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UNIVERSIDADE TÉCNICA DE LISBOA

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MASTER OF SCIENCE IN FINANCE

MASTER FINAL WORK

DISSERTATION

VALUE VERSUS GROWTH IN THE PIIGS STOCK MARKETS

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SUPERVISOR:

MARIA TERESA MEDEIROS GARCIA

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Abstract

Evidence from academic research suggests that stocks trading at a lower price relatively to its fundamentals (value stocks) tend to outperform stocks that trade at higher prices (growth stocks) in the long run. Although this has been immensely studied worldwide, especially in U.S stock market, there is no clear evidence if such assertion is applicable in less renowned countries, such as, Portugal, Italy, Ireland, Spain and Greece which are commonly known as the EU PIIGS due to their economic instability and high national debt levels. We construct and evaluate value and growth portfolios and find an eloquent value premium in these countries, compatible with previous studies conducted worldwide. Using Fama and Macbeth (1973) regressions and its model extensions we find that the alpha generated by value strategies in the PIIGS regions is too large to be explained by conventional asset pricing models.

Keywords: Value Investing, Growth Investing, Value premium, Fundamental ratios, PIIGS, EMH, Asset pricing, Behavioral finance.

Jel Classification: M41, G10, G11, G12, G14

Resumo

Evidência académica sugere que, ações que transacionam a um preço mais baixo comparativamente aos seus fundamentais (ações valor), tendem a ter um desempenho superior ao de ações que transacionam a preços superiores (ações crescimento). Apesar de este tópico ter sido imensamente abordado a nível mundial, especialmente no mercado acionista Americano, não existe evidência clara que tal afirmação se aplica em países menos conhecidos como Portugal, Itália, Irlanda, Espanha e Grécia que são geralmente conhecidos pelos "PIIGS" da União Europeia devido às suas economias instáveis e níveis elevados de dívida pública. Portfólios valor e crescimento são construídos e posteriormente avaliados. Encontramos um prémio valor compatível com estudos previamente conduzidos a nível mundial. Usando as regressões de Fama e Macbeth (1973) e as extensões dos seus modelos, descobrimos que o alfa gerado por estratégias de valor na região dos PIIGS é demasiado grande para ser explicado por modelos tradicionais de avaliação de ativos.

Keywords: Investimento valor, Investimento crescimento, Prémio valor, Rácios fundamentais, PIIGS, Hipótese do mercado eficiente, avaliação de ativos, finanças comportamentais.

Classificação JEL: M41, G10, G11, G12, G14

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List of abbreviation

VP – Value premium

CAPM – Capital asset pricing model

ICAMP – Intertemporal Capital asset pricing model

3FF – Three factor model

PIIGS – Portugal, Italy, Ireland, Greece, Spain

P/E – Price to earnings ratio

P/B – Price to book value ratio

P/S – Price to sales ratio

P/CF – Price to cash flow ratio

EMH- Efficient Market Hypothesis

EV- Extreme Value

EG - Extreme Growth

V – Value

G - Growth

1. Introduction

A main paradigm in the financial industry relies on the hypothesis that markets are efficient, asset prices fully reflect all available information and therefore, it is not possible to achieve abnormal returns[1], or, in other words, to beat the market (Fama, 1970). However, several studies on market anomalies have tried to contest the argument of the efficient market hypothesis. Ball and Brown (1968) on post-earnings-announcement drift, Basu (1977) on the relation of Price to earnings in investment performance, Banz (1981) on size effect, Keim (1983) on seasonal effects, DeBondt and Thaler (1985) on behavior and psychologic individual decision making and Piotroski (2000) on the usage of historical financial statement information, are some examples in the literature that directly, or indirectly, postulate against the EMH and that demonstrates the possibility to achieve abnormal returns by following different investment strategies. Whether the markets are truly efficient or not is without doubt a controversial question. What we do know is that, investor's ultimate goal should be to construct a portfolio that maximizes the discounted value of future returns (Markowitz, 1952). To do so, investors select an investment strategy in accordance to its belief's and preferences. Among the vast list of different strategies used by market participants, the present study will focus on two of those strategies that researchers have devoted a considerable amount of effort to study, and are widely recognized between financial analysts.

Value and growth investment styles dates back mid XX century and since then they have remained as two predominant strategies in the financial industry, used by professional investors and institutional funds. On 2013, Henrik Cronqvist, Stephan Siegel, and Frank Yuy (2015) observed that a universe of 2050 value funds and 3500 growths funds were available for

[1] Used in the context of stock returns, abnormal returns refers to the return of a portfolio in excess of the return to a market portfolio.

investors, representing a substantial parcel of the total stock funds in the market. Despite the increasing popularity of such investment approaches, it is still an underexplored subject within the academics and smaller market participants such as retail investors.

Value investing refers to the principle of buying mispriced companies that trade below intrinsic value based on tangible assets, earnings, dividends, financial strength and stability, usually exhibiting below-average performance, low fundamental ratios and expected to growth at a modest, slow rate (Graham and Dodd, 1934). In contrast, growth investing is concerned to gain it's returns essential through capital appreciation, focusing on investing in stocks of companies with long-term earnings growth prospects, usually exhibiting higher fundamental ratios due to the signs of above-average growth (Fisher, 1958).

Over the past decades, academics have been undertaking efforts to understand the rationality behind the difference of returns of value and growth stocks. Some important finance academics such as Fama and French (1992, 1993, 1996), Lakonishok, Shleifer, and Vishny (1994) and De Bondt and Thaler (1985), agree that in that over the long run, value stocks tend to outperform growth stocks in a consistent and substantial form. While no unquestionable answer has been found to explain this event, one thing in certain: a lot of value premium[2] is yet to be discovered.

1.1 Problem Discussion

Evidence from academic research suggest that stocks trading at a lower price relative to its fundamentals (value stocks) tend to outperform stocks that trade at higher prices (growth stocks) in the long run. Most of those studies have focused mainly on renowned stock markets that have an underlying strong-steady economy, such as the U.S. With no clear evidence if the same results are obtained under an investment environment of distressed economies, the aim of this

[2] Value premium refers to the greater risk-adjusted return of value stocks over growth stocks

study is to understand if the value premium predominate in the so called PIIGS[3] countries: Portugal, Italy, Ireland, Greece and Spain, known for having troubled economies among the Eurozone, which might shelter a higher amount of mispriced companies leveraged by increased market volatility and irrational exuberance caused by macroeconomic shocks. The research will focus the very beginning of the introduction of the euro currency in all countries, so it is expected to cover a time period from 2003 until late 2015. It´s noteworthy to mention the lack of research covering period, combined with concentrated focus on PIIGS region, might raise different conclusions when comparing to other studies. Furthermore, the countries in study have peculiar financial, social and legal conditions which cause investors to act differently and, in turn can lead to distinctive performance of value and growth stocks when comparing with other regions (Bauman, Conover, & Miller, 1999). Notwithstanding, we attempt to delineate parallelisms between our findings and those from similar studies worldwide.

This research will be expressly appealing for market participants carrying or willing to carry equity investments within the countries of study, for investment fund managers accessing for alpha generating strategies and for those who are unware of value and growth investment styles and would like to expand their knowledge about the topic.

1.2 Structure

The study is decomposed into five main parts: introduction, literature review, methodology, empirical findings and conclusion.

The introduction briefly presents the subject in analysis, comparing both investment approaches, highlighting the existence of value premium from international evidence and ceases with the purpose to find out if the value premium exists in PIIGS stock markets. Literature review addresses the efficient market hypothesis theory, followed by contents to clarify the

[3] PIIGS is an acronym used in financial markets to refer the troubled and heavily-indebted countries of Europe.

differences and determinants of value and growth stocks, and concludes with an overview of past studies worldwide and their main results. The methodology section describes the methodological approach to conduct the empirical research by outlining the stock indexes in study, the gathering of data process and setting the criteria's to be used and how it will be tested to create portfolios. In the empirical findings, it is analyzed and interpreted the results obtained from the research. The conclusion section pools the results and interprets them in the full context. The study's limitations are described afterwards, and suggestions are provided for further research.

2. Literature review

2.1 (In)Efficient market hypothesis

Eugene Fama (1970) originated one of the most debated topics that still endure among the financial industry, even after decades since its publication. According to his theory, the market is efficient in 3 forms: weak, semi-strong and strong. In a weak efficiency, stock prices follow a random walk process, reflecting all historical prices, thus attempts to predict future prices, and cash in excess returns using past data, will be unsuccessful. In a semi-strong efficiency, stock prices will adjust very quickly and in an unbiased manner whenever new data is available in the market, implying that neither fundamental analysis nor technical analysis techniques will be able to produce excess returns. In a strong efficiency market, stock prices reflect all information available, whether it's public or private, preventing market participants to earn excess returns. In its view, stocks always trade at their intrinsic value, making it unattainable for investors to buy underpriced or to sell overpriced stocks, and to outperform the market without increasing risk.

