962045 (1.073249)***	4.891851 (1.045597)***	4.730886 (1.043680)***	4.791778 (1.050668)***
BM	+		-0.237921 (0.070184)***			-0.228001 (0.068545)***	
EY	+			0.161305 (0.169737)			0.156702 (0.109836)
Size	-	-3.135252 (0.621857)***	-2.807518 (0.616847)***	-3.084455 (0.629108)***	-3.124880 (0.631749)***	-2.798587 (0.627356)***	-3.092680 (0.631866)***
Crisis	+	0.517044 (0.151502)***	0.617859 (0.148330)***	0.509513 (0.151829)***	0.526201 (0.151530)***	0.618215 (0.148629)***	0.529144 (0.150935)***
R^2		0.257407	0.271753	0.258846	0.259036	0.272481	0.261211
Adjusted R^2		0.179987	0.194114	0.179832	0.181622	0.194754	0.182280
F - test			9.238916	0.910811		8.648379	1.377349
Observations		520	520	520	519	519	519

Notes:
Estimated asynmptotic standard errors are given below the coefficients estimates in parenthesis. ***,** and * denote that the variables are statistically significant at 1%, 5% and 10%, respectively.

Table 2 - Results for the base model of specification equations

The profitability ratios are among the ratios with more studies presenting significant relationship with the stock market return; still none of the proxy for profitability is statistically significant in our models. Therefore, we find that the *BM* is good control variable for leverage. These results are similar to Obreja (2013) who presents a positive relationship when controlled for the size effect and market beta. We can conclude the most indebted firms tend to have higher *SMR*, when we do not control for the *BM*.

The investment ratio has a statistically significant positive relationship with stock return, however we expected a different sign, since previous studies have been consistently presenting a negative relationship because of managers' behavior to over-invest or to invest with empire[20] building mentality. Moreover, the abnormal increase in capital

[20] This claim is presented in several studies of the investment behavior of managers who invest to build an empire and not for maximizing value to the shareholders. This practices are normally associated with the fact that the salary of the management team is positively related to the size of the company.

investments is seeing positively by the investors in the Portuguese stock market. Therefore, we reject the hypothesis 2. The cash flow has positive relationship with stock market return; therefore, we did not reject our hypothesis that higher the cash flow obtained by the business the higher the stock market return. The *BM* relationship with *SMR* is most commonly attributed to the generally accepted claim that the *BM* is a proxy for risk, as shown in several studies. Hence, in general the higher the *BM* the higher the *SMR*. Our results, however, as previous results of Griffin and Lemmon (2002) and Moharan (2005) present a reversal relation between the *BM* and *SMR*. Therefore, the results contradict the risk-return relation and therefore *BM* cannot be used as proxy for risk in the Portuguese stock market. One explanation, for this reverse is the fact that the Portuguese stock market suffered and is suffering from recent crisis such as: the sub-prime crisis in 2007 and sovereign debt-crisis in 2011 and the overall unstable economic environment caused a reversal relation in the risk premium or as the irrational pricing theory would suggest making the stock undervalued or inefficient. The control variable *Size* is negatively related to the stock market return as expected. Hence, smaller the firm the higher the *SMR* which is consistent with the literature. The control variable *Crisis* is also statistically significant and positive as expected, the interpretation we make from these results it that in the year of positive growth in the real *GDP* the firms have higher *SMR*.

Second group of specification equations

For the second group of regression equation estimation, Table 3, we dropped the variables that were not statistically significant in the specification equations on Table 2, namely the profitability ratios *ROA* and *GP*. The variable *TL* is not stable throughout the model being statistically significant at 1% when the variables for *BM* and *EY* are excluded from the model, statically significant at 10% when the *EY* is proxy for market performance in the model and not statistically significant when the *BM* is added into the model as proxy for market performance ratio. Leverage relationship with *SMR* is very dependent on the market performance ratio, investments, cash holdings, cash flow and *BM* are consistently significant at 1%. *EY* is statistically significant at 10% level of significance and has positive relationship with *SMR*. The coefficient signs are consistent with the Table 2 regression equations. Hence, as the non-inclusion of profitability proxies did not change the signs of the other variables, we assume that our model is robust. We check robustness

F-test for the proxies of the market performance, the *BM* improves the model quality, since as it is statistically significant at 1% level of significance in the test while the *EY* does not improve the model's quality.

		Specification equations		
Dependent Variables	***Expected Sign***	***(7)***	***(8)***	***(9)***
Constant		17.07171 (3.778279)***	16.18956 (3.743373)***	17.02938 (3.772093)***
TL	+	1.373155 (0.759185)***	0.255961 (0.887250)	1.310040 (0.760036)*
CI	-	0.124853 (0.041593)***	0.117621 (0.041233)***	0.118925 (0.041769)***
CFOIMOTA	+	3.083083 (0.483820)***	3.296756 (0.496951)***	2.650134 (0.549220)***
CNGCASH	+	5.137485 (1.041296)***	4.980779 (1.038005)***	4.997776 (1.051382)***
BM	+		-0.226137 (0.068501)***	
EY	+			0.187995 (0.102999)*
Size	-	-3.086207 (0.614094)***	-2.760856 (0.612560)***	-3.067128 (0.612517)***
Crisis	+	0.499881 (0.151662)***	0.590856 (0.148551)***	0.505144 (0.150854)***
R^2		0.255542	0.268650	0.258745
Adjusted R^2		0.179673	0.192403	0.181465
F - test			8.424281	2.031040
Observations		520	520	520

Notes:

Estimated asynmptotic standard errors are given below the coefficients estimates in parenthesis. ***,** and * denote that the variables are statistically significant at 1%, 5% and 10%, respectively.

