Analysis of European Institutional Preferences for Stock Characteristics

By

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Biographical notes

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Abstract

We analyze the equity portfolio composition of investment funds of 15 European countries. We find that these institutions tend to prefer larger, more liquid, high dividend, low volatility stocks that belong to the main stock market indices. These results are consistent with previous studies that analyze institutional preferences for stock characteristics. These results are also consistent with theories of "prudent" behavior by institutions and are robust to factors such as funds within sample with small numbers of stocks and to funds with unusually large holdings relative to the number of outstanding shares of a single company. We also compare institutional preferences between sub-groups of funds. We find no relevant differences between the stock preferences of funds from PIIGS countries (Portugal, Ireland, Italy, Greece and Spain) versus those of funds from the other countries; also, no significant differences between different fund investment styles; and also, no relevant differences between preferences before and during the advent of the recent financial crisis in Europe. We also find similar preferences between funds located in countries that adopted the Euro and funds from the other countries, except for the variable stock price. Additionally, we find that funds that are more inclined to invest in the long-term exhibit more evident behaviors of "prudence" than funds more focused on the short-term.

Resumo

Nesta dissertação, analisamos a composição das carteiras de ações dos fundos de investimento de 15 países Europeus. Concluímos que estas instituições tendem a preferir ações de empresas de maior dimensão, com maior liquidez, com dividendos elevados, em que as ações têm baixa volatilidade e pertencem aos principais índices bolsistas. Estes resultados estão em concordância com estudos anteriores que analisam as preferências dos fundos quanto às características das ações. Estes resultados estão também em concordância com teorias de comportamento "prudente" por parte das instituições e mantêm-se robustos face a fatores como a existência na amostra de fundos com um baixo número de posições e fundos que detêm posições anormalmente elevadas relativamente ao número de ações em circulação de uma empresa.

Nesta investigação, também comparamos as preferências entre subgrupos de instituições. Não encontramos diferenças significativas entre as preferências dos fundos dos países intitulados "PIIGS" (Portugal, Irlanda, Itália, Grécia e Espanha) e as dos fundos dos restantes países; também não encontramos diferenças relevantes entre diferentes estilos de investimento por parte dos fundos; e também não encontramos diferenças significativas entre as preferências antes e durante a crise financeira que afetou a Europa nos últimos anos. Por outro lado, os nossos resultados são similares entre os fundos localizados em países que adotaram o Euro e os localizados nos outros países, salvo relativamente à variável preço das ações. Adicionalmente, os nossos resultados sugerem que os Fundos de Investimento mais predispostos a investir em horizontes de longo prazo tendem a demonstrar comportamentos mais "prudentes" do que os fundos mais focados em prazos mais curtos.

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1. Introduction

The equity market has seen a dramatic shift in the profile of the typical investor. In 1950, more than 90% of the total U.S. equity market was controlled by individuals (Friedman, 1996). Institutions, like banks, pension funds, mutual funds, insurance companies and others owned a very small fraction of the market. Meanwhile, as time progressed, a considerable growth in institutional ownership took place. Portfolios under management by institutions gradually became larger, assuming more than 50% of the total U.S. equity market in the 1990's (Friedman, 1996). This trend of growing institutional ownership has since then continued, and in recent years has allowed institutions to further reinforce their dominating position. In 2008, assets under management by institutions were reported at 68% of total managed assets (Blume and Keim, 2011) and volume traded on exchanges by institutions is estimated to account for 70% of total traded volume (Schwartz and Shapiro, 1992).

This progressive growth in institutional dominance has increased the need for research on institutional activity, institutional behavior and its impact on financial markets. While institutions as a group can be quite heterogeneous, they have certain characteristics that distinguish them from individuals. Bennet *et al.* (2003) describe that institutions (1) typically control much larger portfolios, which leads to economies of scale in areas such as investment research and trade execution; (2) are usually evaluated and compensated based on investment performance, leading to similarities in incentives; and (3) face constraints that can affect their investment decisions (e.g. prudent-man regulations, which are laws that seek to protect clients of those institutions). These common factors can affect institutional investment decisions and are therefore of interest from an academic perspective.

This dissertation aims to help analyze and document institutional behavior, the variables that institutions take into account in their decisions, and the impact of their decisions on the financial markets. We aim to help improve our understanding on institutional behavior by developing and extending previous studies done on this area, examining in particular the behavior of European investment funds.

Institutional behavior in financial markets

Many institutions are involved in the management of assets that belong to other investors in a so-called fiduciary relationship, in which they act as agents on behalf of others instead of managing assets that belong to them. In this relationship, institutions are conceded the right to manage assets from usually smaller investors, making pools of assets and managing the assembled pool. Their objective is to maximize the returns achieved for a chosen level of risk, and in compensation they charge a set of fees for their services.

A good relation between institutions and their clients is one in which both parties are satisfied with the results. Institutions usually prefer to manage larger portfolios, from which they can extract larger fees. Clients, on the other hand, are normally satisfied when they have returns according to their expectations for the chosen level of risk, as long as they are assured that their assets are managed with an adequate level of prudence.

In the case of poor management by institutions, a number of laws exist that may provide penalties in the case of non-prudent behavior by institutions. This means that institutions may be liable towards their clients if their investment decisions are not deemed "prudent". Some researchers argue that these laws have created a potential agency issue in the relationship between institutions and their clients. Badrinath *et al.* (1989) argue that, as institutional portfolio managers invest client money, they must not only be concerned with earning an adequate return on their portfolios, but they also must ensure that the securities in the portfolio are such that they will qualify as prudent investments. As a result, these researchers argue that institutions involved in managing clients' assets may choose to adjust their investment decisions in order to protect themselves from potential liabilities that may arise from their relationship with clients (e.g. they may decide to allocate their portfolios to more "prudent" stocks, or stocks that can more easily be explained as "prudent" investments, instead of merely using the premise of best returns for the chosen level of risk). Institutions are aware that, in the case of poor management, they may be subject to legal action against them.

The issues described above, and others that we further describe later, are some of the central institutional operating conditions that we analyze on this dissertation. The scope of this dissertation is therefore to understand institutional financial decision making, focusing on European investment funds. We are primarily concerned with the variables that investment funds take into consideration when choosing which stocks to hold. In addition to possible "prudent" behaviors from institutions, we analyze possible relations with stock characteristics that may be of interest in explaining institutional investment decisions.

Main objectives of this investigation

The set of criteria that institutions use to select stocks is the issue under study in this investigation. We are interested in finding out why European investment funds favor certain stocks relative to others. With this goal in mind, we analyze European investment fund preferences for stocks from different points of view: first, we search for the stock characteristics that are most appealing to institutions (such as company size, volatility and others). Second, we try to validate up to which extent institutions exhibit "prudent" behavior when managing their portfolios. Third, we try to relate institutional preference with other possible variables that might help explain that preference. We test for differences across stock market geographic location, funds by investment style, and funds when investing on domestic and in foreign markets.

Our sample includes European investment funds from 15 countries. With this investigation we contribute to fill a gap on research that focuses on European institutions, since studies in this area have been mostly limited to the preferences of institutional investors in the U.S. market.

Note that although we include dedicated sections on the Literature Review chapter to explore the "Home Bias" effect and group behaviors such as Herding and trend-following, we have not performed analyses on these topics.

Motivation for this investigation

This dissertation serves a number of purposes. First we document the variables that European investment funds take into account when managing their portfolios and compare and contrast our results with previous studies for other markets. We can verify whether European investment funds follow the same set of criteria to select stocks as, for instance, U.S. based institutions.