Although the existence of empirical evidence supporting the EMH, it hasn't been uniformly accepted neither by academics nor investors. On the doctrine side, researchers have devoted efforts to identify and understand the different anomalies existent in the markets, taking

especially consideration on the importance of company fundamental drivers as predictors of future abnormal returns. Basu (1977) tested the EMH by examining if price/earnings ratio (P/E) could be used as an indicator of future performance. In fact, his findings suggested that due to overdone expectations it was possible for investors to earn abnormal risk adjusted returns by creating low P/E stock portfolios. Banz (1980) examined the relationship between size of the firm and its stock return, proving the existence of a size factor effect. Small firms had, on average higher risk-adjusted returns than large firms. Chan, Hamao and Lakonishok (1991) went further, by extending the sample to four different fundamental ratios such as price to earnings (P/E), price to book value (P/B), price to cash flow (P/CF) and size, finding that the performance of portfolios based on low P/B and low P/CF Japanese stocks were peculiarly noteworthy, retrieving the most significant impact on expected returns and the highest statistically and economically importance. Rosenberg, Reid and Lanstein (1985), Griffin and Lemmon (2002) corroborate that P/B has strong explanatory power on expected returns. While some of the anomalies have been attributed to a lack of market efficiency, researchers also started to questioning the possibility of misspecification of the stock pricing model. Chopra and Ritter (1991) find that portfolios consisting of "losers "companies, i.e stocks that have had poor returns over some number of past years retrieved much higher average returns than "winners", i.e stocks that had high returns over the same past years. Moreover, "losers" exhibited significantly lower betas than "winners" proving that the beta couldn't justify the higher returns and inducing the failure of the EMH.

2.2 Value and growth investment

Value investing concept flourished in the aftermath of 1929 stock market crash when Graham and Dodd (1934) compared the markets to a "*voting machine*". A voting machine because the

market participants often overreact partly due to reason and partly due to emotion, rather due to an exact and emotionless "*weighing machine*"[4]. By voting machine they meant that people usually vote based on a sentiment at a given time. This sentiment can rapidly change and it´s hard to measure precisely. In contrast, a weighing machine is much more precise and easier to measure weight accurately. Through this metaphor, they resumed how psychology and financial analysis play a role in financial markets. If in the short-term stock prices are driven by sentiment, in the long-term trends are driven by something that one can actually measure more concretely, financial results. The main driver of a stock price is the actual underlying business performance, and not the general unwavering opinion about its short-term outlook. When the real value is perceived by the market, there will be an intrinsic tendency for disparities to correct themselves in the long term. Therefore, they postulate that the value investor will buy stocks when their market price falls below their intrinsic value, this is, when it appears undervalued in some form of fundamental analysis. Typically, a value investor will seek to find "bargains" that trade at discount relatively to industry peers, showing low price ratios, high dividend yields with a strong solid balance sheet operating in stable environments with reduced competition.

An example that have puzzled and enhanced interest among academics was the ability of legendary investor Warren Buffet, student and disciple of the Graham and Dodd value investing approach, to beat the market consistently. With a proven track of outstanding performance over the period 1976-2011, resultant of selecting cheap, safe, high-quality stocks, he was able to obtain one of the best performances among all stocks and mutual funds (Frazzini, Kabiller, Pedersen, 2013), being the living proof that EMH claim, that one should not expect to outperform the market predictably or consistently over a long period of time, doesn't necessarily hold true for every case.

[4] A living example of this parallelism could be an investor selling Jerónimos Martins SGPS stock just because Sonae SGPS had a bad quarter result (both companies are Portuguese and operate in the retail sector)

One example of a value stock is Daimler, a well-established company engaged in the development, production and distribution of cars, trucks and vans, trading at a P/E 8.55, a P/B 1.33, a P/S 0.45 and exhibiting quarterly revenue growth (year-over-year) of 2.9% as at 10 October 2016.[5]

Unlike value investors, growth investors don't rely so heavily on the price factor. Instead, they are oriented by the growth prospects of companies. Fischer (1958) was one of the most important pioneers behind this investment philosophy privileging companies with high profit margins, high return on capital and a proven track of commitment to R&D to ensure future capability of superior outgrowth, and thus providing companies a great potential of development, whereas earnings are expected to growth faster than other companies in the market. As result, growth companies exhibit a stronger past performance than the average company and are expected to maintain a strong performance in the future. For this reason, investors are willing to pay more to buy growth stocks, which cause them to reflect higher price ratios in order to reflect the market expectations. One example of a growth stock is Tesla Motors, Inc., a young company that designs, develops, manufactures and sells electric vehicles and energy storage products, trading at a negative P/E -23.26, a P/B 11.55, a P/S 6.40 and exhibiting quarterly revenue growth (year-over-year) of 33% as at 10 October 2016.[6]

2.3 Value Premium

With the surface of abnormal performances in the market, researchers have devoted efforts to understand the rationality behind the two investment strategies. Academics manifest a consensual agreement towards an existence of a value premium. Historically speaking, it is clear that value stocks have outperformed growth stocks around different countries and different asset classes (Fama and French 2012). However, explaining the reason inducing the superiority of

[5] Retrieved from Bloomberg terminal
[6] Retrieved from Bloomberg terminal

value stocks is yet to be achieved unanimously since academics vindicate boundaries between risk, mispricing and market behavior. Based on Banz (1981) findings, that suggested that the CAPM was misspecified due to size effects, Fama and French (1992) claimed that value stocks tend to be attached to riskier companies, as their prices are partial correlated to some risk factor, such as distress, liquidity or size. In their view, if assets are priced rationally, asset risks are multidimensional that can be captured by incorporating the potential risk factor in the expected return, and for that reason, they developed proxies – the *HML* (High Minus Low factor, which indicates the returns of stocks with high book-to-market values, or inversely, low P/B multiples minus the returns of low book-to-market, or inversely, high P/B) and the *SMB* (small minus big size factor, which indicate the returns of small capitalization stocks minus the returns of high capitalization stocks) that could be used to measure the sensitivity to a future potential risk, in detriment of simplistic usage of beta. In fact, they went even deeper stating "*beta as the sole variable explaining returns on stocks is dead*" sparking the debate about the "*death of beta*" within the academia, that smoothly started shifting their efforts to study factors like book value and size to explain the cross-section of average stock returns.

They found out that by including book to market equity and size factors on CAPM they were able to increase the explanatory power of cross-section average returns of value stocks from 70% (CAPM) to 90% (3FF). Moreover, value stocks (low P/B) should have higher returns than growth stocks, and small size stocks higher returns than big size stocks. Small value stocks should rank as number one performers.

On the other hand, behaviorists believe that risk cannot be a source of the value premium. Instead, the anomaly results from successive behaviorist errors made by investors causing pricing mistakes that cannot be explained by a rational pricing model. Lakonishok, Shleifer and Vishny (1994) argue that value oriented strategies provide higher returns because these strategies take advantage of suboptimal behavior of the typical investor, and not because of fundamental

increased risk of the companies. La Porta, Lakonishok and Shleifer (1997) extended this vision by studying value and growth stock prices movements around earnings announcement. They concluded that approximately 25-30 percent of the difference between their annual returns could be justified by earnings surprises[7], which are consistently more positive for value stocks. Justifying the reason of the dissemblance of earnings repercussion on value and growth stock prices can be quite doubtfulness. One hypothesis that the authors suggest is that some investors may have a preference to invest in quality companies, with satisfying levels of profitability and a good management team. On the other side, "unsophisticated" investors may consider a trendy company regardless of its price, tempted by "sophisticated" institutions that launch initiatives to promote those *glamor*[8] stocks because they are easier to sell to clients. Value investing success might be reasonable justified for the refusal to follow naïve strategies followed by the unsophisticated investors. A subsequent study done by Black (1986) introduced the concept of *noise* as the element that makes financial markets simultaneously possible and imperfect. Contrasting with previous studies of overreaction amid published financial data, a *noise trader*[9] would be characterized for making irrational investment decisions based on shortage of information. The absence of noise would make market participants hold assets *ad æternum* because there would be scanty reasons to trade. People buying and selling based on noise, are willing to trade even though they objectively know it's the wrong move, hoping the noise to convert in information. Bondt and Thaler (1985) show that psychology play a crucial role on how financial markets behave, specially how people react to unexpected and dramatic news. Overreaction is clear, but the more striking is the fact that investors tend to overweight recent

[7] An earnings surprise occurs when a company's reported quarterly or annual profits are above or below analysts' expectations.
[8] Well-notarized stock that is widely held and popular among investors. Also known as growth stocks.
[9] The term used to describe an investor who makes decisions regarding buy and sell trades without the use of fundamental data. These investors generally have poor timing, follow trends, and over-react to good and bad news.

and underweight prior information respectively. "*Buy the rumor sell the fact*[10]" highlight this paradox that has been around financial industry; clearly enlightening how investors are willing to base their decisions on noise. By simply speculating about a future event, investors buy in anticipation that the stock price will increase. Once the event happens, the buying pressure drops, previous buyers rush to sell and take profits, causing the stock price to fall even if the event was positive for the company. Lakonishok, Shleifer and Vishny (1994) identify naïve strategies such as extrapolating past earnings growth too far into the future, assuming that stocks prices move in trends, overreacting to good or bad news or simply investing in a trending company independently of the current price lead most investors to avoid value stocks and to buy growth stocks at irrational prices, which allow those who reason correctly, to profit from bargains in neglected value stocks and the overreacted selling of growth stocks. Consistent with other studies, they reached the conclusion that stocks that was "beaten" (loser stocks) by the market, exhibiting value characteristics outperformed the winner's stocks (growth stocks) in the long run.

2.4 International evidence

Most of the research on the value premium was conducted in the US. For its importance and magnitude, it became the launching ramp of studies concerning fundamental variables and expected returns. In contrast, there has been limited research in the European market, especially on least popular markets. In table I, it is resumed the most relevant findings worldwide. Although the vast quantity of studies available, we proceed to select a diversified sample following a selection criteria based on the importance of the study, i.e., if it was published in a noteworthy journal (such as *Journal of Finance* and *The Journal of Portfolio Management*). Moreover, we try to cover an extended periodic and geographic sample of study to ensure that

[10] A catchphrase meaning that positive rumors about a company often cause stock prices to rise (because of increased buying on the part of investors), but then the prices fall (because of increased selling) after actual reports do not bear out the rumors.

any cyclical pattern between value and growth investments is observable. All studies follow similar principles of this research; thus we are interested in analysis based on constructing of portfolios of stocks, based on some form of financial analysis.