Table 3 - Results for the second group of specification equations

Third group of specification equations

In this group of equations, Table 4, we test the measure cash-based profitability of Ball et *al*. (2016). Cash based profitability is statistically significant at the 1 % and has a positive relationship with *SMR*. The explanatory variable leverage is statistically significant at 5% in specification equations (10) and (12), in these equations the *BM* is not included. *BM* repeated impacts at the significance level of *TL* as we saw in previous specification equations. *CI* is statistically significant at 1% throughout the models, but with positive sign, a different sign that was expected, but consistent with others specification equations. *BM* is statistically significant at 1% significance level, however, with a different sign than predicted. *CNGCASH* and *EY* are statistically significant at the 1 % and has a positive relationship with *SMR*.

		Specification equations		
Dependent Variables	***Expected Sign***	***(10)***	***(11)***	***(12)***
Constant		13.37331 (3.773516)***	12.45380 (3.752499)***	14.13267 (3.770580)***
TL	+	1.881918 (0.754043)**	0.973496 (0.873049)	1.611177 (0.752278)**
CI	-	0.135123 (0.042133)***	0.129450 (0.041803)***	0.121154 (0.041816)***
CNGCASH	+	5.394321 (1.044228)***	5.269452 (1.043296)***	5.101937 (1.053278)***
BM	+		-0.189711 (0.068414)***	
EY	+			0.393212 (0.090859)***
CBPOTA	+	3.171016 (0.825581)***	3.262103 (0.833370)***	2.973558 (0.819588)***
Size	-	-2.576336 (0.612794)***	-2.278130 (0.616668)***	-2.659996 (0.609355)***
Crisis	+	0.506280 (0.151735)***	0.585137 (0.149666)***	0.497203 (0.148159)***
R^2		0.239591	0.249023	0.257354
Adjusted R^2		0.161932	0.170562	0.179764
F-test			5.890281	11.21799
Observations		519	519	519

Notes:

Estimated asynmptotic standard errors are given below the coefficients estimates in parenthesis.
***,** and * denote that the variables are statistically significant at 1%, 5% and 10%, respectively.

Table 4 - Results for the third group of specification equations

With the specification equations in Table 4 we test if the cash flow was stronger than probability predicting *SMR*. We conclude that cash based profitability is *SMR* determinant and that cash flow ratios are better predictors of *SMR* that profitability ratios, for the Portuguese listed firms. Therefore, we did not reject the hypotheses 4 and assume that cash flow has a stronger relation with stock return than profitability. Our results show that the cash related ratios are "king" determinants of the stock market return for the Portuguese firms. Moreover, the *EY* improves the models' quality at 1% significance level, while *BM* improves the model's quality at 10% significance level.

Lastly, after several tests performed in this Section for the seven hypothesis and answer the research questions we arrived to the following conclusions: the profitability ratios does not explain the stock market return for the Portuguese firms and H1 has been rejected; the investment ratio is stock market return determinant, although we an opposing

sign than expected and we reject H2; the cash flow ratio explains the stock market return and the coefficient is in the sign we expected, therefore we do not reject H3 neither H4, since the cash based profitability is also a stock market return determinant with the expected sign; the leverage ratio is not a consistent determinant, because it depends a lot on the proxy for market performance, still we cannot reject H5 in eight out of the twelve regression equations; the market performance ratio are statistically significant, however the *BM* has coefficient with a different sign than the expected and H6 has been rejected; the cash holdings ratio as strong positive relationship with *SMR* and H7 has not been rejected.

4. Conclusion

The aim of this dissertation is to answer if there is a relationship between financial ratios and the stock market return as well as which ratios or which categories of ratios have a stronger relationship with the stock market return. Therefore, we analyzed relevant information theory literature such as: efficient markets theory, behavioral finance, asymmetric information and signaling theories and agency theory; that might explain the relationship between the financial ratios and stock market return.

We combine both, theories and empirical literature, in order to provide more insightful and credible results to the analysis. Since, by adding more theoretical background into a rather empirical field of research, we might be able to provide more sustained evidence within the relationship between the financial ratios and stock market return. Not a simple theory will explain the overall connections, the best understandings comes from combining the overall theories into the analysis.

We used the panel data approach, assuming the existence of fixed effects for the firms and tested the existence of positive expected relationship with profitability, cash flow, leverage, cash holdings and market performance and an expected negative relationship with investment ratios. Moreover, we also test which ratios, profitability or cash flow would be the most determinant to stock return.

Profitability ratios that are among the most used predictors of stock market return performs poorly in our sample. Our measure of leverage yields better results, however not when controlled for the *BM*. *BM* is negatively correlated to the stock market return. Cash flow and cash holdings ratios are among the ones with strongest relation with stock market return.

We advise, scholars and practitioners, that although performing an analysis of the relationship between financial ratios of profitability, investment, financing, cash flow, cash holdings and market performance and the stock market return we came to the conclusion that some ratios are statistically significant to the stock market return; such as cash flow, cash holdings, market performance, investment and leverage ratios, this analysis is not meant to be done separately, at a ratio level, and even the ratios of profitability should be incorporated to provide a more complete overview. Hence, the

chosen proxies are key determinants for the success of the analysis. Furthermore, we are able to show the dominance/importance of the cash flow and the cash holdings to firms in Portugal and we might say that *cash is king.*

The lack of data for the calculations of certain variables and the small size of the Portuguese stock market was among our biggest limitations. For instance, we were unable to control for asymmetries of information on the model due to lack of data for proxies or to test variables that presumably would provide much more information.