Another motivation that has already been referred is related with possible agency-related issues on the relation between institutions and their clients. By searching for evidence of "prudent" behavior by institutions, we allow individual investors for better judgment when conceding their money to be managed by institutions. In addition, our analysis may be useful for the regulation and supervision of prudent-man laws, since our results contribute to provide insight regarding the potential impact that these regulations can have on the financial markets.

Main results

Overall, we find evidence that European investment funds tend to prefer larger, more liquid, high dividend, low volatility stocks that belong to the main stock market indices; and that these funds tend to be averse to stocks with higher 12-month momentum. These results are generally consistent with theories supporting behaviors of "prudence" by institutional investors (see, for instance, Badrinath *et al.* (1989)) and with previous studies that analyze preferences of institutional investors for stocks (see, for example, Falkenstein (1996) and Gompers and Metrick (2001)). Our results are also robust to "outlier" funds, which are funds that either have a small number of positions (less than 15) or own unusually high positions (50% or more outstanding shares of a company).

We also analyze European investment fund preferences for geographical regions. We find weak or inconclusive results that investment funds prefer stocks from the so-called PIIGS countries (Portugal, Ireland, Italy, Greece and Spain) relative to stocks

from other countries; and results are also inconclusive on whether funds prefer stocks from Euro-adopted countries relative to stocks from other European countries.

Analyzes by geographical regions show that funds in PIIGS countries and funds located in non-PIIGS countries have similar preferences; evidence suggests further that while funds located in Euro-adopted countries tend to prefer stocks with higher prices, funds located in non-Euro countries tend to avoid higher priced stocks.

We also find that investment fund preferences were not significantly affected by the recent financial crisis in Europe.

Analyzing the preferences by fund investment style, our results suggest that Growth, Value and other styles do not substantially differ from each other. As for fund turnover, we find evidence that funds that have smaller turnover (more inclined to long-term horizons) exhibit more strictly the preferences towards "prudent" stocks than funds with higher turnover.

Comparing preferences between domestic and foreign stocks by funds, in general we find similar stock characteristics between domestic and foreign investment approaches. However, we find evidence that when funds invest domestically they hold stocks with low prices, whereas when they invest in foreign markets they exhibit a positive preference for stocks with high prices.

Finally, our results suggest that the book-to-market ratio variable is not relevant in explaining European investment funds' preferences for stocks.

Comparison with previous studies

As referred above, our results are generally consistent with previous studies that analyze preferences of institutional investors for stocks. Yet, there are a few important distinctions. First, our results are in line with previous studies by Falkenstein (1996) and Gompers and Metrick (2001) in that all three studies show institutional preference for Size and Liquidity, and aversion to Momentum. In addition, our results and those by

Gompers and Metrick show preference for stocks included in the main stock market indices (Falkenstein does not include this variable in his study).

Our results for Variance, on the other hand, are in line with one of these studies and in opposition to the other. We find that this variable is statistically significant and its coefficient has a negative sign; this is similar to the results presented by Falkenstein but not for those found by Gompers and Metrick. While this variable is found statistically significant in this latter study, their evidence suggests investment funds prefer high variance stocks.

Finally, our results are not consistent with these studies for Price, Age, Dividend Yield and Book-to-Market ratio. Price is found statistically significant in our investigation and in these studies, but while we find a negative sign on this variable's coefficient, the two previous studies find a positive sign; the same is observed for Dividend Yield, except that signs are in opposite directions (our results show a positive sign, while Gompers and Metrick find a negative sign; Falkenstein does not use this variable in his analysis); and while we find that Age and Book-to-Market ratio are not significant in most estimations, the above studies find that these variables are statistically significant and positively related with institutional holdings, even though on Falkenstein's study Book-to-Market is only statistically relevant in one of the two samples used.

As a summary, our results are generally similar to previous studies for the most relevant variables (Size, Liquidity, Momentum and presence in the main indices).

The structure of this dissertation

In this dissertation, we start by reviewing the main findings highlighted in the literature related with institutional behavior and preferences for stock characteristics. Chapter 2 covers the following topics: we examine some of the stock characteristics that are more interesting to institutions; we review prudence and "prudent" behavior among institutions; we analyze institutional activity in terms of group behaviors such as herding and positive-feedback trading; we explore some of the latest trends and changes

in institutional preference in the most recent decades; we review the topic of home bias, a behavior in which investors seem to prefer investing domestically as opposed to in foreign markets, ignoring the gains in international diversification; we explore some other potential agency-related issues that may drive institutional behavior; and we provide an overview of European and U.S. institutional investors.

In chapter 3, we first describe the main objectives of the investigation; then, we examine the data sources and the methodology; afterwards we provide summary statistics of the variables used in our study.

In chapter 4 we show and discuss the results of our study. We first present the main results for the entire sample of investment funds and later for the sub-analyses that were performed.

Chapter 5 concludes.

2. Literature Review

In the U.S., institutions managing assets above a certain size are required to report the composition of their portfolios. In the U.S., institutions with $100 million or more in assets under management are required to report this information to the Securities and Exchange Commission (SEC) on a quarterly basis, in a 13F form. Several types of securities need to be reported, including stocks, certain options and warrants, and others.

In Europe, similar requirements exist. Recent legislation enacted to facilitate the development of the financial market has devised the UCITS directives, which stand for "Undertakings for Collective Investment in Transferable Securities". The UCITS are a set of regulations (2001/107/EC and 2001/108/EC) that aim to allow collective investment schemes to operate freely throughout the EU on the basis of a single authorisation from one member state. UCITS, a name attributed to funds that are compliant with these regulations, are now the predominant form of European collective investment vehicles and are required to report the composition of the assets under their management at least every six months. Non-UCITS funds, which are established under domestic law, may have different reporting schemes according to the legislation on the countries they operate. Nevertheless, most of the time (if not always), the composition of these funds is also required to be reported on a periodic basis.

Using the portfolio composition data of institutions, many studies in recent decades have analyzed institutional stock ownership preferences and more broadly the drivers of investment decision making. We summarize these findings in the next sections.

<u>Institutional ownership preferences and investment decision making</u>

Some authors explore the preferences of institutions for certain stock characteristics. They analyze institutional holdings of stocks according to variables such as company size, stock volatility, past returns, book-to-market ratio, liquidity, and

others. Their objective is to look for factors inherent to the stocks institutions hold that can help in explaining their preferences.

Another part of the literature focuses on issues related with prudence and due diligence. Studies that belong to this category analyze institutional behavior in light of the effects of the Prudent-man Laws, a body of rules that aim to regulate the investment behavior of institutions when managing their clients' money. Among other reasons, these studies aim to infer about the usefulness or degree of adequacy of these laws, analyzing how effective they are in protecting investors' interests and in ensuring due diligence on the side of managers of these institutions. Also, some of these studies compare different institutional investors like banks, insurance companies, pension funds, mutual funds and others in order to look for indications of different levels of prudence among institutional types.

Another important part of the literature focuses on herding and trend behavior among institutions. This research aims to study group behaviors by institutions towards specific stocks over a period of time. The objective is to take considerations about the impact of this behavior on the stock market and to analyze questions related with agency costs, irrationality and other arguments for the observed group behaviors.

Existing literature also examines the trends of institutional investment preferences through time, particularly in recent years. After the observed tendency of institutions to move from larger stocks to smaller stocks in recent years (see Bennet *et al.* (2003) and Blume and Keim (2011)), these studies intend to understand what caused this change, analyzing for instance whether this effect was caused by a shift in institutional preferences or by any other factor. In general, these studies aim to analyze whether institutional preferences change over time, to document the reasons in case they do, and to discuss the impact of these changes on the stock market.