2.5 Conceptual Framework

The ensuing research methodology was designed to study the relationship between fundamental financial ratios and investment performance of stocks. Risk-return relationships are also evaluated in pre-specified measures, in an attempt to understand the reliability of the results and its implications concerning the efficient market hypothesis. Thus, we seek to answer the following questions:

- Is there a value premium in the PIIGS[11] stock market? Do value stocks outperform growth stocks? Is there a value premium for all the countries?
- If there is value premium, is it statistical significant? Which indicator is the strongest?
- Does CAPM and its extensions hold to justify the excess of returns? If not, can the market behavior characteristics justify the results?

3. Data and Methodology

3.1 Data description

The study will analyze risk and returns of stocks listed in European countries known as the "PIIGS": Portugal, Ireland, Italy, Greece, and Spain, pursuing the objective to clarify the existence of a value premium individually and as a common region. Since we are dealing with a low number of countries, it will be considered companies listed on both primary and secondary

[11] When referring to PIIGS, we consider that all the stocks of each country are grouped as a Global portfolio.

exchanges in order to increase sample size and for diversification purposes when constructing portfolios. The sample changes over time reflecting new listings, but it doesn't included companies that have been delisted through the time, causing a survivorship bias as noticed in other studies (Banz and Breen, 1986). Sample period covered was from 2003 to 2015, so we guaranteed that eurocurrency was implemented in all the countries. Monthly returns and fundamental variables – Price to earnings (P/E), Price to book value (P/B), Price to cash flow (P/CF) and Price to sales were collected from DataStream data base. Table II summarizes quantitative details of the data extracted from DataStream. Our database contained 608 companies at the beginning of 2015 with an average market capitalization of 1.081 million of euros. In this sample, it is visible a discrepancy of the number of companies and the average market capitalization among the countries. Greece represents the biggest share of total number of companies (35%) while Ireland represents the lowest share (3.4%). In terms of size, Spain has the biggest average market capitalization (2.822 M€) while Greece has the lowest (176 M€).

3.2 Fundamental Variables

As previously explained, fundamental variables will be used to distinguish value and growth stocks. For investors, the task of analyzing and reaching the value of a company by looking at financial statements can be exhausting. It is a common practice to compress extensive financial information into financial ratios to support investment decisions and quickly engage a potential value for a stock. Although achieving an accurate value is nearly impossible, those ratios simplify the process of determining the value of the company and appear as an extremely helpful tool to investors[12]. By using a variety of different ratios, we try to ensure that the study is not biased by country or industry characteristics. In figures 1 to 4 (in the Annexes) it is shown the development of the ratios during the period of study. Briefly, Spain and Ireland appear to be the

[12] Known as stock screening process, a technique in which the investor filters a large set of possible investments by separating according to a range of values for a predetermined set of variables.

countries with more value stocks when comparing with other countries as their average ratios in most cases is lower than the index average. Contrariwise, Greece distinguishes for its apparent growth factor.

3.2.1 Price to Earnings ratio

One of the most widely approach found in the literature, and popularized among investors, is to see the value of any asset as the multiple of the earnings that the asset generates. In this context, we see the value of a stock by the earnings it generates.

$$\frac{P}{E} = \frac{Market\ Price\ Per\ Share}{Earnings\ Per\ Share}$$

The ratio Price to Earnings represents the market value of a stock in relation to its earnings per share. This value is determined by the last closing price of the year divided by the Trailing twelve months EPS. Most of the studies point out that value stocks have low P/E whilst growth stock have high P/E. Although being the most used ratio in the financial industry, it has the disadvantage of being easily manipulated by accounting standards as well as not being useful when a company posts negative earnings.

3.2.2 Price to Book Value ratio

Price to book value ratio provides a relatively simple metric that can be used to analyze almost every stock in the market. Unlike P/E, P/B can be applied even to companies losing money and can be used as a much simpler benchmark to compare companies when there's a perception of earnings manipulation within markets. Typically, P/B is seen as an estimate of what would be left for equity holders if the company liquidated all its assets and paid its liabilities.

$$\frac{P}{B} = \frac{Market\ Price\ Per\ Share}{Book\ Value\ Of\ Equity\ Per\ Share}$$

Thus, P/B is the relation between the market value of equity to book value of equity. In order to calculate the book value, we subtract the company total liabilities and intangibles from total assets. Although the clear advantages of this ratio, there is a disadvantage. Similar to P/E, P/B its affected by accounting standards that vary widely across companies and its rules can affect balance sheet items which forge discrepancies of value among countries and industries. Stocks selling below the book value of equity have generally been considered good candidates to be undervalued (value stocks), while those selling for more than book value have been labeled as overvalued (growth stocks).

3.2.3 Price to Cash Flow ratio

Price to cash flow can be less subjected to accounting conventions when comparing to P/E and P/B because it measures actual cash, not paper or accounting profits. Cash plays a main role to ensure company's financial health to finance operations, invest in new opportunities and create long term sustainability.

$$\frac{P}{CF} = \frac{Market\ Price\ Per\ Share}{Cash\ Flow\ per\ Share}$$

The P/CF ratio is obtained by dividing the market value per share by the cash flow per share. Similar to other ratios, P/CF is more insightful when used to compare companies within the same industry. Every industry is different, requiring companies to be more or less capital intensive, which obviously will determine how much cash the business can generate. The

majority of the studies point out that value stocks have low P/CF whilst growth stocks have high P/CF.

3.2.4 Price to Sales ratio

Sales ratio is considered a reliable option to engage in a potential stock value because unlike the ratios mentioned before, which can turn out to be negative in some situations, sales are broadly available for young and even for the most troubled companies[13]. Thus, the potential for bias created by eliminating firms in the sample is far lower.

$$\frac{P}{S} = \frac{Market\ price\ Per\ Share}{Sales\ per\ Share}$$

The P/S is given by dividing the market value per share by the sales per share. The biggest disadvantage of looking merely to sales is that it can create a misconception of assigning high values to companies that are generating high revenue growth while not being profitable. Value stocks tend to trade at low P/S comparing to the high P/S visible in growth stocks.

3.3 Portfolio construction

To find the value premium we analyze the relationship between stock returns and fundamental variables at a portfolio level. Basu (1977) state that the generality of the companies publishes their financials at the end of March. For that reason, the best time to form the portfolio should be at the end of June for the stock price digest the information. I find a major problem applying this methodology due to the unavailability of gathering the ratios on that particularly

[13] Exceptions are more common on U.S stock market, where a large number Biotech/Pharmaceutical with of intensive R&D expenditure and null revenues go public.

date for all the countries. For our study sample, we were only able to obtain from the DataStream, trailing twelve months (TTM)[14] ratios for all the countries as at the beginning of each year, which implies that our portfolios are formed at the beginning of each year and considering the previous 3rd quarter results of the preceding year as a proxy to calculate the fundamental variables. Ball and brown (1968) indicate that even tough investors don't have access to the firm's financial statements, and exact earnings of the full year on 31 December, the market reacts as tough it possesses such information.

The portfolio construction process was based on Bauman, Conover and Miller (1999) approach, which divides the sample in four different portfolios. Extreme value (EV) portfolio consists in one-fourth of the sample with lowest multiple in study, value (V) portfolio consists in one-fourth of the sample with next highest multiple, growth portfolio (G) consists in one-fourth of the sample with next highest multiple and finally extreme growth portfolio (EG) consists in one-fourth of the sample with highest multiple. Within each portfolio, we equally weight all stocks and calculate returns using an annual buy-and-hold strategy. At the end of each year portfolios are rebalanced according to the established portfolio rules.

$$Ri = \frac{S1+S2+S3+\cdots+Sx}{n} \text{ , i = EV, V, G, EG}$$

Where,

R= Annual return of the portfolio

Sx= Return for stock x, x= 1,…,N

N= number of stocks in the portfolio

[14] Trailing Twelve Months (TTM) is the timeframe of the past 12 months used for reporting financial figures. A company's trailing 12 months is a representation of its financial performance for a 12-month period, but typically not at its fiscal year end. Since quarterly reports rarely report how the company has done in the past 12 months.

Since we will rebalance at the end of each year, and following Bauman, Conover and Miller (1999) approach, we will use geometric monthly returns. Portfolios are formed collectively and individually.

In the end, our calculations will allow us to determine which strategy generated the higher returns during the sample period, and which fundamental ratio has the strongest alpha on the portfolio.