Further research should focus, not only in the direct relationship between stock market ratios, but also in the interconnections between ratios, not fully analyzed in this dissertation. Future avenues of research should focus on the relation between asymmetries of information and investment decisions.

References

Abarbanel, J. S., & Bushee, B. J. (1998). Abnormal Returns to a Fundamental Analysis Strategy. *The Accounting Review*, *73*(1), 19–45.

Aharoni, G., Grundy, B., & Zeng, Q. (2013). Stock returns and the Miller Modigliani valuation formula: Revisiting the Fama French analysis. *Journal of Financial Economics*, *110*(2), 347–357. doi:10.1016/j.jfineco.2013.08.003

Aharony, J., & Swary, I. (1980). Quarterly Dividend and Earnings Announcements and Stockholders' Returns: An Empirical Analysis. *The Journal of Finance*, *35*(1), 1–12. doi:10.2307/2327176

Almas, D., & Duque, J. (2008). Value Investing: The Book-To-Market Effect, Accounting Information, and Stock Returns. Retrieved from https://www.repository.utl.pt/handle/10400.5/2058

Anderson, C. W., & Garcia-Feijóo, L. (2006). Empirical evidence on capital investment, growth options, and security returns. *The Journal of Finance*, *61*(1), 171–194. doi:10.1111/j.1540-6261.2006.00833.x

Asquith, P., & Mullins, D. W. (1983). The Impact of Initiating Dividend Payments on Shareholders' Wealth. *The Journal of Business*, *56*(1), 77–96. Retrieved from http://www.jstor.org/stable/2352747

Bachelier, L. (1900). *Théorie de la spéculation*. Gauthier-Villars.

Ball, R. (1978). Anomalies in relationships between securities' yields and yield-surrogates. *Journal of Financial Economics*, *6*(2), 103–126.

Ball, R. (1992). The earnings-price anomaly. *Journal of Accounting and Economics*, *15*(2-3), 319–345.

Ball, R., & Brown, P. (1968). An empirical evaluation of accounting income numbers. *Journal of Accounting Research*. Retrieved from http://www.jstor.org/stable/2490232

Ball, R., Gerakos, J., Linnainmaa, J. T., & Nikolaev, V. V. (2015). Deflating profitability. *Journal of Financial Economics*, *117*(2), 225–248. doi:10.1016/j.jfineco.2015.02.004

Ball, R., Gerakos, J., Linnainmaa, J. T., & Nikolaev, V. (2016). Accruals, cash flows, and operating profitability in the cross section of stock returns. *Journal of Financial Economics*, *0*, 1–18. doi:10.1016/j.jfineco.2016.03.002

Barberis, N., Shleifer, A., & Vishny, R. (1998). A model of investor sentiment. *Journal of Financial Economics*, *49*(3), 307–343.

Barberis, N., & Thaler, R. (2003). A survey of behavioral finance. *Handbook of the Economics of Finance*, *1*, 1053–1128.

Basu, S. (1977). Investment performance of common stocks in relation to their price-earnings ratios: A test of the efficient market hypothesis. *The Journal of Finance*, *32*(3), 663–682.

Basu, S. (1983). The relationship between earnings' yield, market value and return for NYSE common stocks: Further evidence. *Journal of Financial Economics*, *12*(1), 129–156.

Beaver, W. H., & Dukes, R. E. (1972). Interperiod Tax Allocation, Earnings Expectations, and the Behavior of Security Prices. *The Accounting Review*, *47*(2), 320–332. Retrieved from http://www.jstor.org/stable/244755

Beneish, M. D., Lee, C. M. C., & Tarpley, R. L. (2001). Contextual Fundamental Analysis Through the Prediction of Extreme Returns. *Review of Accounting Studies*, *6*(2), 165–189. doi:10.1023/A:1011654624255

Bernard, V. L., & Stober, T. L. (1989). The Nature and Amount of Information in Cash Flows and Accruals. *The Accounting Review*, *64*(4), 624–652. Retrieved from http://www.jstor.org/stable/247852

Bhandari, L. C. (1988). Debt/equity ratio and expected common stock returns: Empirical evidence. *The Journal of Finance*, *43*(2), 507–528.

Bhattacharya, S. (1979). Imperfect information, dividend policy, and "the bird in the hand" fallacy. *Bell Journal of Economics*, *10*(1), 259–270.

Brennan, M. J., Chordia, T., & Subrahmanyam, A. (1998). Alternative factor specifications, security characteristics, and the cross-section of expected stock returns. *Journal of Financial Economics*, *49*(3), 345–373.

Chan, L. K. C., Hamao, Y., & Lakonishok, J. (1991). Fundamentals and Stock Returns in

Japan. *Journal of Finance*, *46*(5), 1739. doi:10.2307/2328571

Charitou, A., & Panagiotides, G. (1999). Financial analysis, future earnings and cash flows, and the prediction of stock returns: evidence for the UK. *Accounting and Business Research*. doi:10.1080/00014788.1999.9729589

Chung, H., & Kim, J. (2001). A structured financial statement analysis and the direct prediction of stock prices in Korea. *Asia-Pacific Financial Markets*, *8*(1), 87–117. Retrieved from http://link.springer.com/article/10.1023/A:1011951102564

Chung, H. Y., Kim, J.-B., & Lee, B. (1999). Market Efficiency Anomalies in Korea: Mispricing vs. Omitted Risk Factors. *Asia-Pacific Financial Markets*, *6*, 311–340.