The Literature Review section is organized as follows. In section 2.1, we analyze institutional preferences based on stock characteristics. In section 2.2 we explore prudence behavior among financial institutions. Section 2.3.1 reviews topics of herding and trend following by investors. Section 2.3.2 addresses some of the latest trends in the preferences of institutions. In section 2.3.3 we review the literature on home bias

behavior by institutional investors. In section 2.3.4 we address topics of potential agency issues as drivers of institutional behavior. Finally, in section 2.4 we provide an overview of European and U.S. investment organizations, exploring their typical profiles towards risk and preferred asset types.

2.1. Preferred Stock Characteristics by Institutional Investors

The study of institutional preference has led researchers to search for the reasons why institutions favor certain stocks relative to others. In an example of this type of research, Falkenstein (1996) finds that mutual fund stock holdings increase with share price, volatility, liquidity, level of publicized news stories, time since the stock was first listed, and firm size. As proxy for volatility, this researcher uses standard deviation and variance of returns; and for liquidity he uses transaction volume divided by quantity of shares outstanding. Two comments, however, are relevant here: firstly, according to the author, the relationship between mutual fund ownership and the variables of share price, level of publicized news stories and time since the stock was first listed may best be explained, not by a simple positive relation, but rather by an aversion to respectively low-priced stocks (under $5), stocks that are very rarely in the news, and stocks that are newly listed. The second important comment is for volatility: this variable is indicated as having a nonlinear relationship with mutual fund preference, due to the fact that standard deviation and variance show respectively a positive and a negative coefficient with mutual fund ownership.

Falkenstein's study also includes beta (the "market sensitivity" of an asset to the overall market) as a variable on the analysis but finds a mere weak relation between beta and mutual fund ownership. This author uses mutual fund equity holdings data on NYSE and AMEX for the years 1991 and 1992.

Other subsequent studies extend this type of analysis to additional variables. A study of Gompers and Metrick (2001) includes past returns as an independent variable and finds that institutions primarily show demand for "large, liquid stocks that have low past returns". This study uses firm size, stock turnover and stock price as proxies for

liquidity, whereas for past returns it uses the 3-month and 9-month figures. According to this study, institutional ownership is positively correlated with all these variables, but for Momentum (for both 3-month and 9-month measures) the coefficient is negative whenever size is included in the regression. Also, this study includes book-to-Market ratio[1] and finds that it is significantly related with institutional ownership, most of the time positively. In their study, Gompers and Metrick (2001) use NYSE, AMEX and NASDAQ common stock holdings data of institutions with assets above $100,000 under discretionary management from 1980 to 1996.

Finally, other investigations show results similar to the ones above. Bennet *et al.* (2003), for instance, analyze NYSE, AMEX and NASDAQ data for March 1983 through end of 1997 and find that institutional ownership increases with firm size, time since the stock was first listed, price, liquidity, and momentum, and has weak or mixed relationship with beta and standard deviation.

Research on institutional ownership preferences based on European financial markets is somewhat scarce. Nevertheless, Khurshed *et al.* (2011), using a sample of UK firms, find that institutional block holders (which are large company shareholders) prefer to invest in companies with lower directors' ownership and higher non-executive director presence on the board. These researchers also find evidence of a negative relationship between block holder presence and firm size, meaning that block holders prefer small stocks relative to large stocks.

2.2. Prudence by Institutions and Prudent-man Laws

A great part of institutions involved in discretionary asset management operate using capital that belongs to clients. Many times, these institutions merely act as agents (i.e. they only invest capital provided by others, not their own). In this case, the relationship between institutions and their clients is said to be one of fiduciary nature, a

[1] The book-to-market ratio is given by the ratio of a firm's book value of common equity to its market value.

contract in which one party operates in representation of another. In this fiduciary relationship, operations by institutions are governed by rules and regulations that purport to protect clients' interests. These rules are called "Prudent-man laws" and aim to regulate the action of fiduciary agencies so that the money they are entrusted to invest is managed in an adequate way (i.e. a proper level of risk is considered in terms of asset protection and expected return). In the case of poor management, these rules may hold institutions responsible for the liability suffered by clients, possibly enabling these clients to claim compensations from fiduciaries.

Prudent-man laws, therefore, seem evidently positive for clients, increasing their power over institutions in the case of poor management. On the side of institutions, however, these laws may introduce risks and costs, and add uncertainty to the business decisions these institutions take. Managers of these institutions are aware of these rules, and may decide to take them into account when operating client money. Specifically, they may see interest in protecting themselves from the potential liability that comes from the effect of Prudent-man laws. Badrinath *et al.* (1989) argue that these managers may, for instance, concentrate their stock investment on a fraction of the total universe of firms, investing on the ones that provide the best "safety-net" in case of legal action moved against them. In effect, these researchers suggest that a portfolio manager "not only considers the usual criteria in making investment choices, but also pay attention to whether the investment choices would be considered by others to be those made by a well-informed and prudent individual." (Badrinath *et al.*, 1989, 627) These researchers argue that Prudent-man laws, and the effects they might bring, can considerably influence institutional decisions as they manage clients' assets.

In the same paper, those authors find evidence that in their view strengthens the hypothesis of a "safety-net" biased criterion for selecting stocks by institutions. They find a positive relationship between institutional ownership and firm size, past performance, liquidity, time since the stock was first listed, and an aversion to stocks with high volatility. These results may constitute evidence of prudent behavior from institutional managers, by focusing on stocks that are more easily explainable as "prudent". Furthermore, these authors emphasize other reasons why managers might feel an incentive to protect themselves from potential liability: during times of inferior

portfolio performance, managers face the possibility of client loss, changes in the remuneration scheme, or penalties if their actions are deemed to be imprudent, therefore have an additional incentive to protect themselves by choosing “prudent” stocks.

Another side of this discussion is that different institutions may have different levels of prudence. Bank managers, for example, are subject to rigorous prudence standards because they invest on behalf of private trust and pension plan clients. As referred previously, empirical data suggests that bank managers tilt their portfolios towards stocks that they perceive as prudent to protect themselves from potential liabilities (Del Guercio, 1996). Also, mutual funds, according to the same study, are subject to less restrictive prudence standards, and are not so inclined to protect themselves by tilting their portfolios towards more “prudent” stocks.

Note that the fact that fund managers may have to respond to clients that are unpleased with their management could also lead them to be more risk-averse in terms of their bets and strategies. Particularly, when funds do not follow active strategies, managers may have an incentive to follow their peers. This would explain the phenomenon of Herding behavior as documented by several authors (see below, section 2.3.1).

2.3. Additional Topics in Institutional Preferences

2.3.1. Herding and Trend Following by Institutions

Herding and trend-following are two other extensively researched factors that influence institutional stock holdings. Herding refers to “any mass movement into particular stocks for whatever reason”, as defined by Falkenstein (1996, 112). It happens when investors trade the same stock in the same direction over a period of time. Trend following, also called positive-feedback trading, is, according to the same author, a “specific type of herding by mutual funds that involves a large group of funds chasing

stocks that have recently risen in value." (Falkenstein, 1996, 112) Researchers have focused their investigation on these group behaviors in order to better understand their impact on the securities markets, for instance in analyzing possible price destabilizing behavior by institutional investors.