4. Empirical Findings

4.1 Value premium in the PIIGS stock markets

In table III, we present a summary of the univariate analysis of average annual returns obtained by value and growth investment strategies described in the methodology section. When PIIGS are grouped as global portfolios and then sorted out by value and growth characteristics, a strong value premium is perceived. In eight comparison scenarios between value and growth portfolios, value exhibited superior returns in seven occasions (First row of Panel A and Panel B). The average annual return of value portfolios ranges from 29,32 % to 7,08 %, whereas P/CF and P/B portfolios originates the best and worst performance respectively. Contrariwise P/E and P/CF ratios originated the best and worst performances of growth portfolios, exhibiting monthly returns of 8,72 % and -3,50 % respectively. On a country basis, the higher returns for value portfolios are also noticeable. When "extreme" portfolios are formed by P/CF and P/S all the countries disclose a value premium. Once again P/CF portfolios stood up as the ratio providing better results even on a country level, which underlines the importance of this fundamental variable when accessing for investments opportunities. Value premium is also inherent for P/E and P/B portfolios for all the countries except Ireland, whereas growth achieved slightly higher returns. When 2nd (value) and 3rd (growth) quartile portfolios (Panel B) are formed, and compared, we notice that the value premium is less consistent, yet plausible. Fama and French

(1993), Porta, Lakonishok, Shleifer and Vishny (1997) found that as we move from the lower band to the upper band portfolios the returns tend to be lower and this explains the weaker value premium in middle quartiles, which is consistent with our results. In a statistical perspective, we find evidence to assume that EV and EG returns are not equal, P/B is statistical significant for Portuguese markets and P/CF is also statistical significant for PIIGS (as a global portfolio), Portugal, Italy, Greece and Spain. Similar results were previously discovered by Chan, Hamao, Lakonishok (1990) on the Japanese Market, where P/CF assumed as the most important variable to be considered when accessing for investment strategies in the Japanese Stock Market. While we refrain of delineating economic parallelisms, both regions, even in a different time frame, appear to take in account that "*cash is king*". One theoretical explanation for the performance of low P/CF portfolios could be that investors shifted to those low P/CF stocks during the turmoil of the U.S subprime and EU Debt crisis. Many profitable companies could have been in trouble because they weren't able to turn "*accounting profits*" into cash, and thus, in amid of this events, a safe haven for investors would be companies able to turn business into cash and survive the market instability, driving the stock price in a latter phase.

Heston and Rouwenhorst (1995) found that equally weighted portfolios tend to have higher average returns than value weighted in twelve European markets. Can this result be just a random coincidence? Moreover, Malkiel (1973) stated that *"a blindfolded monkey throwing darts at a newspaper's financial pages could select a portfolio that would do just as well as one carefully selected by experts*." Are the abnormal returns from value portfolios a product of a random investment strategy? In table IV we present a comparison between randomly selected portfolios and our value portfolios using a Monte Carlo approach. Once again, the findings indicate that by following an investment strategy based on value metrics, one could expect to outperform the market in most cases.

The superiority performance of portfolios based on low fundamental ratios set forth the presence of a value premium in the PIIGS stock market between 2003 to the end of 2015, and could be seen as a manifestation of a global anomaly (Fama, French 1998). Proved the existence of a value premium, it is yet crucial to understand if it can be seen as a compensation for risk.

4.2 Explaining Value premium

4.2.1 Test on Capital Asset Pricing Model (CAPM)

We turn next to examine to detail the historical risk and return of the portfolios for PIIGS portfolio. We restrict the main analysis by grouping all countries in one common region to increase diversification and to test CAPM at its best. Portfolios limited to individual countries are less diversified and would originate large idiosyncratic components (Harvey 1991), resulting in noisier tests. Thus, we test if CAPM hold to explain the value premium in PIIGS stock market.

$$Ri - F = \alpha + \beta i(M - F) + e \qquad (1)$$

The model tests the portfolio sensitivity to market risk, represented as beta (β) as well as the expected return of the market and the expected return of a theoretical risk free asset[15] (M-F). In this model context, portfolio risk is represented by the higher variance of returns, which means beta is considered as the predominant factor in rewarding the systematic risk. We construct a market portfolio based on all five markets and perform regressions of the extreme value and extreme growth portfolios excess returns[16] (portfolio return minus risk free asset (R-F)) on the market return (M-F). In a nutshell, if PIIGS market are efficient, the expected alpha of value and

[15] A zero-risk free rate was assumed for all calculations

[16] We restrict the analysis to 1st and 4th quartile (EV and EG) to simplify the visualization of the model results

growth portfolios should be 0 and therefore, the alpha coefficient can be an indicator of how an investment has performed after accounting for the incurred risk. If portfolios have an alpha lower than 0, the investment has not earned enough to compensate its risk, in the opposite if alpha is higher than 0, the investment has a return in excess of the reward for the assumed risk. An alpha of 0 would indicate that the model was accurate and the investment earned an adequate return for the risk taken.

Results from equation (1) are presented in Table V. The interceptions for extreme value and growth portfolios are at least 0,49% per month above zero, and -0,12% below zero, respectively. It's evident that CAPM do not show empirical evidence in its favor. The Jensen alpha (α) should be close to 0 if the model were able to explain the excess returns of value portfolios. However, the opposite is visible. As an example, for portfolio EV P/CF we obtained an alpha of 1,58 a beta of 1,22 and a R-squared of 0,89. The high R^2 points to the accuracy of the portfolio alpha and beta. The alpha of 1,58 indicates that the portfolio performance produced a monthly return of 1,56% higher than its beta would predict. Moreover, t-statistic coefficient of α is relatively high and statistically significant. The same applies for the remaining portfolios. Concluding, if we use the market portfolio return as our single independent variable, a big percentage of our dependent variable (α) remains to be explained. Thus, a two-factor ICAPM model might be pertinent.

4.2.2 Intertemporal Capital Asset Pricing (ICAPM)

We extend CAPM to a two-factor model proposed by Fama and French (1992), in attempt to fully understand the relationship between the fundamental variables, return and risk.

$$Ri \text{ - F= } \alpha + \beta \text{ [M-RF]} + c \text{ [L-H P/B]} + e(t) \qquad (2)$$

In this model, it is proposed that expected return of portfolios can be explained by the market return and the return of any other global factor. It's is proposed the addition of a value factor to see its impact in explaining alpha. C can be seen as an exposure of a portfolio to a certain value factor, in this case we assume the difference between returns of a low and high P/B global portfolios to be our second explanatory variable (L – H P/E, L – H P/CF and L – H P/S are used as well). By examining the results of equation (2) on Table V, we can notice a decrease on alphas and betas for most value portfolios resultant from adding the value factor to the model, which is a good signal, however the improvement verified is not yet significant to accept the model.

4.2.3 Fama and French Three Factor Model (3FF)

Fama and French (1993, 1996) proposed to extend the ICAPM model to a three-factor model (3FF):

$$R\text{-}F = \alpha + \beta\,[M\text{-}RF] + c\,[L\text{-}H\ P/B] + d\,[S\text{-}B] + e(t) \qquad (3)$$

To the previous two factor model, they add a size factor because in theory, small cap stocks outperform the market on a regular basis and should be responsible for a part of excess returns of value stocks. By adjusting the model with a small minus big size factor (S-B) they notice that the model would be more powerful and precise to evaluate a portfolio performance. This factor will be certainty helpful to our analysis as we noticed a large discrepancy in size in our study sample. The results of the model regressions are exhibited on table VI.

A small improvement is made in the explanation of the alfa, prevenient from the Small Minus Big factor as it is observable that value portfolios lean towards small stocks (expect P/S portfolios). However, this isn't enough to explain the value premium. In addition, EV P/S portfolio have a large alpha incompatible with its beta, which is below 1 and the lowest among

the sample. The same has been found with the previous models. By studying the different outputs of each models, we conclude the following: Firstly, our 1st and 2nd quartile portfolios are obviously more value oriented than the market, secondly, value stocks have outperformed growth stocks during our period of evaluation and for this reason, the alpha found in CAPM is highly overestimated. In the light of this facts, we tried to control alpha for value and size biases to obtain a more refined measure of excess return. While ICAPM and 3ff slightly improved the explanatory factor of some portfolios it failed for others.

At the end, value premium in this region appears to be too large to be explained by traditional asset pricing models.

4.3 Performance review and other remarks

Table VII summarizes the performance measures for each portfolio followed by a graphical cumulative return of value and growth strategies from 2003 until 2015 (figures 5 to 8). Inter-quartile range shows how the ratios vary for each investment strategy. We then calculate average returns and compare it to the market portfolio of our study sample. A T-statistic test is performed for every portfolio to understand the significance of returns of the portfolios with the market portfolio. We then analyze return provided per unit of risk using different risk measures such as volatility, Sharpe and Treynor. In addition, for each panel, we present the average values of the other fundamental variables. Some observations are pertinent and need to be discussed with particular care. Firstly, by observing the pattern of the returns one can state that returns of portfolios constructed by value metrics earn more than portfolios constructed by growth metrics (as discussed extensively before). Furthermore, the returns appear to decline as one moves from value to growth portfolio. Analyzing the different ratios of each portfolio we find that various variables are in some degree correlated. For instance, portfolios with low P/E tend to have lower P/B and P/CF, whilst having higher P/S. Inversely portfolios with high P/E tend to have higher

P/E and P/CF, whilst having lower P/S. A portfolio combining a double screener, this is, a portfolio screening stocks that simultaneously are in the 1st quartile of P/S and P/CF sample would retrieve an outstanding annualized return of 53,58%, way above the results observed in our portfolios. In terms of performance adjusted to risk, once again P/CF stands out from the remaining competition by revealing the best Sharpe ratio (1,21) and the highest Treynor Ratio (24,07).

5.1 Conclusion

Academic research has proven that value stocks tend to have higher returns than growth stocks in international markets. This value premium has been explained differently among the academia. Some studies point that the higher returns of value stocks are a mere compensation for their increased risk, while other studies reject this hypothesis and attribute the result to investor behaviorist reactions in the stock markets. The objective of this research was to add further evidence on the value premium in PIIGS region, where little research was made before and to evaluate the riskiness of the value and growth strategies using CAPM model, and some of its variations.