Cooney, J. W., & Kalay, A. (1993). Positive information from equity issue announcements. *Journal of Financial Economics*, *33*(2), 149–172.

Cooper, M. J., Gulen, H., & Schill, M. J. (2008). Asset Growth and the Cross-Section of Stock Returns. *The Journal of Finance*, *LXIII*(4), 1609–1651. doi:10.1111/j.1540-6261.2008.01370.

Cootner, P. H. (1964). The random character of stock market prices.

Correia, R. (2009). *Testing information efficiency in the Portuguese stock market*. Instituto Superior de Ciências do Trabalho e da Empresa - Instituto Universitário de Lisboa. Retrieved from https://repositorio.iscte-iul.pt/handle/10071/1728

Daniel, K. D., Hirshleifer, D., & Subrahmanyam, A. (2001). Overconfidence, Arbitrage and Equilibrium Asset Pricing. *The Journal of Finance*, *LVI*(3), 921–965. doi:10.1111/0022-1082.00350

Daniel, K., Hirshleifer, D., & Subramanyam, A. (1998). Investor Psychology and Security Market Under and Overreactions. *Journal of Finance*, *53*(1839), 85.

Daniel, K., & Titman, S. (1997). Evidence on the characteristics of cross sectional variation in stock returns. *The Journal of Finance*, *52*(1), 1–33.

De Bondt, W. F. M., & Thaler, R. (1985). Does the Stock Market Overreact? *The Journal of Finance*, *40*(3), 793–805. Retrieved from http://www.jstor.org/stable/2327804

Dechow, P. M. (1994). Accounting earnings and cash flows as measures of firm performance: The role of accounting accruals. *Journal of Accounting and*

Economics, *18*(1), 3–42.

Dechow, P. M., Hutton, A. P., & Sloan, R. G. (1999). An empirical assessment of the residual income valuation model. *Journal of Accounting and Economics*, *26*(1), 1–34.

Dimson, E., & Mussavian, M. (1998). A brief history of market efficiency. *European Financial Management*, *4*(1), 91–103. Retrieved from http://onlinelibrary.wiley.com/doi/10.1111/1468-036X.00056/full

Drucker, P. F., & Wilson, G. (2001). *The essential drucker* (Vol. 81). Butterworth-Heinemann Oxford.

Fama, E. (1965). Random walks in stock market prices. *Financial Analysts Journal*, (16). Retrieved from http://www.jstor.org/stable/4469865

Fama, E. (1970). Efficient capital markets: A review of theory and empirical work. *The Journal of Finance*, *25*(2), 383–417. Retrieved from http://onlinelibrary.wiley.com/doi/10.1111/j.1540-6261.1970.tb00518.x/full

Fama, E. F. (1991). Efficient capital markets: II. *The Journal of Finance*, *46*(5), 1575–1617.

Fama, E. F., & French, K. R. (1988). Dividend yields and expected stock returns. *Journal of Financial Economics*, *22*(1), 3–25. doi:10.1016/0304-405X(88)90020-7

Fama, E. F., & French, K. R. (1992a). The cross-section of expected stock returns. *The Journal of Finance*, *XLVII*(2), 427–465. Retrieved from http://onlinelibrary.wiley.com/doi/10.1111/j.1540-6261.1992.tb04398.x/full

Fama, E. F., & French, K. R. (1992b). The cross-section of expected stock returns. *The Journal of Finance*, *47*(2), 427–465.

Fama, E. F., & French, K. R. (2006). Profitability, investment and average returns. *Journal of Financial Economics*, *82*(3), 491–518. doi:10.1016/j.jfineco.2005.09.009

Fama, E. F., & French, K. R. (2008). Dissecting anomalies. *Journal of Finance*, *63*(4), 1653–1678. doi:10.1111/j.1540-6261.2008.01371.x

Fama, E. F., & French, K. R. (2015). A five-factor asset pricing model. *Journal of Financial Economics*, *116*(1), 1–22.

Faulkender, M., & Wang, R. (2006). Corporate Financial Policy and the Value of Cash. *The Journal of Finance*, *61*(4), 1957–1990. doi:10.1111/j.1540-6261.2006.00894.x

Fazzari, S. M., Hubbard, R. G., Petersen, B. C., Blinder, A. S., & Poterba, J. M. (1988). Financing constraints and corporate investment. *Brookings Papers on Economic Activity*, *1988*(1), 141–206.

Finnerty, J. E. (1976). Insiders and Market Efficiency. *The Journal of Finance*, *31*(4 (Sep. 1976)), 1141–1148. Retrieved from http://www.jstor.org/stable/2326279

Foerster, S., Tsagarelis, J., & Wang, G. (2015). Are Cash Flow Better Stock Return Predictors Than Profits. *Ivey Business Scholl*, *1*(519). doi:10.1017/CBO9781107415324.004

Frankel, R., & Lee, C. M. C. (1998). Accounting valuation, market expectation, and cross-sectional stock returns. *Journal of Accounting and Economics*, *25*(3), 283–319.

Giner, B., & Reverte, C. (2003). The predictive ability of financial information for future earnings: A European perspective. *Revista Espanola de Financiacion Y Contabilidad*, *32*(115 SPEC. ISSUE), 8–43. doi:10.1080/02102412.2003.10779474

Givoly, D., & Palmon, D. (1985). Insider Trading and the Exploitation of Inside Information : Some Empirical Evidence. *The Journal of Business*, *58*(1), 69–87. Retrieved from http://www.jstor.org/stable/2352910

Goslin, J., Chai, D., & Gunasekarage, A. (2012). The Usefulness of Financial Statement Information in Predicting Stock Returns: New Zealand Evidence. *Australasian Accounting, Business and Finance Journal*, *6*(2), 51–70.