Motivation factors for herding and positive-feedback trading by institutions

Three popular theories are described in the literature as explaining why institutions seem to exhibit them. First, a number of authors emphasize reasons related with irrational behavior and/or mass psychology. These authors argue that financial institutions usually "follow the herd", investing in certain stocks merely because other institutions also did, thus mimicking each other. Reasons advocated for this behavior are, for instance, concerns from managers of these institutions about their reputation in the labor market, fearing that, if they follow a strategy of their own (without following others), they might be perceived as "lone fools" if the market goes against them (Sharfstein and Stein, 1990). On the other hand, if they follow what the other institutions are doing and the market goes the other way, the damage to their reputation will not be as significant because the loss will be shared by all institutions. As a result, institutions tend to mimic investment decisions made by their peers, which strengthens the argument in favor of the "behavior of the herd".

This view of group behavior is further supported by other authors. Banerjee (1992) suggests that these behaviors are rooted in everyday life-learned habits, arguing that the common person takes decisions based on what others around her are doing. This investigator cites several examples of daily living to support this argument, such as deciding what restaurant to go to, what school to attend or in which party to vote, decisions that one often takes based on what others did or are doing in the same situation. This author suggests that the same principle (denominated as cascade behavior) is valid for the process of investment decision making in financial institutions.

Supporting the view of group behavior, Welch (1992) provides the example of later investors on IPO sales. He asserts that these investors tend to invest on the IPO if

earlier investors already did so, and to avoid investing if those did not, thus contributing to the "view of the herd".

Other researchers suggest alternative reasons. Falkenstein (1996), for instance, emphasizes that mass behaviors on the part of institutions may be observed when stocks display certain characteristics. This author finds a strong aversion to low-priced stocks (stocks under $5) by mutual funds, due mostly to transaction costs reasons. However, on the same study, this researcher finds that, as stock prices rise above $5, mutual funds become more inclined to buy them. This tendency to start buying, which this researcher considers herding, would of course be unrelated to "irrational" or group mimicking behaviors.

Finally, other reasons that may cause institutions to herd together is that they might receive correlated private information (Hirshleifer *et al.*, 1994), and especially if they engage in short-term speculation (Froot *et al.*, 1992). These latter researchers argue that short-term speculators base their decisions on the perceptions of what other traders are doing, thus have the tendency to herd.

Additional insights into herding and positive-feedback trading

Additional insight into herding and positive-feedback trading is given on other studies. First, Lakonishok *et al.* (1992) find that pension fund managers herd relatively little in their trades in large stocks, and Grinblatt *et al.* (1995) find relatively little herding by mutual funds, although they find that the majority of mutual funds use positive-feedback trading strategies to select stocks. Wermers (1999) finds low levels of herding in trades on the average stock by mutual funds, but finds much higher levels among small stocks. Also, looking at subgroups of mutual funds, this researcher finds higher levels of herding among growth-oriented funds than among income funds, and also finds evidence of positive-feedback trading among growth-oriented funds. In studies done on European financial markets, Walter and Weber (2006) find evidence of herding and positive-feedback trading on German-based mutual funds, and further hypothesize that these herding behaviors are to a great extent the result of shared data between funds, therefore not the result of group mimicking or "irrational" behavior. On

another paper, Wylie (2005) studies a data sample of U.K. equity mutual funds and, in accordance to some of the studies referred above, finds evidence of herding especially in small stocks. Contrasting to other studies, however, this researcher finds evidence of herding also in the largest stocks. Also, curiously, this author finds evidence of contrarian behavior on large stocks on the part of U.K. mutual funds. In other words, U.K. mutual funds seem to herd out of stocks with positive one-year excess returns relative to benchmarks, and to herd into stocks that had low excess one-year returns. This contrasts with U.S. mutual funds, which are known to be primarily momentum investors, buying on positive returns and selling on negative returns. In studies for less mature markets, Lobão and Serra (2002) test for herding behavior in Portugal and find strong evidence of herding, about 4 to 5 times the level observed in mature markets like the U.K. and the U.S., as described in previous studies. Also, Agudo *et al.* (2008) test for herding in Spain and also find strong levels of herding, considerably higher than for levels observed in other studies for the U.K. and the U.S..

In terms of the impact of herding and trend-following by institutions in the stock markets, Lakonishok *et al.* (1992) find that pension fund herding on stock market prices has only a small impact. On a contrary view, Nofsinger and Sias (1999) document a strong relationship between annual changes in institutional ownership and stock returns. On another study, Wermers (1999) finds evidence that mutual fund herding speeds the price-adjustment process and, therefore, is not destabilizing. Walter and Weber (2006) find that herding on German mutual funds seems neither stabilizing nor destabilizing on stock prices, and similar conclusions are taken by Wylie (2005), who finds that mutual fund herding in the U.K. does not seem to substantially affect future prices.

2.3.2. Latest Trends in Institutional Preferences

Studying institutional ownership preference trends is important to investigate the possible impact of these changes on the stock markets. Some effects that can be originated are in trading activity, volatility, and also on the stability of prices. Also, another important reason is to understand certain stock market phenomena, such as the so-called small-stock premium. This effect, which is a documented superior

performance of small stocks over large stocks even after controlling for risk, and which prevailed through several decades (see, for instance, Banz (1981)), has reversed in recent years, according to Gompers and Metrick (2001). These researchers argue that the observed reversal in the small-stock premium is related with trends in institutional ownership. We detail the reasons in the next paragraphs.

In a study of recent trends in institutional ownership preference, Bennet *et al.* (2003) analyze US institutional ownership data between 1983 and 1997 and document that institutional investors, whose interest has been primarily for larger stocks throughout the decades, have in recent years shifted their portfolios towards smaller stocks. These researchers conclude that this observed shift was due to changes in the preferences of institutional investors, rather than to other factors like changes in the relative importance of different investor types. In a subsequent study, Blume and Keim (2011) further document increasing smaller firm stock holdings on the part of institutions until 2008, and add that this shift in asset allocation is especially visible on hedge funds.

Such a shift in the preferences of institutions is historically uncommon, and naturally raises the question of what could be causing it. One reason, as suggested by Bennet *et al.* (2003), is that a temporal decline in transaction costs could have motivated an increased interest in smaller firms. But perhaps a better reason, also suggested by these researchers, is related with the institutional growth that is documented by several researchers already mentioned in this document (see, for instance, Friedman (1996), Blume and Keim (2011) and Gompers and Metrick (2001)). This growth was, according to Bennet *et al.*, focused on large stocks, causing an increase in prices of these stocks (assuming imperfect elasticity). As prices of large stocks rose, these researchers suggest, this may have caused institutions to look for better opportunities, which in this case could be found among smaller stocks.

As a side note, this institutional growth is, according to Gompers and Metrick, one of the primary reasons that caused the disappearance of the small-stock premium referred earlier. With the rising prices of large stocks, the returns of these stocks outperformed the ones for small stocks. To support this hypothesis, these researchers find that the common stock market share of institutional investors nearly doubled in

U.S. markets between 1980 and 1996, representing a sharp institutional growth over this time frame. According to these authors, this was a gradual but steady shift that took place over this time frame.

2.3.3. Home Bias by Institutions

The extent to which investors balance their portfolios between domestic and foreign equities (and securities in general) has been subject of considerable academic debate in recent decades. Researchers have searched for the causes of the so-called "Home Bias", a phenomenon in which investors tend to invest domestically rather than in foreign markets. This is a puzzling result given that investing in foreign securities provides potential gains in diversification (see, for instance, Grubel (1968), Levy and Sarnat (1970), Solnik (1974) and more recently Grauer and Hakasson (1987), French and Poterba (1991) and Santis and Gerard (1997)). Thus, the persistence of the "Home Bias" effect even when potential gains by foreign investment exist implies that other factors offset these gains, from a fund manager's viewpoint.