Our main findings are summarized as follows. Firstly, by constructing value and growth portfolios based on P/E, P/B, P/CF and P/S ratios we show that, from 2003 to 2015, a strong value premium prevailed. Statistical evaluations indicate that P/CF and P/B are the most relevant ratios, for all the countries, expect Ireland where we notice a mixed manifestation towards value and growth. Secondly, we then proceeded to evaluate the risk and return of global PIIGS portfolio. We suggest that the superiority risk adjusted of value P/E, P/B, P/CF and P/S portfolios are a market anomaly in the PIIGS region that can´t be explained by some of the most common asset pricing models. Thus, a set of hypothesis emerge: either those asset pricing

models are misspecified and further variables need to be added, or, information provided by the fundamental ratios used in this study were not fully reflected on the stock prices through the time, as suggested by the semi-strong form of the EMH. Subscribers of efficiency hypothesis can argue that the models used should be adapted to the region in study and other variables should have been examined. Subscribers of the inefficiency hypothesis can argue that the outperformance is explained by the actions of market participants that cause the stocks to be mispriced. While this is a preliminary study on this region and set of puzzles are still to be solved, we can state that fundamental variables carry valuable information and should be considered by investors when forming/revising its portfolios. In the end, one thing is certain, value premium is out there to be found.

5.2 Limitations

Some characteristics of this research have limitations and are noteworthy to be mentioned, reflected and discussed. In a practical perspective, a major flaw is the quality of the database. For several companies the database retrieved its ratios but not the stock prices. This restrained us to calculate its returns and to include those companies on the respective portfolios. In a theoretical perspective, the selected period frame is relatively short. Other aspect related to the database is that it doesn't include delisted companies during the period of study causing a survivorship bias Furthermore, the selected period frame is relatively short (the research covers 2003 to 2015, a period characterized by high volatility resultant from 2007 financial crisis and 2012 European debt crisis). This events might have biased our findings in some degree. Another limitation is that we don't consider transaction costs when constructing the portfolios. If those strategies would have been put in practice the cost factor would have a tremendous impact on the alpha as a lot of purchases and sales are made during the period. Finally, it's important to

distinguish theoretical and practical value and growth investing. In empirical studies, it is a common practice to use quantitative measures to formulate and answer research questions. While quantitative measures are indeed important in formulating investment strategies, other factors play an important role as well. For instance, qualitative measures are disregarded in our research because they are hard to measure but we do acknowledge that those measures are the base foundation of both value and growth strategies, and so, this research shouldn't not be seen as the one, and only one explanation of the performance of both strategies, but it should be seen as a complementary source to explain it.

5.3 Further research

The main suggestion goes towards the continuation of the present study using succeeding models such as the Carhart (1997) four-factor model (includes a momentum factor) and Fama and French (2015) five-factor model (includes profitability and investment factors).

Furthermore, we suggest to extend the period in study in order to observe patterns in the behavior of value and growth returns, which would be useful to understand if the value premium is period dependent. Moreover, most studies construct portfolios based on a single ratio, thus it would be interesting to see the results of combining different ratios when constructing portfolios.

Considering we followed an asset pricing perspective, it would be pertinent to compare our study with a behaviorist perspective. Thus, a comparative approach would allow us to understand the behavior of value and growth stocks to micro level events such as quarterly results, sales guidance's, analysts price targets updates, and macro level events such as, central bank monetary announcements or economic data publications (GDP and CPI estimates for example).

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Annexes

Table I

International evidence on value premium

International evidence

Author	Period	Country	Indicators	Main findings
Basu (1977)	1957-1971	U.S	P/E	Low P/E had on average, earned higher absolute and risk-adjusted rates of return than the high P/E stocks.
Rosenberg, Reid and Lanstein (1985)	1980-1984	U.S	P/B	Reports the statistically significant abnormal performance of low P/B strategy.
Chan, Hamao, Lakonishok (1990)	1971 -1988	Japan	P/B, CFY, EY, Size	Significant relationship between fundamental variables and expected returns in the Japanese market. OF the four fundamental variables considered, the P/B and P/CF yield the most significant value premium.
Fama and French (1992)	1963-1990	U.S	P/B , P/E , Size	Value tends to have higher returns than growth in markets over the world.
Capaul, Rowley, Sharpe (1993)	1981-1992	France, Switzerland, Germany, US , UK , Japan	P/B, P/E	Existence of value premium in each country, absolutely and after risk adjustment.
Bauman and Miller (1997)	1975-1995	U.S	P/E ,P/B, P/CF, Earnings growth	Value stocks evince favorable investment performance.
Arshanapalli ,coggin,doukas (1998)	1975-1996	U.S , Canada, Europe, , Norway, Sweden, Australia,Hong Kong, Japan, Malaysia, Singapore	P/E ,P/B, P/C, DY	Value stocks outperform growth stock, on average, in most countries. Value is not fundamental riskier.
Gonenc, Karan (2003)	1993-1998	Turkey	P/B, Size	Growth portfolios have superior performance over value portfolios but neither value nor growth investment strategies show superior performance over the national market index.
Yen , Sun, Yan (2004)	1975-1997	Singapore	P/B , P/E, P/CF	Value premium exists using every indicators, however it may not persist in long horizons.
Duque and Almas (2008)	1993-2003	Paris, Amsterdam, Brussels, and Lisbon	P/B, ALTZ, FSCORE	The results convincingly demonstrate that investors can use relevant historical information to eliminate firms with poor future prospects from a generic high B/M portfolio.
Athanassakos (2009)	1985-2005	Canada	P/E , P/B	P/E based search process did a better job of identifying value stocks and arriving at more consistent and sizeable value premium than did a search process based on P/BV.
Spyrou, Kassimatis (2009)	1982-2005	Europe	P/B	Existence of value premium but not significant.
Fama, French (2012)	1989-2011	America , Europe, japan	P/B, Size	Value premium persists in each region. Value premium is larger for small stocks in all countries,except Japan.

Table II

Characteristics of country samples

Table II presents the number of companies (N) extracted from DataStream database for the PIIGS globally, and individually from the beginning of 2003 until 2015. (MV) represents the average market capitalization in millions of EUR. (Avg.) is the average of N and MV for all years.

	PIIGS		Portugal		Italy		Ireland		Greece		Spain	
Year	N	MV	N	MV	N	MV	N	MV	N	MV	N	MV
2003	407	738	38	578	120	984	13	775	160	154	76	1654
2004	418	915	39	720	123	1219	13	918	166	179	77	2115
2005	431	1102	40	864	128	1472	14	984	171	194	78	2628
2006	443	1237	41	894	136	1530	14	1303	174	248	78	3101
2007	461	1556	42	1127	147	1698	16	1661	174	310	82	4144
2008	493	1582	45	1133	161	1547	19	1255	177	367	91	4296
2009	507	885	46	610	167	803	19	604	184	158	91	2701
2010	515	1064	46	828	170	1040	19	835	187	162	93	3082
2011	530	989	47	777	174	1028	19	987	189	113	101	2658
2012	542	850	47	666	179	828	19	982	189	64	108	2317
2013	555	893	48	613	185	866	19	1401	189	92	114	2298
2014	575	1130	49	727	202	1106	20	1787	189	135	115	2867
2015	608	1117	50	618	224	1063	22	2025	190	112	122	2825
Avg.	499	1081	44	781	163	1168	17	1194	180	176	94	2822

Table III

Univariate analysis of returns and fundamental variables for PIIGS portfolios

At the beginning of each year, from 2003 and 2015, we construct portfolios based on values of P/E, P/B, P/CF, P/S. Value portfolios include firms whose ratio are among 1st and 2nd quartile and are identified as EV (extreme value) and V (value) respectively. Growth portfolios are identified by EG (extreme growth) and G (growth), including ratios of 3rd and 4th quartile respectively. The first row for each country represents the annualized average returns of the portfolios, the second is the standard deviation of the returns (in parenthesis). We subtract growth returns to value portfolios to identify the value premium and perform a t-statistic test [in brackets the p-value]. Panel A represents 1st and 4th quartile, Panel B 2nd and 3rd quartile.

Panel A - Extreme Value and Extreme Growth portfolios

	P/E			P/B			P/C			P/S		
	EV	EG	EV-EG	EV	EG	EV-EG	EV	EG	EV-EG	EV	EG	EV-EG
PIIGS	13.55	3.98	9.57	18.44	-0.02	18.46	29.32	-3.5	32.82	13.62	-0.81	14.43
	(23.59)	(18.68)	[0.29]	(26.43)	(17.69)	[0.06]	(23.86)	(18.99)	[0.001]	(18.44)	(23.55)	[0.10]
Portugal	19.64	0.14	19.5	59.67	-0.41	60.09	54.43	0.72	53.7	18.92	4.64	14.28
	(35.78)	(22.47)	[0.13]	(52.49)	(22.34)	[0.003]	(52.21)	(24.63)	[0.008]	(21.48)	(41.67)	[0.32]
Italy	10.48	8.14	2.34	12.37	-2.51	14.88	21.29	-3.76	25.05	9.44	-3.47	12.91
	(20.91)	(18.24)	[0.77]	(20.91)	(20.15)	[0.06]	(22.47)	(19.64)	[0.003]	(18.76)	(22.09)	[11.23]
Ireland	18.02	18.93	-0.91	23.86	27.6	-3.74	29.05	8.78	20.26	29.69	14.66	15.03
	(33.86)	(26.12)	[0.95]	(34.51)	(22.03)	[0.79]	(28.45)	(25.18)	[0.10]	(26.03)	(30.02)	[0.26]
Greece	23.35	-1.82	25.17	22.31	-5.26	27.57	35.89	-5.61	41.5	15.15	-4.14	19.29
	(44.79)	(26.45)	[0.12]	(39.76)	(26.38)	[0.06]	(38.96)	(27.29)	[0.006]	(27.48)	(37.27)	[0.16]
Spain	11.36	8.83	2.52	15.04	1.39	13.64	23.42	2.24	21.17	13.71	2.19	11.51
	(20.83)	(20.30)	[0.77]	(23.8)	(17.67)	[0.12]	(21.92)	(20.94)	[0.025]	(20.46)	(24.77)	[0.24]