Griffin, J., & Lemmon, M. (2002). Book–to–market equity, distress risk, and stock returns. *The Journal of Finance*, *LVII*(5), 2317–2336. doi:10.1111/1540-6261.00497

Guedes, J., & Thompson, R. (1995). Tests of a signaling hypothesis: The choice between fixed-and adjustable-rate debt. *Review of Financial Studies*, *8*(3), 605–636.

Harford, J. (1999). Corporate Cash Reserves and Acquisitions. *The Journal of Finance*, *54*(6), 1969–1997. doi:10.1111/0022-1082.00179

Harvey, C. R., Liu, Y., & Zhu, H. (2015). ... And the cross-section of expected returns. *Review of Financial Studies*.

Hirshleifer, J., & Riley, J. G. (1979). The analytics of uncertainty and information-an expository survey. *Journal of Economic Literature*, *17*(4), 1375–1421.

Holthausen, R. W., & Larcker, D. F. (1992). The prediction of stock returns using financial statement information. *Journal of Accounting and Economics*. doi:10.1016/0165-4101(92)90025-W

Hou, K., Karolyi, G. A., & Kho, B. C. (2011). What factors drive global stock returns? *Review of Financial Studies*, *24*(8), 2527–2574. doi:10.1093/rfs/hhr013

Huang, D., & Wang, F. (2009). Cash, investments and asset returns. *Journal of Banking & Finance*, *33*(12), 2301–2311. doi:http://dx.doi.org/10.1016/j.jbankfin.2009.06.006

Hubbard, R. G. (1998). Capital-market imperfections and investment. *Journal of Economic Literature*, *36*(1), 193–225. doi:10.2307/2564955

Ijiri, Y. (1978). Cash-flow accounting and its structure. *Journal of Accounting, Auditing and Finance*, *1*(4), 331–348.

Jaffe, J. F. (1974). The Effect of Regulation Changes on Insider. *The Bell Journal of Economics and Management Science*, *5*(1), 93–121. Retrieved from http://www.jstor.org/stable/3003094

Jaffe, J., Westerfield, R. W., & Ross, S. A. (2013). *Corporate finance*. McGraw-Hill/Irwin.

Jegadeesh, N., & Titman, S. (2001). Profitability of momentum strategies: An evaluation of alternative explanations. *The Journal of Finance*, *56*(2), 699–720.

Jensen, M. C. (1986). Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *The American Economic Review*, *76*(2), 323–329. Retrieved from http://www.jstor.org/stable/1818789

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, *3*(4), 305–360.

John, K., & Williams, J. (1985). Dividends, dilution, and taxes: A signalling equilibrium. *The Journal of Finance*, *40*(4), 1053–1070.

Johnson, T. C. (2004). Forecast dispersion and the cross section of expected returns. *The Journal of Finance*, *59*(5), 1957–1978.

Keynes, J. M. (1934). *The applied theory of money* (Vol. 2). Macmillan and Co.

Kothari, S. P., & Shanken, J. (1997). Book-to-market, dividend yield, and expected market returns: A time-series analysis. *Journal of Financial Economics*, *44*(2), 169–203. doi:http://dx.doi.org/10.1016/S0304-405X(97)00002-0

Krasker, W. S. (1986). Stock price movements in response to stock issues under asymmetric information. *The Journal of Finance*, *41*(1), 93–105.

Lakonishok, J., Shleifer, A., & Vishny, R. W. (1994). Contrarian investment, extrapolation, and risk. *The Journal of Finance*, *49*(5), 1541–1578.

Lee, C., Ng, D. T., & Swaminathan, B. (2003). International asset pricing: Evidence from the cross section of implied cost of capital. In *14th Annual Conference on Financial Economics and Accounting (FEA)*.

Lev, B., & Thiagarajan, S. R. (1993). Fundamental Information Analysis. *Journal of Accounting Research*, *31*(2), 190–215. doi:10.1016/j.meatsci.2013.05.001

Lewellen, J. (2004). Predicting returns with financial ratios. *Journal of Financial Economics*, *74*, 209–235.

Litzenberger, R. H., & Ramaswamy, K. (1979). The effect of personal taxes and dividends on capital asset prices: Theory and empirical evidence. *Journal of Financial Economics*, *7*(2), 163–195.

Miller, M. H., & Modigliani, F. (1961). Dividend Policy, Growth, and the Valuation of Shares. *The Journal of Business*, *34*(4), 411–433. doi:10.1086/521238

Modigliani, F., & Miller, M. H. (1958). The cost of capital, corporation finance and the theory of investment. *The American Economic Review*, *48*(3), 261–297.

Modigliani, F., & Miller, M. H. (1963). Corporate income taxes and the cost of capital: a correction. *The American Economic Review*, *53*(3), 433–443.

Mohanram, P. S. (2005). Separating Winners from Losers among Low Book-to-Market Stocks using Financial Statement Analysis. *Review of Accounting Studies*. doi:10.1007/s11142-005-1526-4

Myers, S. C. (1977). Determinants of corporate borrowing. *Journal of Financial Economics*, *5*(2), 147–175.

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, *13*(2), 187–221.

Nissim, D., & Penman, S. (2001). Ratio analysis and equity valuation: From research to practice. *Review of Accounting Studies*, 109–154. Retrieved from http://link.springer.com/article/10.1023/A:1011338221623

Nissim, D., & Ziv, A. (2001). Dividend changes and future profitability. *The Journal of Finance*, *56*(6), 2111–2133.