Several hypotheses have been considered by researchers to try to explain the home bias phenomenon. One first hypothesis is the cost associated with cross-border investing, such as taxes and transaction cost barriers (Black (1974) and Stulz (1981)). According to this hypothesis, these costs induce a domestic bias on investors because the net return on foreign portfolios is less than on domestic portfolios. However, it is well known that direct barriers to foreign transactions in the major world markets have been drastically reduced since the late 1970's but the home bias effect persisted in the years thereafter (French and Poterba, (1991)). Also, Ahearne *et al.* (2004) analyze a data sample of 1997 and demonstrate that the effects of direct barrier to international investment, when statistically relevant, are not economically meaningful. On the other hand, French and Poterba assert that different transaction costs between countries cannot account for the home bias effect, arguing that if it was the case that these costs induced domestic bias, this would incline all investors towards the countries with highest liquidity, not towards their respective domestic market, which of course is not observed in actual portfolios.

A second possible reason described by the literature is information asymmetry between countries. According to this hypothesis, the poor quality and low credibility of financial reports in many countries may cast doubts in foreign investors and therefore cause them to prefer investing domestically. In support of this hypothesis, Ahearne *et al.* (2004) analyze U.S. investor behavior and find that the home bias effect is significantly less for foreign companies listed on North American exchanges than for companies not listed on those exchanges. These researchers find that U.S. investors show greater interest in allocating their portfolios to those companies listed on U.S. exchanges, and hypothesize that this is due to the more stringent U.S. financial reporting standards and regulations. Moreover, additional studies provide evidence that information asymmetry can indeed cause home bias. Kang and Stulz (1997) analyze foreign investor behavior in Japan and find that foreign investors tend to concentrate on shares of the largest companies and companies with good accounting performance, as opposed to companies with higher expected returns; and Coval and Moskowitz (1999) find that even in domestic markets investors tend to allocate their portfolios to companies spatially closer to them, as opposed to more distant ones.

A third possibility for the home bias effect is related with investor behavior. French and Poterba (1991) consider that different return expectations among groups of investors could account for the existence of the home bias effect. These researchers hypothesize that the domestic bias could be caused by investors in separate countries expecting better returns on their domestic market than on foreign markets. Supporting their argument on the fact that high volatility makes it difficult to estimate *ex-ante* returns, and therefore make the job of choosing where to invest harder, these researchers conjecture that investors in different countries could be following their own idiosyncratic rules for investment which would lead them to expect better returns on their domestic market. Also, these researchers point out that different perception of risk between countries could account for the home bias effect. According to these researchers, investors tend to invest in what they know, and investing in foreign markets has the potential disadvantage of being less known to investors.

A fourth hypothesis suggested by the literature is related with deviations from purchasing power parity (PPP) between countries. With inflation risk and potential

deviations from PPP, investors may be induced to incorporate in their portfolios a component to hedge different inflation risk (Adler and Dumas, 1983). Thus, the home bias effect could be explained if domestic equities provide a hedge against this risk. However, Cooper and Kaplanis (1994) demonstrate that the magnitude of these PPP deviations, combined with plausible estimations for deadweight costs, is insufficient to explain the existing domestic bias unless investors have very low levels of risk aversion. Therefore, inflation risk hedging is not likely to be the real cause of the home bias effect.

Finally, other authors suggest the level of development and familiarity as drivers for domestic and foreign biases. Chan *et al.* (2005) find that as countries become more developed or less remote from the rest of the world, deadweight costs for foreign investment are reduced, resulting in smaller domestic and foreign biases. This is measured by a country's market capitalization, market development indicators, transaction costs and native language. These authors further find that factors such as economic development, capital controls, and withholding taxes also impact domestic and foreign biases, although to a smaller extent.

2.3.4. Other Motivators for Institutional Preference

Competition between peers can also drive institutional behavior. Alves and Mendes (2010) show that mutual funds tend to overweight stocks issued by their parent company and underweight those of competitors. These authors further find that funds especially buy stock of their parent company when there is widespread selling, and continue to hold those stocks during low performance periods. In addition, these researchers find evidence that this potential agency issue is costly to funds, since the stock of their parent company underperforms the stock of competitors after funds have acquired their parent company's stock.

2.4. Overview of European and U.S. Investment Funds

According to EFAMA (EFAMA, International Statistical Release Q1 2012), investment funds worldwide totaled 20.9 trillion euros at end of Q1 2012. U.S. funds alone represented 10.2 trillion, close to half of the total in terms of domiciled assets. Europe as a whole represented almost 6.0 trillion, or 29%. Other regions included Brazil (1.2 trillion, 6%), Australia (1.1 trillion, 5%), Japan (762 billion, 4%) and Canada (746 billion, 4%).

We can take several conclusions by examining this information closer. Table 1 shows an overview of U.S. and European investment fund industry at end of Q1 2012, based on assets domiciled or legally owned by country or region, as reported by EFAMA. For each region, the total assets are displayed (in billions of euros), as well as the total number of mutual funds, and the relative asset allocation between asset types, including equity, bonds, and others.

Table 1 - Selected figures for the Investment Fund Industry in Major Regions

The second column represents the total domiciled or legally owned assets by country or region (in billions of euros), the third column the number of mutual funds, and the columns to the right the relative asset allocation. As reported by EFAMA, funds of funds are not included, except for France, Germany, Italy, and Luxembourg. Figures refer to the end of the first quarter of 2012. Source: European Fund and Asset Management Association (EFAMA), International Statistical Release Q1 2012.

Country / Region	Total Assets	Number of Mutual Funds	Asset Allocation (in %)				
			Equity	Bond	Money Market	Balanced / Mixed	Other
World	19,159	73,343	41%	25%	18%	12%	4%
USA	9,327	7,707	47%	25%	21%	7%	0%
Europe	5,904	35,658	34%	27%	18%	16%	5%
UK	676	1,928	59%	21%	1%	9%	10%
Luxembourg	1,864	9,452	31%	32%	15%	16%	6%
France	1,132	7,701	26%	18%	33%	22%	1%
Germany	239	2,051	48%	23%	2%	21%	6%
Italy	140	645	14%	37%	18%	30%	0%

The most striking conclusion we can draw from Table 1 is related with asset allocation policy. A total of 47% of U.S. assets were allocated to equities in Q1 2012,

whereas European funds allocated only 34% of their assets to these securities. This suggests that European investors are considerably less inclined to allocate their portfolios to equities than their U.S. counterparts (Bams and Otten (2002) reach the same conclusions based on 1998 data). Also, there seems to be significant heterogeneity in terms of portfolio allocation profiles between European countries. For instance, UK and Germany had respectively 59% and 48% of their assets concentrated in equities at end of Q1 2012, whereas Luxembourg, France and Italy had 31%, 26% and 14%. The figure of 48% for Germany might seem unexpectedly high. The cause could be related with local factors, considering the relatively small size in Germany's total assets (€239 billion).

Another interesting conclusion we can take from Table 1 is that the number of European funds largely exceeds that of U.S. funds. By Q1 2012, whereas U.S. investors held assets on a total of 7707 funds, European counterparts invested in almost 36000 funds, more than four times the number for U.S. investors. Luxembourg and France alone had more funds than U.S. investors.

Portfolio allocation profiles by European institutions

Table 2 contains Assets under Management figures for European investment funds. These figures are reported by EFAMA on its Asset Management report 2012 and now refer to end of 2010, since values for 2012 (and 2011) are not yet available. Note that the difference between Table 1 and Table 2 is that Table 1 refers to assets domiciled or legally owned by country, whereas Table 2 refers to managed assets by country.