Panel B - Value and Growth portfolios

	P/E			P/B			P/C			P/S		
	V	G	V-G	V	G	V-G	V	G	V-G	V	G	V-G
PIIGS	7.4	8.72	-1.32	7.08	3.38	3.7	11.15	5.12	6.03	11.62	4.34	7.28
	(19.03)	(18.04)	[0.86]	(20.45)	(18.42)	[0.65]	(19.39)	(19.20)	[0.46]	(19.53)	(21.64)	[0.40]
Portugal	9.89	9.92	-0.13	5.39	-1.27	6.66	8.47	6.9	1.57	14.75	9.12	5.63
	(21.76)	(23.91)	[1.00]	(20.65)	(22.30)	[0.33]	(19.22)	(21.49)	[0.85]	(29.21)	(28.59)	[0.66]
Italy	8.83	7.44	1.39	7.77	3.72	4.05	11.70	2.98	14.68	8.38	4.29	4.09
	(17.20)	(18.03)	[0.85]	(19.78)	(18.61)	[0.60]	(18.98)	(17.43)	[0.25]	(18.98)	(20.75)	[0.61]
Ireland	21.62	28.98	-7.36	21.01	16.41	4.59	25.34	19.25	6.09	23.54	13.38	10.16
	(24.99)	(20.81)	[0.50]	(27.14)	(21.08)	[0.68]	(25.26)	(22.33)	[0.59]	(29.43)	(26.17)	[0.42]
Greece	4.01	5.60	-1.59	2.29	0.38	1.91	11.14	-0.63	11.77	10.44	3.18	7.26
	(29.58)	(31.15)	[0.9]	(31.30)	(28.95)	[0.88]	(30.92)	(28.64)	[0.33]	(28.56)	(32.08)	[0.57]
Spain	13.99	7.44	6.55	9.3	8.45	0.85	14.54	7.73	6.81	8.11	8.53	-0.42
	(17.07)	(17.42)	[0.37]	(19.28)	(18.63)	[0.92]	(17.55)	(17.37)	[0.37]	(17.93)	(19.49)	[0.96]

Table IV

Comparison between value and random selected portfolios

We use Monte Carlo approach to randomly attribute stocks to 1st, 2nd,3rd and 4th quartiles. We simulate one hundred random portfolios (per country) with similar amount of companies as the portfolios in the study sample. We compare the annual average returns of Extreme value (EV) and Value (V) portfolios with the random portfolios (RP). We denote (N) as the number of times that value portfolios outperform the random portfolios.

P/E				
	EV - RP	N	V - RP	N
PIIGS	0,07	100/100	0,01	80/100
Portugal	0,07	92/100	-0,03	32/100
Italy	0,07	100/100	0,05	100/100
Ireland	-0,02	40/100	0,02	63/100
Greece	0,18	100/100	-0,02	23/100
Spain	0,03	91/100	0,06	99/100

P/B				
	EV - RP	N	V - RP	N
PIIGS	0,12	100/100	0,01	72/100
Portugal	0,47	100/100	-0,08	9/100
Italy	0,08	100/100	0,04	99/100
Ireland	0,04	76/100	0,01	57/100
Greece	0,17	100/100	-0,03	4/100
Spain	0,07	100/100	0,01	80/100

P/C				
	EV - RP	N	V - RP	N
PIIGS	0,23	100/100	0,05	100/100
Portugal	0,41	100/100	-0,05	23/100
Italy	0,17	100/100	0,08	100/100
Ireland	0,09	96/100	0,06	82/100
Greece	0,30	100/100	0,05	100/100
Spain	0,16	100/100	0,07	100/100

P/S				
	EV - RP	N	V - RP	N
PIIGS	0,07	100/100	0,05	100/100
Portugal	0,41	87/100	0,02	56/100
Italy	0,06	100/100	0,04	100/100
Ireland	0,10	98/100	0,04	75/100
Greece	0,09	100/100	0,05	97/100
Spain	0,06	99/100	0,00	56/100

Table V

Test on CAPM and two factor regression ICAPM to explain value premium in the PIIGS region from 2003 until 2015

Monthly returns are used to perform the regressions. M is the global market portfolio return, F is the one-month risk free asset rate, and R is the PIIGS portfolio return to be explained. Portfolios are formed based on P/E, P/B, P/CF and P/S as described in Table III. We designate value (low) and growth (high) by a leading L or H, the difference between them is L – H. Panel A describes regressions of the one factor CAPM model, using excess market return (M-F), and a two factor ICAPM model using the latter factor plus the Price to book Value – Growth return c (L – H P/B) to explain the excess returns on value and growth portfolios. Panel B condense the regressions done using other ratios (L – H P/E, L – H P/CF, L – H P/S) as explanatory variables. The method of estimation is ordinary least squares.

Panel A

	R- F= α + β[M-RF] +e(t)					R- F= α + β[M-RF] + c [L-H P/B] + e(t)							
R - F	α	β	t (α)	R^2	s (e)	a	β	c	t (α)	t (b)	t (c)	R^2	s (e)
EV P/E	0,49	1,21	2,63	0,89	0,02	0,24	1,11	0,20	1,37	30,05	5,12	0,91	0,02
EV P/B	0,78	1,35	3,35	0,86	0,03	-	-	-	-	-	-	-	-
EV P/CF	1,58	1,22	7,78	0,87	0,03	1,16	1,05	0,35	6,87	29,65	9,29	0,92	0,02
EV P/S	0,63	0,93	4,98	0,91	0,02	0,78	0,98	-0,13	6,37	38,56	-4,70	0,92	0,01
EG P/E	-0,12	0,94	-1,05	0,92	0,01	0,03	1,00	-0,13	0,26	42,54	-5,04	0,93	0,01
EG P/B	-0,42	0,87	-3,10	0,89	0,02	-	-	-	-	-	-	-	-
EG P/CF	-0,76	0,96	-6,47	0,93	0,01	-0,55	1,04	-0,17	-5,27	48,08	-7,52	0,95	0,01
EG P/S	-0,65	1,22	-3,73	0,90	0,02	-0,93	1,11	0,23	-5,75	32,92	6,44	0,92	0,02

Panel B

Explanatory variable		Avg (α)			Avg (β)			Avg (c)			Avg	
1	2	All	Value	Growth	All	Value	Growth	All	Value	Growth	R^2	s (e)
M-F	-	0,19	0,87	-0,49	1,09	1,18	1,02	-	-	-	0,90	0,02
M-F	[L - H P/E]	0,14	0,86	-0,58	1,07	1,10	1,03	0,09	0,23	-0,06	0,91	0,02
M-F	[L - H P/B]	0,12	0,73	-0,48	1,05	1,05	1,05	0,06	0,14	-0,02	0,92	0,02
M-F	[L - H P/C]	-0,07	0,14	-0,28	1,07	1,11	1,02	0,08	0,21	-0,05	0,93	0,02
M-F	[L - H P/S]	0,34	1,38	-0,69	1,04	1,08	1,02	-0,07	-0,33	0,20	0,91	0,02

Table VI

Test on Fama and French three factor model to explain value premium in the PIIGS region from 2003 until 2015

Monthly returns are used to perform the regressions. M is the global market portfolio return, F is the one-month risk free asset rate, and R is the PIIGS portfolio return to be explained. Portfolios are formed based on P/E, P/B, P/CF and P/S as described in in Table III. We designate value (low) and growth (high) by a leading L or H, the difference between them is L – H. Panel A describes regressions of Fama and French three factor model, using excess market return (M-F), plus the Price to book Value – Growth return c (L – H P/B) and the size effect d (S-B) to explain the excess returns on value and growth portfolios. Panel B condense the regressions done using the other ratios (L – H P/E, L – H P/CF, L – H P/S) as explanatory variables. The method of estimation is ordinary least squares.