Novy-Marx, R. (2013). The other side of value: The gross profitability premium. *Journal of Financial Economics*, *108*(1), 1–28.

Obreja, I. (2013). Book-to-market equity, financial leverage, and the cross-section of stock returns. *Review of Financial Studies*, *26*(5), 1146–1189.

Opler, T., Pinkowitz, L., Stulz, R., & Williamson, R. (1999). The determinants and implications of corporate cash holdings. *Journal of Financial Economics*, *52*(1), 3–46. doi:10.1016/S0304-405X(99)00003-3

Ou, J., & Penman, S. (1989). Financial statement analysis and the prediction of stock returns. *Journal of Accounting and Economics*, *11*, 295–329. Retrieved from http://www.sciencedirect.com/science/article/pii/0165410189900177

Palazzo, B. (2012). Cash holdings, risk, and expected returns. *Journal of Financial Economics*, *104*(1), 162–185. doi:http://dx.doi.org/10.1016/j.jfineco.2011.12.009

Patell, J., & Kaplan, R. (1977). The information content of cash flow data relative to annual earnings. *Unpublished Working Paper. Palo Alto, California, Stanford University, August*.

Penman, S. H., Richardson, S. A., & Tuna, I. (2007). The Book-to-Price Effect in Stock Returns: Accounting for Leverage. *Journal of Accounting Research*, *45*(2), 427–467.

Pettit, R. R. (1972). Dividend Announcements, Security Performance, and Capital Market Efficiency. *The Journal of Finance*, *27*(5), 993–1007. doi:10.2307/2978844

Pinkowitz, L., & Williamson, R. (2002). What is a dollar worth? The market value of cash holdings.

Piotroski, J. D. (2000). Value Investing: The Use of Historical Financial Statement Information to Separate Winners from Losers. *Journal of Accounting Research*, *38*(May), 1–41. doi:10.2307/2672906

Rocha, D. (2013). *A análise financeira como auxiliar da estratégia de investimento no mercado de ações português*. Retrieved from http://repositorio-aberto.up.pt/handle/10216/69408

Rosenberg, B., Reid, K., & Lanstein, R. (1985). Persuasive evidence of market inefficiency. *The Journal of Portfolio Management*, *11*(3), 9–16.

Ross, S. A. (1977). The determination of financial structure: the incentive-signalling approach. *The Bell Journal of Economics*, *8*, 23–40.

Samuelson, P. A. (1965). Proof that properly anticipated prices fluctuate randomly. *Industrial Management Review*, *6*, 41–49.

Simutin, M. (2010). Excess cash and stock returns. *Financial Management*, *39*(3), 1197–1222.

Sloan, R. (1996). Do stock prices fully reflect information in accruals and cash flows about future earnings? *Accounting Review*, *71*(3), 289–315.

Stattman, D. (1980). Book values and stock returns. *The Chicago MBA: A Journal of Selected Papers*, *4*(1), 25–45.

Stein, J. C. (1992). Convertible bonds as backdoor equity financing. *Journal of Financial Economics*, *32*(1), 3–21.

Titman, S., Wei, K. C. J., & Xie, F. (2004). Capital investment and Stock Returns. *Journal of Financial and Quantitative Analysis*, *39*(4), 677–700.

Wilson, G. P. (1986). The relative information content of accruals and cash flows: Combined evidence at the earnings announcement and annual report release date. *Journal of Accounting Research*, 165–200.

Wilson, G. P. (1987). 1986 Competitive Manuscript Award: The Incremental Information Content of the Accrual and Funds Components of Earnings after Controlling for

Earnings. *The Accounting Review*, *62*(2), 293–322. Retrieved from http://www.jstor.org/stable/247928

Woolridge, J. R. (1983). Dividend Changes and Security Prices. *Journal of Finance*, *38*(5), 1607–1615. Retrieved from http://onlinelibrary.wiley.com/journal/10.1111/%28ISSN%291540-6261/issues

Annexes

TABLE 1: CFOIM template source:*(Foerster et al., 2015)*

	Net Income
+	Depretiations (ITEM:
-	Change in Accounts receivables
-	Change in Inventory
-	Change in Accounts payables Operations
+	Change in Accounts Payables Taxes
=	**Net Cash from Operating Activities**

TABLE 2: CFODM template (source: (Foerster et al., 2015)

+		Sales		
-		Change in Accounts Receivables		()
(1)		**Gross Cash Inflows**	0	
		Cash Outflows:		
-		Cost of Goods Sold		
-		Operating Expenses		
-		Change in Inventory		
-		Change in Accounts Payables Operations		
-		Gross Cash Outflows		
(2)		**Direct Business Cash Flows**	0	
		Financing:		
-		Interest Expense		
+		Interest Income		
(3)		**Financing Outflows**	**0**	
		Corporate Taxes:		
-		Income Statement Taxes		
+		Changes in Accounts Payables Taxes		
(4)		Net Tax Cash Flows	0	
(1)+(2)+(3)+(4)		**Net Cash From Operating Activities**	0	