Table 2 - Selected figures for the Asset Management Industry in Europe

The second column shows the total assets under management by country or region (in trillions of euros), the third column the number of asset management companies, the fourth column the average size in assets under management (in billions of euros) and the columns to the right the relative asset allocation. Figures refer to end of 2010. Source: European Fund and Asset Management Association (EFAMA), Asset Management report 2012

				Asset Allocation (in %)			
Country / Region	AuM (EUR trillion)	Number of asset management companies	Average AuM (EUR billion)	Equity	Bond	Money Market	Other
Europe	14.0	3125	4.5	31%	44%	11%	14%
UK	4.6	186	6.4	46%	36%	9%	10%
France	2.9	592	4.9	18%	44%	18%	20%
Germany	1.5	304	4.9	18%	58%	7%	17%
Italy	0.7	302	2.2	20%	63%	10%	8%

According to Table 2, overall European asset allocation to Equities is shown to have been at 31%, lower than values based on domiciliation of assets, as seen on Table 1. Moreover, EFAMA reports on its Asset Management 2012 Report that European asset allocation to equities is highly influenced by the United Kingdom (which allocated 46% of its assets to equities at end of 2010). The UK, representing about one third of total assets under management in Europe in 2010, has, according to the same report, a “long established culture of equity investing”, which may explain the strong allocation of assets under management to stocks. If we excluded the UK, the total European percentage invested in equity and bonds would change to respectively 19% and 51%.

3. Empirical Study

3.1. Research Objectives and Issues Analyzed

The primary goal of this investigation is exploratory: we aim at finding out which variables European investment funds take more into account when managing their portfolios. We analyze equity Institutional Ownership from different points of view. First, we relate this variable with several stock characteristics such as Size, Liquidity, Dividend Yield, and others. Our objective is to better understand which stock characteristics are most important in explaining investment fund preferences for stocks, as well as to take conclusions in terms of possible "prudent" behavior by investment funds.

In addition to these analyses, we investigate institutional preference by several sub-groups of funds. Our goal is to find out whether other variables are important in explaining fund preferences. We analyze for patterns by regions, in order to find out (a) whether certain countries are favored compared to others and (b) whether funds across countries exhibit different preferences; we compare fund preferences across Investment Styles, to better understand whether funds with different investment philosophies demonstrate different preferences (e.g. Growth versus Value funds); and we compare investment fund preferred characteristics when funds invest in their respective domestic market with those selected when investing in foreign markets. We also try to understand whether institutional preference for stocks was in any way influenced by the recent financial crisis.

3.2. Data

The data sample used was generated from two separate databases. European fund composition data was extracted from Thomson Reuters' One Banker – Ownership module database. Stock level data was extracted from Thomson Reuters' Datastream and Thomson Reuters' Datastream Worldscope databases. From Thomson Reuters' One Banker database, we used the fund composition information from a total of 15 different European countries (listed later on this section). The data from a total of 984 funds was available for the time frame between 1997 and 2011, from which we used Quarter 1 data from 2008 and 2011. We did so for simplicity reasons in terms of database usage. Note that the choice of using only 15 of the total number of countries in Europe was due to database constraints (no more data was available).

From Thomson Reuters' Datastream / Datastream Worldscope database, we used the stock ownership information for the same 15 countries, which totaled 5758 different common stocks. Thomson Reuters' Datastream Worldscope is a module within Thomson Reuters' Datastream database that contains information relative to the financial accounts of listed companies.

<u>Considerations taken with respect to the data samples</u>

We use data in a cross-sectional format and consider all funds and all stocks that were active at the time corresponding to the analysis. Our sample is therefore free of survivorship bias. In terms of data utilization technique, we use the Sedol code as a unique company identifier both on the Thomson Reuters' One Banker and on the Thomson Reuters Datastream/Datastream Worldscope databases; therefore we were able to find a one-to-one relationship between the two databases. The Sedol code, which stands for "Stock Exchange Daily Official List", is an alphanumeric code assigned to each stock by the London Stock Exchange.

As we will see on the Methodology section, our model uses one entry per stock in our data samples. To cover for companies that have more than one stock (i.e. stocks

listed on different exchanges or stocks with primary, secondary and subsequent issues), we use whole company data that is available from Thomson Reuters' Datastream Worldscope database. Examples of whole-company data that is available in the database are a company's total market capitalization, the number of shares outstanding, and the company's share price. Note that on the side of Thomson Reuters' One Banker database this issue does not apply since the information is already presented on a whole-company level basis.

Filters used to generate the data sample

A number of conditions were taken into account in the generation of the samples used on these analyses, which we now detail. As a starting point, only common stocks were considered. Depositary Receipts, including American, Global and Non-Voting receipts were excluded. In addition, Exchange-Traded Funds, Closed-End Funds, Investment Trusts and "Bonus Rights" issues were also excluded.

In terms of geographical region, we limited our analyses to stocks domiciled in the 15 countries analyzed: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and the United Kingdom. Note that we were restricted to those 15 countries due to data source constraints. Also, for better results on these analyses we limited our samples to the stocks traded on the stock exchanges of those countries.

Since it was a chief requirement to have one Sedol code per company, we restrained our data sample to stocks uniquely identified by one Sedol code. A total of 8 stocks (roughly 0.2% of the data sample), which had multiple Sedols, were excluded due to this reason.

On the side of Thomson Reuters' One Banker database, several other considerations were taken. As a starting point, only funds with active management were considered. Also, we imposed a minimum of $500,000 in assets under management, counting at the time of the last filing date by June 2011. Finally, we had to discard a

total of 132 entries (roughly 0.1% in percentage of data entries) due to corrections on the Sedol code format.

3.3. Methodology

3.3.1. Empirical Specification

We use a censored model to analyze institutional ownership by stock characteristics as given by the following equation:

$$\mathrm{y}_i = \begin{cases} 0 & \text{if } \mathrm{y}_i^* \leq 0 \\ \mathrm{y}_i^* = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_n x_n + \varepsilon & \text{if } 0 < \mathrm{y}_i^* \leq 100 \\ 100 & \text{if } 100 < \mathrm{y}_i^* \end{cases}$$

where y_i represents the main variable under study (institutional ownership), y_i^* represents the latent variable under study, and the explanatory variables x_i represent the stock characteristics: price, size, volume percentage, and the remaining variables.

The fund composition data reported on Thomson Reuters' One Banker database contains only long positions. In other words, no fund reported any short position in the whole spectrum of data on the database. However, a great part of stocks were found to have zero ownership by institutions (more than 40% of available stocks, as we will see on section 3.3.3). This high percentage of stocks not owned by any institution needs to be taken into account in the choice of the model. Ordinary Least Squares model estimates would likely be biased and inconsistent due to the high impact of these stocks. Therefore, we use a censored model since this potential drawback is avoided with this

type of specification. We decided to use the standard Tobit model (Tobin, 1958) left censored on 0 and right censored on 100.

Heteroscedasticity

Previous studies[2] have reported heteroscedasticity, or the existence of sub-populations with different variances on the data samples analyzed, in their analyses. We have also found evidence of heteroscedasticity on the data samples used in our analysis (as can be observed in Appendix I). The existence of heteroscedasticity in these samples is somewhat expectable, given the large sample of data (several thousands of stocks, as previously stated) and the wide spectrum of values that some of the stock characteristics under analysis can assume (e.g. small and large companies; small and high trading volumes; stock prices with much diversity). Given the importance of heteroscedasticity on the estimation of regression residuals, our analyses of inference use Huber-White standard errors and covariance (Huber, 1967; White, 1980).