Panel A

	R- F= α + β[M-RF] + c [L-H P/B] + d [S-B] e(t)									
R-F	α	β	c	d	t(a)	t(b)	t(c)	t(d)	R^2	s(e)
EV P/E	0,20	1,11	-0,05	0,25	1,13	29,99	-1,15	4,41	0,91	0,02
EV P/B	-	-	-	-	-	-	-	-	-	-
EV P/CF	1,01	1,04	-0,19	0,53	6,32	31,76	-5,17	10,73	0,93	0,02
EV P/S	0,78	0,99	-0,01	-0,12	6,20	38,39	-0,22	-3,13	0,92	0,01
EG P/E	0,04	1,00	0,01	-0,14	0,34	42,40	0,45	-3,86	0,93	0,01
EG P/B	-	-	-	-	-	-	-	-	-	-
EG P/CF	-0,55	1,04	-0,01	-0,17	-5,22	47,87	-0,30	-5,06	0,95	0,01
EG P/S	-0,94	1,11	-0,01	0,24	-5,68	32,77	-0,25	4,69	0,92	0,02

Panel B

Explanatory variable			Avg (α)			Avg (β)			Avg (c)			Avg (d)			Avg	
1	2	3	All	Value	Growth	All	Value	Growth	All	Value	Growth	All	Value	Growth	ave R^2	ave s(e)
M-F	-	-	0,19	0,87	-0,49	1,09	1,18	1,02	-	-	-	-	-	-	0,90	0,02
M-F	L - H P/E	SMB	0,14	0,85	-0,57	1,06	1,07	1,05	0,02	0,10	-0,05	0,08	0,18	-0,03	0,93	0,02
M-F	L - H P/B	SMB	0,09	0,66	-0,48	1,05	1,05	1,05	-0,04	-0,08	0,00	0,10	0,22	-0,02	0,93	0,02
M-F	L - H P/C	SMB	-0,05	0,22	-0,31	1,06	1,08	1,03	0,03	0,09	-0,04	0,07	0,16	-0,03	0,94	0,02
M-F	L - H P/S	SMB	0,32	1,24	-0,59	1,07	1,13	1,00	0,02	0,13	-0,09	-0,05	-0,26	-0,02	0,93	0,02

Table VII

Performance Measures and related summary statistics

We denote (Q) by the range criteria used to construct each portfolio, by (ri) the annualized average rate of returns, by (ri-rm) the difference between portfolio returns and the market portfolio, by (rp,rp) a t statistic test between the returns of portfolio and the market portfolio returns, by (σ) a statistical measure of the dispersion of returns, by (β) the coefficient of the OLS regression , by (S) a measure of the excess return per unit of deviation (ri-rf /σ), and by (T) a measure for returns that exceed the risk free rate per each unit of market risk (ri/β), and by (Avg. P/E, Avg. P/B , Avg. P/CF, Avg. P/S, Avg. Size) the fundamental characteristics underlying each portfolio.

Panel A - P/E Portfolios

	EV	V	G	EG
Inter-quartile range (Q)	0 - 10,48	10,48-15,34	15,34-25,05	>25,05
Avg. annual rate of return (ri)	13,55	7,40	8,72	3,99
Avg. annual excess return (ri - rm)	7,66	1,51	2,84	-1,90
T - statistic test (rp,rm)	0,40	0,85	0,71	0,80
Volatility (σ)	23,87	19,04	17,78	18,15
Systematic risk (β)	1,21	0,97	0,96	0,94
Sharpe ratio (S)	0,57	0,39	0,49	0,22
Treynor ratio (T)	11,19	7,66	9,09	4,25
Avg. P/E	7,04	12,63	19,16	63,79
Avg. P/B	1,70	1,76	2,52	2,69
Avg. P/C	8,94	9,38	11,77	18,09
Avg. P/S	4,92	3,13	2,82	2,75
Avg. Size	1311	2179	1866	1353

Panel B - P/B Portfolios

	EV	V	G	EG
Inter-quartile range (Q)	0-0,74	0,74-1,27	1,27-2,18	>2,18
Avg. annual rate of return (ri)	18,45	7,09	3,38	-0,03
Avg. annual excess return (ri - rm)	12,56	1,20	-2,51	-5,92
T - statistic test (rp,rm)	0,21	0,88	0,74	0,41
Volatility (σ)	26,97	20,50	18,03	17,16
Systematic risk (β)	1,35	1,05	0,92	0,87
Sharpe ratio (S)	0,68	0,35	0,19	-0,002
Treynor ratio (T)	13,68	6,73	3,68	-0,03
Avg. P/E	17,48	23,89	27,42	32,25
Avg. P/B	0,50	1,01	1,66	5,83
Avg. P/C	9,54	9,96	13,63	19,32
Avg. P/S	6,66	4,88	2,89	3,74
Avg. Size	97	754	1447	2382

Panel C - P/CF Portfolios

	EV	V	G	EG
Inter-quartile range (Q)	0-4,53	4,53-7,38	7,38-12,7	>12,7
Avg. annual rate of return (ri)	29,32	11,15	5,13	-3,51
Avg. annual excess return (ri - rm)	23,44	5,27	-0,76	-9,39
T - statistic test (rp,rm)	0,018	0,514	0,922	0,203
Volatility (σ)	24,28	19,52	18,88	18,54
Systematic risk (β)	1,22	1,00	0,93	0,96
Sharpe ratio (S)	1,21	0,57	0,27	-0,19
Treynor ratio (T)	24,07	11,20	5,52	-3,65
Avg. P/E	18,43	20,55	24,47	39,54
Avg. P/B	1,16	1,60	2,24	3,29
Avg. P/C	2,97	5,89	9,69	33,80
Avg. P/S	7,66	3,49	2,72	3,52
Avg. Size	1275	2064	1117	1023

Panel D - P/S Portfolios

	EV	V	G	EG
Inter-quartile range (Q)	0-0,70	0,70-1,69	1,69-4,01	>4,01
Avg. annual rate of return (ri)	13,62	11,62	4,34	-0,82
Avg. annual excess return (ri - rm)	7,74	5,74	-1,54	-6,71
T - statistic test (rp,rm)	0,32	0,47	0,85	0,44
Volatility (σ)	18,04	19,24	21,68	23,94
Systematic risk (β)	0,93	0,97	1,12	1,22
Sharpe ratio (S)	0,76	0,60	0,20	-0,03
Treynor ratio (T)	14,72	11,96	3,86	-0,67
Avg. P/E	35,48	23,76	21,71	20,11
Avg. P/B	3,29	2,02	1,67	1,99
Avg. P/C	18,81	12,38	11,04	9,48
Avg. P/S	0,39	1,23	2,76	15,42
Avg. Size	1657	1665	818	317