TABLE 3 : Discritive statistics

	SMR	*SIZE*	*TL*	*GP*	*EY*	*CNGCASH*	*CI*	*CFOIMOTA*	*BM*
Mean	0.322348	5.861887	0.720766	0.106559	-0.079154	-0.001462	1.293678	0.007940	1.076422
Median	0.170809	5.797468	0.708911	0.094616	0.047599	0.001526	0.917389	0.018003	0.831947
Maximum	37.96730	7.629963	1.914851	0.565493	10.87035	0.284402	31.87500	1.667034	12.36661
Minimum	-3.479047	4.308351	0.049596	-0.378685	-5.676667	-1.271645	0.000000	-2.020926	-6.965172
Std. Dev.	2.248335	0.720037	0.202239	0.114567	0.808890	0.080000	2.194952	0.160793	1.683491
Skewness	9.878608	0.259351	1.144137	1.002108	2.660795	-7.972982	8.890684	-1.384555	2.104777
Kurtosis	156.6695	2.508114	8.464586	6.212244	80.26757	126.4742	105.5030	79.28651	18.89990
Jarque-Bera	519100.7	11.05044	758.9922	310.0030	129719.7	335190.7	234048.5	126015.4	5850.147
Probability	0.000000	0.003985	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	167.2987	3042.320	374.0775	55.30422	-41.08111	-0.758610	671.4189	4.121106	558.6632
Sum Sq. Dev.	2618.496	268.5588	21.18654	6.799046	338.9289	3.315159	2495.627	13.39265	1468.085
Observations	519	519	519	519	519	519	519	519	519

TABLE 4 : Correlation Matrix

	SMR	*ROA*	*GP*	*TL*	*CNGCASH*	*CI*	*CFOIMOTA*	*BM*	*EY*	*CBPOTA*	*SIZE*	*CRISIS*
SMR	1.000000											
ROA	0.157891	1.000000										
GP	0.027323	0.381051	1.000000									
TL	0.098529	0.006039	-0.143873	1.000000								
CNGCASH	0.133988	0.130160	0.050727	0.029119	1.000000							
CI	0.162834	0.049175	-0.000126	-0.034298	-0.014290	1.000000						
CFOIMOTA	0.192110	0.695656	0.205560	0.037727	0.037320	0.004639	1.000000					
BM	-0.092546	0.024336	0.015986	-0.406415	-0.000537	0.034529	0.063277	1.000000				
EY	0.164238	0.723113	0.249802	-0.025945	0.073098	0.055856	0.464071	0.074965	1.000000			
CBPOTA	0.096322	0.155512	0.682909	-0.112770	-0.087777	-0.053763	0.531074	0.064907	0.085203	1.000000		
SIZE	-0.150755	0.185152	0.221024	-0.205680	0.036171	-0.082601	0.096068	0.040663	0.092984	0.122595	1.000000	
CRISIS	0.110559	0.019279	-0.016849	0.065003	0.000711	-0.058243	0.103305	0.118078	0.023681	0.076462	0.027938	1.000000

TABLE 4 – GDP Growth

Anos	Real GDP growth rate
2015	Pre 1,46
2014	Pre 0,91
2013	-1,13
2012	-4,03
2011	-1,83
2010	1,90
2009	-2,98
2008	0,20
2007	2,49
2006	1,55
2005	0,77
2004	1,81
2003	-0,93
2002	0,77
2001	1,94
2000	3,79
1999	3,89
1998	4,79
1997	4,43
1996	3,50

Real GDP growth rate

Data Source: INE - Estimativas Anuais da População Residente

INE | BP - Contas Nacionais Anuais (Base 2011)

Fonte: PORDATA

Última actualização: 2016-03-30

TABLE 5: LIST OF FIRMS INCLUDED IN THE STUDY

Firm	Firm number
ALTRI SGPS	1
SPORT LISBOA E BENFICA FUTEBOL	4
CIMENTOS DE PORTL.SGPS	5
COFINA	6
COMPTA	7
CORTICEIRA AMORIM	8
CCT CORREIOS DE PORTUGAL	9
EDP RENOVAVEIS	10
EDP ENERGIAS DE PORTUGAL	11
ESTORIL SOL 'B'	12
F RAMADA INVESTIMENTOS	13
FUTEBOL CLUBE DO PORTO	14
GALP ENERGIA SGPS	15
GI.GLB.INTEL.TECHS.SGPS	16
IBERSOL - SGPS	17
IMMOBL.CON.GRAO-PARA	18
IMPRESA SGPS	19
INAPA	20
JERONIMO MARTINS	21
LISGRAFICA	22
LUZ SAUDE	23
MARTIFER	24
MEDIA CAPITAL	25
MONTEPIO	26
MOTA ENGIL SGPS	27
NOS SGPS	28
NOVABASE	29
OREY ANTUNES	30
PHAROL SGPS	31
REDITUS	32
REN	33
SAG GEST	34
SDC INVESTIMENTOS	35
SEMAPA	36
SONAE CAPITAL	37
SONAE INDUSTRIA SGPS	38
SONAE COM LIMITED DATA	39
SONAE SGPS	40
SPORTING LIMITED DATA	41
SUMOL COMPAL	42
TEIXEIRA DUARTE	43
NAVIGATOR COMP	44
TOYOTA CAETANO	45
VAA VISTA ALEGRE ATLANTI	46