3.3.2. Model Variables

Dependent variable

The variable under analysis is Institutional Ownership (IO), which represents the fraction of each stock that is owned by European investment funds, in percentage. To compute this variable, on a first step we first sum the percentage ownership by each fund for each stock. The result is the total holding percentage of each stock by institutional investors. Whenever any stock is not held by any institution, we set its ownership percentage to zero. On a second step, to linearize the variable we sum 1 (one) to the calculated value and take the natural logarithm of the resulting value. We follow

[2]Falkenstein (1996) and Gompers and Metrick (2001), to name a few.

the same calculation procedure as used by Falkenstein (1996). The dependent variable is therefore calculated as follows:

$$ln(1 + IO_{i,t}),$$

$$where\ IO_{i,t} = \sum_{m=1}^{M} \frac{shares\ owned\ by\ fund\ m\ at\ time\ t,m}{shares\ outstanding\ at\ time\ t,m} * 100$$

Period of the analyses

We use two samples: one for March 2008, which is intended to be a sample with small impact from the recent financial crisis in Europe and another one for March 2011. The objective is to try to find out whether ownership preferences changed over time and in any way were influenced by the financial crisis.

Note that the sample of March 2008 could be already contaminated by the financial crisis referred above; therefore a sample based on previous results would be preferable. However, two factors contributed to our choice of March 2008 as one of the used data samples. First, on the side of Thomson Reuters' One database, the data were available only starting in mid-2007 (data for the quarters prior to this period were to a large extent unavailable, except by means of considerably increasing complexity on the analysis side). Second, data for several relevant independent variables from Thomson Reuters' Datastream Worldscope are stated on an annual basis, which means that intermediate (non-end of year) data were not available. Since it was our goal to base the measurement of the independent variables on the beginning of the data samples, we needed to use data samples at the beginning of the year (i.e. the first quarter, therefore March samples). The first March sample available was for the year 2008, therefore this was the one that we used.

In terms of the impact of this limitation, unreported results from our side indicate that the regression estimates using the same independent variables data as used on our regressions for 2008-Q1 data (i.e. end of year 2007) and dependent variables in December 2007 or March 2008 are very similar (all the coefficients have the same signs

and are of the same magnitude; statistical relevance is similar for all coefficients). Therefore, we believe that the impact of this limitation is trivial.

Explanatory variables

We use a number of explanatory variables that correspond to the stock characteristics of the stocks in our samples. The list of variables considered is found below. All variables are measured right before the beginning of the time interval considered for each data sample (on December 31st, 2007 for sample 2008-Q1 and on December 31st, 2011 for sample 2011-Q1).

a) *PRICE*: Price of the stock, expressed in Euros. For securities traded in other currencies, their price is converted at the close price of the respective exchange rate on the corresponding date.
b) *SIZE*: Market Capitalization, also expressed in Euros, if necessary converted using the same procedure.
c) *LIQUIDITY*: As proxy for liquidity we use turnover, i.e., the transaction volume percentage, calculated by the number of traded stocks during the last month prior to the beginning of the data sample divided by the number of shares outstanding at the beginning of the data sample. For example: for the 2008-Q1 data sample, this variable is the number of traded stocks during December 2007 divided by the number of shares outstanding on December 31st, 2007.
d) *AGE*: number of months since the stock was first time listed. In case more than one share type exists for a company, or if the company has stocks issued in more than one exchange, we use the age of the domestic or home shares.
e) 12-month *MOMENTUM*: 12-month return, including dividends paid, expressed in percentage.
f) *DIVIDEND YIELD*: Dividend distributed on the same year as the data sample, expressed in percentage of market price at the beginning of the quarter under analysis.
g) *BTM* (Book-to-Market ratio): the ratio of a firm's book value of common equity to its market capitalization.

h) *VARIANCE*: the variance of the monthly returns for the 24-60 months prior to the beginning of the quarter under study, depending on availability. This field is left empty for stocks with fewer than 24 months of past data (i.e. those observations are not used).

i) *DUMMY_STOXX600* (STOXX600 dummy): dummy variable that is equal to 1 if the stock belonged to the EURO STOXX 600 index at the beginning of the quarter under analysis, or equal to 0 (zero) otherwise.

j) *DUMMY_LOCAL_CTY* (Main local indices dummy): dummy variable that is equal to 1 if the stock belonged to at least one of the main indices from the countries analyzed at the beginning of the quarter under analysis, or equal to 0 (zero) otherwise. The list of indices considered are as follows: ATX for Austria, BEL20 for Belgium, OMX Copenhagen 20 for Denmark, OMX Helsinki 25 for Finland, CAC 40 for France, DAX for Germany, Athex 20 for Greece, ISEQ 20 for Ireland, FTSE MIB for Italy, LuxX for Luxembourg, AEX index for The Netherlands, PSI-20 for Portugal, IBEX 35 for Spain, OMX Stockholm 30 for Sweden, FTSE 100 for the United Kingdom.

Additional comments

Seeking to obtain more robust results, we tried several variable transformations in our attempts to choose the most adequate model. After some analysis, we decided to use the same principle as Falkenstein (1996) and linearize the variables by taking the natural logarithm on most of them, including the dependent variable. For explanatory variables, in some cases we use the natural logarithm of the variable plus one, to start in zero and to reduce the level of distortion created by this procedure (i.e. in fractional numbers between zero and one). The exact metric by which each explanatory variable is calculated is as follows: LOG(Variable + 1) for *PRICE*, *LIQUIDITY*, *DIVIDEND YIELD* and *VARIANCE*; LOG(Variable) for *SIZE* and *AGE*; and the variables not expressed in logarithms for 12-month *MOMENTUM*, *BTM* and the dummy variables for presence in indices.

3.3.3. Overview of European Investment Funds and Equity Holdings

The equity composition of a total of 984 funds is analyzed on the present investigation, which invest in roughly 4900 to 5700 stocks in 15 different European countries in the two data points of time analyzed. We now include a brief overview of the analyzed data samples. The information presented in this section may allow for a better understanding of the results reported on chapter 4.

Investment Fund Summary Statistics

Table 3 contains the summary statistics of investment funds for the sample under analysis, as reported on Thomson Reuters' One Database – Ownership module. Panel A contains values for the first quarter of 2008 and panel B for the first quarter of 2011. Only equities are reported, in addition to the conditions discussed previously on section 3.2. As shown on Table 3, great diversity exists across countries in terms of number and size of investment funds. The United Kingdom alone is home to more than one third of investment funds included in the two data samples analyzed. In second place in terms of the number of funds, Germany has close to one hundred funds, and other countries all are considerably under one hundred funds each. Also, the United Kingdom represents more than half of investment fund size in our samples. UK based funds, managing about €312 billion in equities in Q1 2008, represent about 57% in overall managed assets in that quarter and around 60% in Q1 2011. The results of our studies are, therefore, highly influenced by the UK. The mean and median values for fund sizes for each country help cement the idea of contrast between the larger and the smaller countries. Funds domiciled in the UK, Germany, France and Sweden average between €500 and €900 million in size, whereas funds located on other countries generally are below €300 million, with several countries under €200 million. An important factor to motivate this

difference could be a strong presence of pension funds, insurance companies and other asset management institutions in the countries with the largest funds.

As a side note, the figures depicted in Table 3 somewhat differ from the ones analyzed previously on section 2.4. These differences could be related with different criteria for classifying funds (e.g. classifying funds as “equity” funds can sometimes be difficult if they invest a certain amount of their assets in other securities, to name one such criterion).