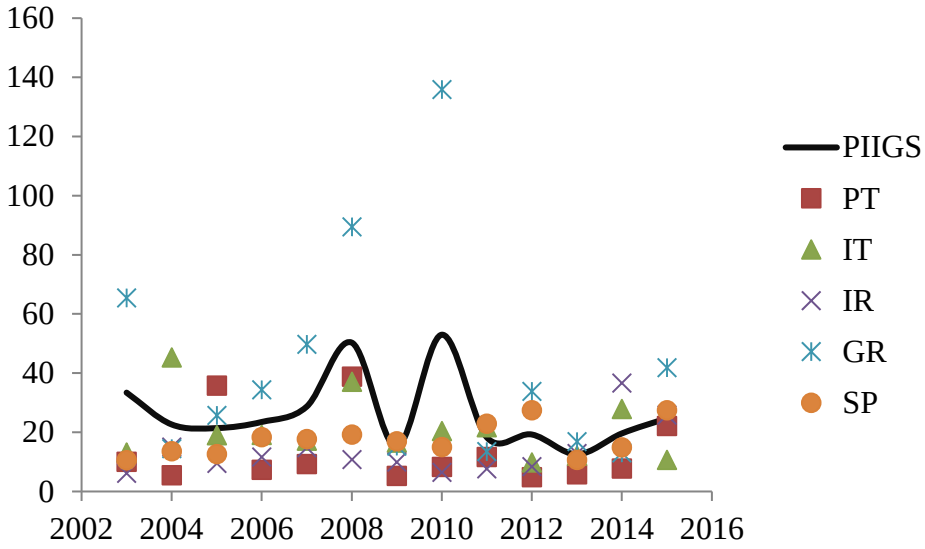

Figure 1 - Average Price to Earnings from 2003 to 2015

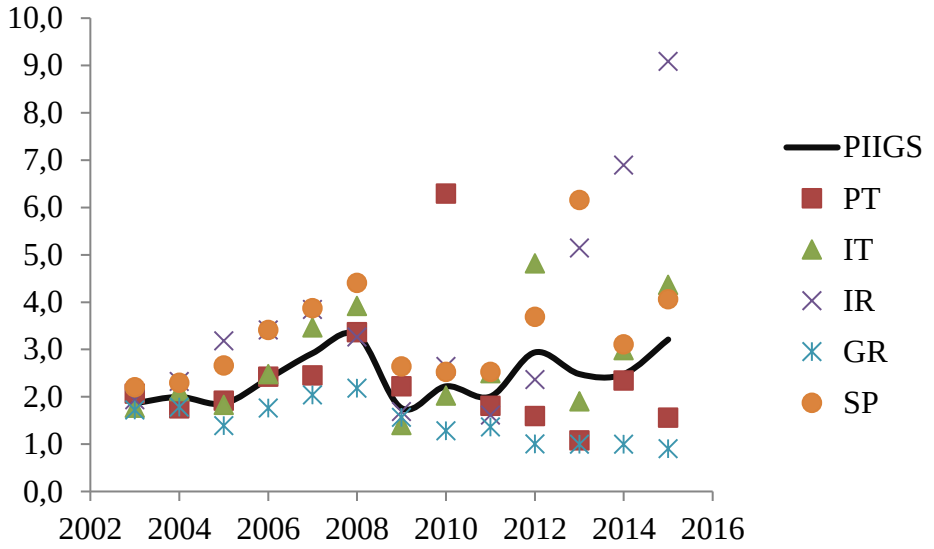

Figure 2- Average Price to Book value from 2003 to 2015

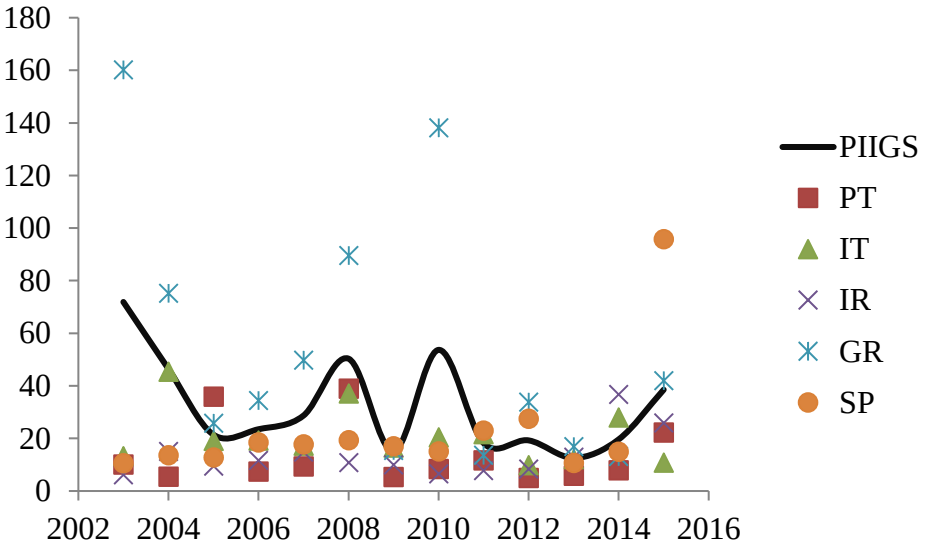

Figure 3 - Average Price to Cash Flow from 2003 to 2015

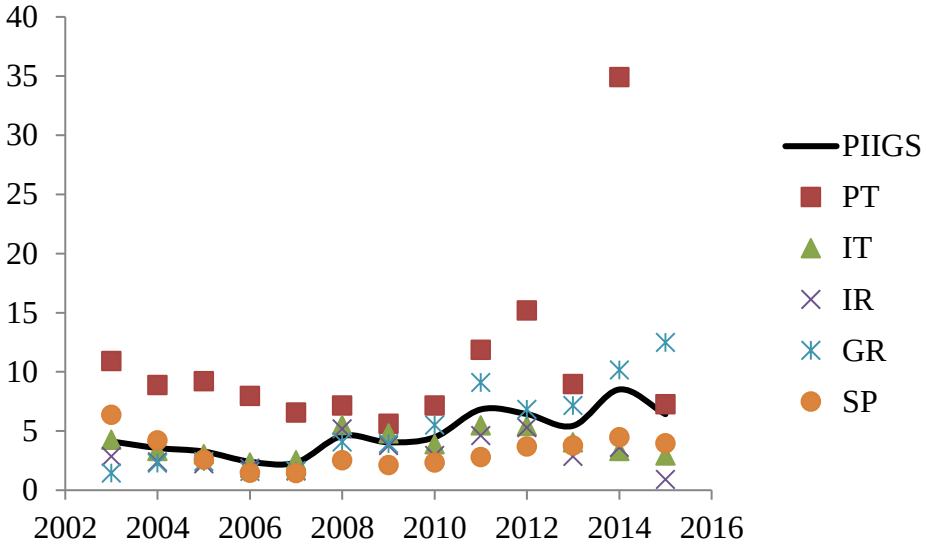

Figure 4- Average Price to Sales from 2003 to 2015

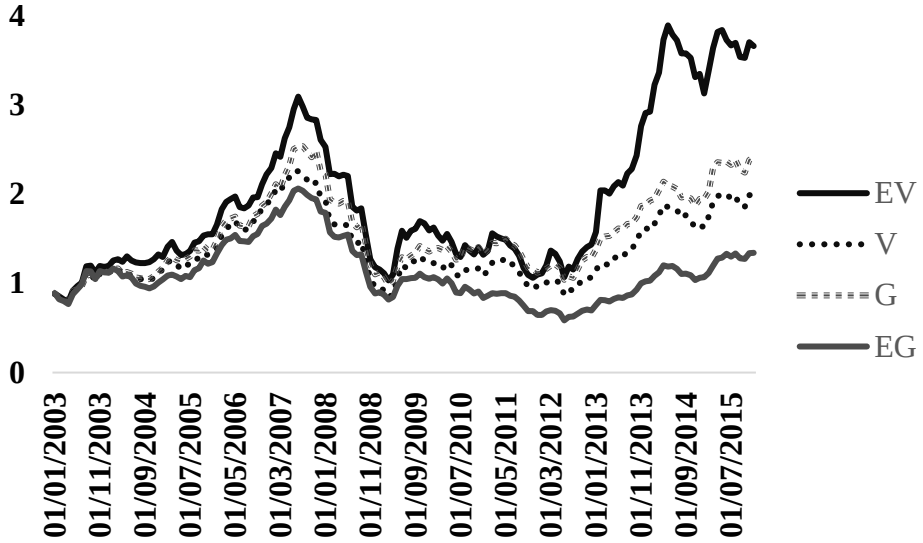

Figure 5 - Cumulative Performance of P/E strategies

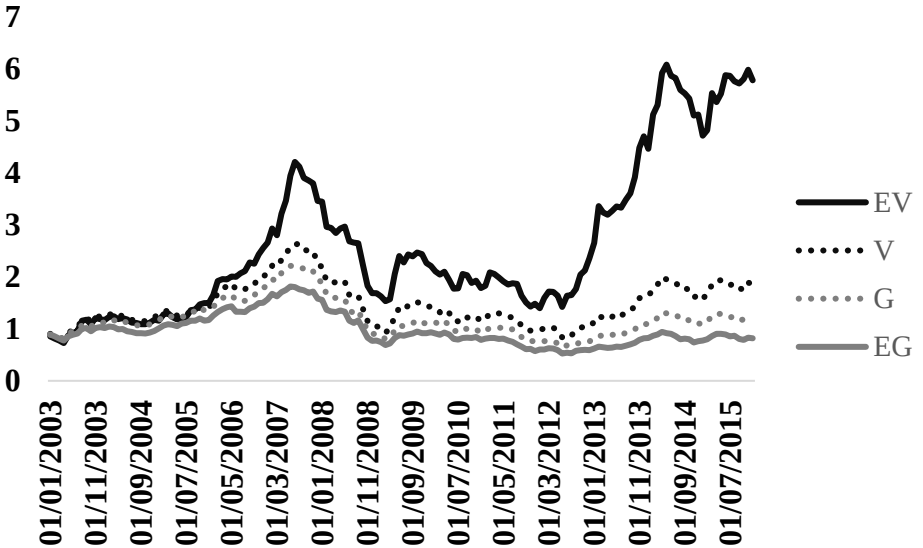

Figure 6- Cumulative Performance of P/B strategies

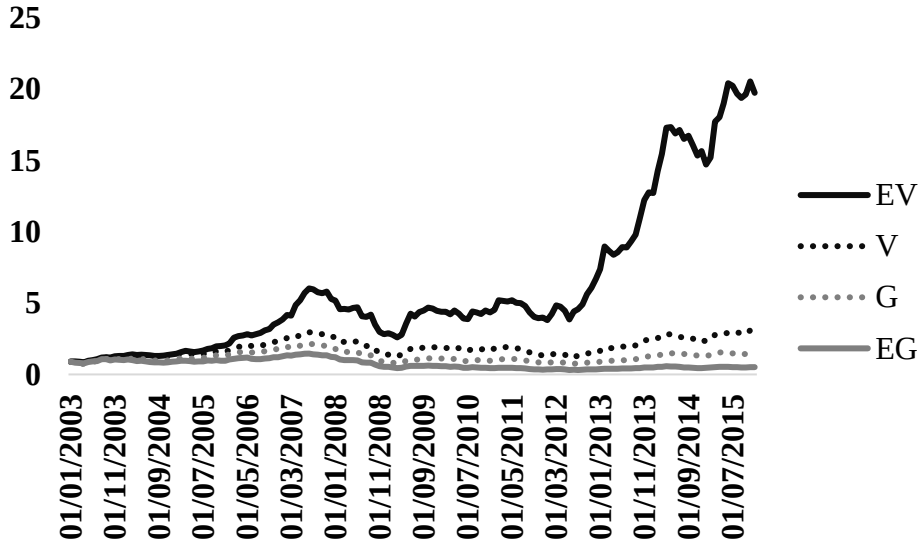

Figure 7 - Cumulative Performance P/CF strategies

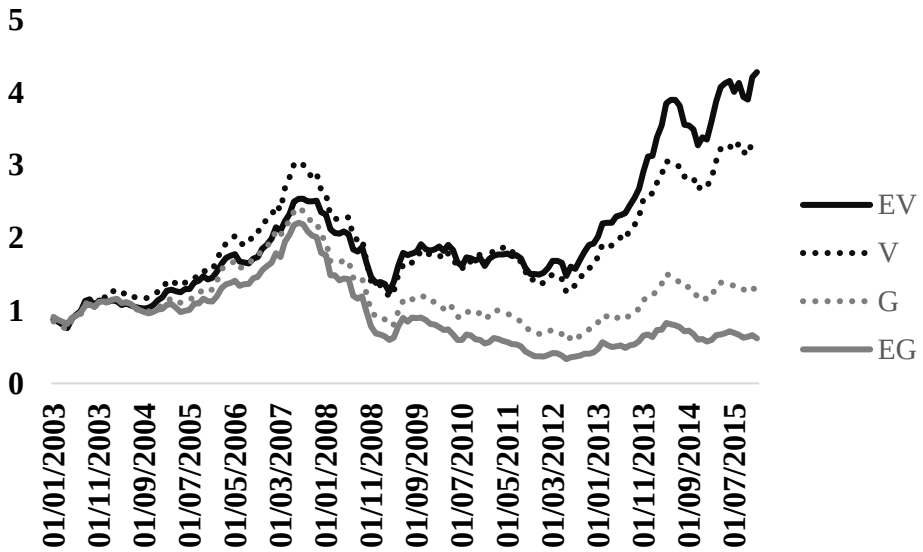

Figure 8 - Cumulative Performance of P/S strategies