TABLE 6: Regression equations

Independent Variables																			
Explanatory Variables	***Expected Signal***	***EQ1***	***EQ3***	***EQ7***	***EQ4***	***EQ9***	***EQ11***	***EQ10***	***EQ8***	***EQ6***	***EQ12***		***EQ5***	***EQ2***	***EQ13***	***EQ17***		***EQ14***	***EQ16***
Constant		16.58916 (3.797212)***	16.58429 (3.813408)***	17.13778 (3.881729)***	17.53975 (3.935150)***	16.19823 (3.810875)***	16.98005 (3.848413)***	17.20386 (3.943831)***	17.07171 (3.778279)***	16.18956 (3.743373)***	17.02938 (3.772093)***	17.15601 (3.871842)***	17.16740 (3.760952)***	16.16488 (3.769604)***	17.11764 (3.754687)***	17.37331 (3.773516)***	12.45380 (3.752499)***	14.13267 (3.770580)***	13.64801 (3.868863)***
ROA	+	1.783369 (1.307543)	1.800711 (1.267670)	0.409813 (1.938229)	1.723696 (1.456718)														
GP	+					2.260605 (1.925552)	1.957105 (1.992745)	2.292734 (1.969453)											
TL	+	0.092473 (0.912245)		1.294809 (0.771499)*	1.600921 (0.829467)	0.215536 (0.881254)	1.287597 (0.751354)*	1.666395 (0.807297)**	1.373155 (0.759185)***	0.255961 (0.887250)	1.310040 (0.760036)*	1.703909 (0.814613)**				1.881918 (0.754043)**	0.973496 (0.873049)	1.611177 (0.752278)**	2.230275 (0.804216)***
CI	-	0.110560 (0.041563)***	0.110065 (0.041837)***	0.118231 (0.041866)***	0.116996 (0.042430)***	0.112701 (0.041646)***	0.115936 (0.042001)***	0.118656 (0.042377)***	0.124853 (0.041593)***	0.117621 (0.041233)***	0.118925 (0.041769)***	0.123541 (0.042035)***	0.118997 (0.041853)***	0.116420 (0.041584)***	0.112971 (0.042037)***	0.135123 (0.042133)***	0.129450 (0.041803)***	0.121154 (0.041816)***	0.133287 (0.042555)***
CFOIMOTA	+	2.528723 (0.624873)***	2.530561 (0.624841)***	2.532550 (0.620514)***	2.453714 (0.641638)***	3.000709 (0.487219)***	2.459017 (0.534388)***	2.877447 (0.496741)***	3.083083 (0.483820)***	3.296756 (0.496951)***	2.650134 (0.549220)***	3.158182 (0.507010)***	3.194442 (0.471021)***	3.322964 (0.476094)***	2.728004 (0.539522)***				
CNGCASH	+	4.730810 (1.066611)***	4.727162 (1.0705)***	4.962045 (1.073249)***	4.856960 (1.080242)***	4.730886 (1.043680)***	4.791778 (1.050668)***	4.845083 (1.054892)***	5.137485 (1.041296)***	4.980779 (1.038005)***	4.997776 (1.051382)***	5.074408 (1.057107)***	5.160851 (1.048544)***	4.977352 (1.041092)***	5.010950 (1.060941)***	5.394321 (1.044228)***	5.269452 (1.043296)***	5.101937 (1.053278)***	5.308590 (1.061436)***
BTM	+	-0.237921 (0.070184)***	-0.241592 (0.05750)***			-0.228001 (0.068545)***				-0.226137 (0.068501)***				-0.23531 (0.057093)***			-0.189711 (0.068414)***		
EY	+			0.161305 (0.169737)			0.156702 (0.109836)				0.187995 (0.102999)*				0.200170 (0.103027)*			0.393212 (0.090859)***	
DY	-				-2.123131 (2.378102)			-1.841411 (2.366773)				-1.929773 (2.393863)							-1.160017 (2.413438)
CBPOTA	+															3.171016 (0.825581)***	3.262103 (0.833370)***	2.973558 (0.819588)***	3.220146 (0.844284)***
Control Variables																			
Size	-	-2.807518 (0.616847)***	-2.794719 (0.648090)***	-3.084455 (0.629108)***	-3.174589 (0.640640)***	-2.798587 (0.627356)***	-3.092680 (0.631866)***	-3.168207 (0.651371)***	-3.086207 (0.614094)***	-2.760856 (0.612560)***	-3.067128 (0.612517)***	-3.121980 (0.633500)***	-2.933814 (0.637701)***	-2.723531 (0.64080)***	-2.920958 (0.636581)***	-2.576336 (0.612794)***	-2.278130 (0.616668)***	-2.659996 (0.609355)***	-2.650926 (0.633103)***
Crisis	-	0.617859 (0.148330)***	0.620770 (0.151581)***	0.509513 (0.151829)***	0.523899 (0.152284)***	0.618215 (0.148629)***	0.529144 (0.150935)***	0.529394 (0.152230)***	0.499881 (0.151662)***	0.590856 (0.148551)***	0.505144 (0.150854)***	0.503856 (0.152327)***	0.522678 (0.155469)***	0.598314 (0.152148)***	0.527166 (0.154510)***	0.506280 (0.151735)***	0.585137 (0.149666)***	0.497203 (0.148159)***	0.501979 (0.152498)***
R^2		27.18%	27.17%	25.88%	26.1%	27.25%	26.12%	26.19%	25.55%	26.87%	25.87%	25.84%	25.08%	26.85%	25.44%	23,96%	24.90%	25.74%	24.28%
Adjusted R^2		19.41%	19.58%	17.98%	18.07%	19.48%	18.23%	18.15%	17.97%	19.24%	18.14%	17.96%	17.62%	19.39%	17.85%	16,19%	17.06%	17.98%	16.22%
Observations		520	520	520	511	519	519	510	520	520	520	511	520	520	520	519	519	519	510
Sample		688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688	688
Periods		2000-2015	2000-2015	2000-2015	2000-2015	2000-2015	2000-2015	2000-2015	2000-2015	2000-2015	2000-2015	2000-2015	2000-2015	2000-2015	2000-2015	2000-2015	2000-2015	2000-2015	2000-2015
Method		Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect

Notes:

Standard errors are given below the coeficients estimates in parenthesis. ***,**, * significant at the 1, 5 and 10 percent levels respectively.