Table 3 - Summary Statistics on European Investment Funds

For each analyzed country we present selected investment fund summary statistics. The second column contains the number of funds. Columns 3 to 5 contain the total, mean and median value of fund equity holdings. Column 6 contains the total number of different stocks owned by the aggregate funds in each country. Column 7 and 8 contain the mean and median number of different stocks owned by aggregate investment funds in each country. Columns 9 and 10 contain the mean and median weight of each owned stock on investment fund portfolios, divided by country. Panel A presents the information for the 2008-Q1 sample, and panel B for 2011-Q1. Values extracted from Thomson Reuters' One Banker database - ownership module, equity assets only.

		Panel A: 2008-Q1 Sample							
		Value of fund equity holdings (EUR Millions)			Number of stocks owned			Stock weight on fund portfolio (%)	
Country	Number of funds	Total	Mean	Median	Total	Mean by fund	Median by fund	Mean	Median
All Countries	933	550,479	559	274	3,326	56	42	0.42	0.06
UK	339	312,325	885	439	2,554	71	54	0.59	0.10
Germany	110	65,511	575	366	1,055	61	47	0.17	0.03
Sweden	56	44,190	789	502	1,293	90	72	0.36	0.10
Austria	47	3,050	56	38	564	25	21	0.23	0.05
France	47	47,290	946	400	684	62	46	0.33	0.04
Spain	40	7,656	187	126	379	37	35	0.41	0.03
Finland	39	7,167	175	97	534	39	35	0.34	0.07
Portugal	39	1,825	42	24	258	20	17	0.18	0.03
Greece	37	2,427	62	28	152	29	29	0.34	0.13
Denmark	35	8,776	219	168	404	35	32	0.33	0.03
Belgium	35	11,530	320	195	642	55	53	0.19	0.04
Netherlands	32	12,427	377	199	417	37	26	0.28	0.03
Ireland	27	14,599	471	257	490	42	33	0.21	0.05
Italy	25	7,461	276	236	353	40	38	0.13	0.03
Luxembourg	25	4,244	163	80	399	30	30	0.42	0.03

		Panel B: 2011-Q1 Sample							
		Value of fund equity holdings (EUR Millions)			Number of stocks owned			Stock weight on fund portfolio (%)	
Country	Number of funds	Total	Mean	Median	Total	Mean by fund	Median by fund	Mean	Median
All Countries	895	454,673	462	153	2695	50	37	0.40	0.05
UK	335	275,040	779	276	2032	60	46	0.57	0.08
Germany	102	50,849	446	205	894	55	42	0.16	0.03
Sweden	54	47,655	851	571	1289	93	59	0.40	0.09
Austria	44	2,338	43	19	486	25	19	0.13	0.03
France	39	32,222	644	298	531	55	40	0.27	0.04
Spain	41	4,209	103	57	345	29	27	0.28	0.03
Finland	37	4,408	108	63	425	32	33	0.28	0.09
Portugal	36	823	19	12	179	15	15	0.15	0.03
Greece	32	1,049	27	10	104	23	24	0.43	0.13
Denmark	38	6,852	171	124	499	36	29	0.23	0.03
Belgium	33	8,676	241	134	752	58	42	0.14	0.04
Netherlands	30	8,243	250	148	379	33	30	0.30	0.03
Ireland	30	7,045	227	90	492	34	24	0.13	0.03
Italy	24	3,240	120	86	344	32	27	0.10	0.03
Luxembourg	20	2,025	78	49	381	28	26	0.43	0.05

Institutional Ownership

A summary of the main figures of Institutional Ownership on these stocks is shown on Table 4, as extracted from Thomson Reuters' Datastream / Datastream Worldscope databases. According to the data samples used, a total of 5752 and 4963 stocks were listed on the 15 countries under analysis, respectively for quarters 2008-Q1 and 2011-Q1. On average 43% and 46% of these stocks were not owned by any fund included in our sample in these time frames. This means that the total listed stocks owned by investment funds were only marginally above half the number of total available stocks, which suggests that a great part of European stocks is perhaps not explored, or not interesting to invest in, by these funds. The fact that such a high level of stocks was not owned by any fund on these time frames adds support to the choice of a

censored model as the primary model for usage to analyze the preferences of investment funds. On Appendix III we detail summary statistics of stocks not owned by any fund.

Table 4 – Characterization of the Dependent Variable

Stock information extracted from Thomson Reuters' Datastream / Datastream Worldscope. Institutional ownership data extracted from Thomson Reuters' One Banker database – ownership module. Figures for stocks listed on the exchanges of the 15 countries analyzed.

	2008-Q1 sample	2011-Q1 sample
Number of stocks	5752	4963
Percentage with $IO_i = 0$ (i.e. stock not owned by any investment fund)	43%	46%
Mean IO_i	3.42%	3.36%
Median IO_i	0.09%	0.03%
Max IO_i	90.9%	94.5%

IO_i: institutional ownership for stock i

Table 5 shows the same figures shown on Table 4, but now by country. Only 2008-Q1 figures are shown because figures for 2011-Q1 are mostly similar.

Unsurprisingly, the largest countries have the majority of listed stocks. The United Kingdom alone contains one third of all listed stocks, and the four biggest countries contain about 70% of listed stocks in total number. With exception of the United Kingdom, the countries with highest numbers of stocks not owned by investment funds are the countries with highest number of available stocks.

As a side note, the median ownership values for a number of countries is zero because more than half of the stocks available for trade on those respective countries is not owned by any investment fund. This of course decreases the median value in these cases to zero.

Table 5 – Characterization of the Dependent Variable by Country

Figures presented are for stocks listed on the exchanges of the 15 countries analyzed. We only display data for sample 2008-Q1 since the data for sample 2011-Q1 is very similar. Stock information extracted from Thomson Reuters' Datastream / Datastream Worldscope, institutional ownership data extracted from Thomson Reuters' One Banker database – ownership module.

	2008-Q1 sample				
Country	Number of stocks	Percentage with $IO_i = 0$	Mean IO_i	Median IO_i	Max IO_i
United Kingdom	1902	36%	5.2%	0.9%	50.6%
Germany	921	60%	1.9%	0.0%	86.0%
France	850	55%	2.0%	0.0%	77.6%
Sweden	441	51%	3.7%	0.0%	37.6%
Italy	300	26%	2.1%	0.9%	20.4%
Greece	285	50%	1.9%	0.0%	23.2%
Denmark	204	52%	1.7%	0.0%	25.4%
Spain	158	25%	2.9%	0.9%	90.9%
Netherlands	153	28%	4.4%	2.5%	22.6%
Belgium	149	23%	2.0%	0.7%	14.9%
Finland	131	15%	5.0%	3.9%	21.2%
Austria	102	38%	2.4%	1.3%	13.0%
Ireland	68	6%	3.7%	2.1%	27.7%
Portugal	55	20%	3.6%	2.1%	21.2%
Luxembourg	33	18%	2.8%	1.1%	32.2%

IO_i: institutional ownership for stock i

Stock Holdings summary statistics

A summary on the descriptive statistics of the stocks owned by investment funds is provided on Table 6. The mean, median, maximum and minimum values for most independent variables are displayed.

An interesting point to mention about the values on Table 6 is the comparison between the values on Panel A and the values on Panel B. As expected, these figures appear to reflect the effects of the recent financial crisis in Europe. On one hand, average values for Size, Price and Dividend Yield decreased from 2008 to 2011; as for

the variance of returns and the transaction volume percentage figures, we observe an indication of the increased volatility in the financial markets.

For added insight into these figures, we also add this information detailed by country for data sample 2008-Q1. We include it on Appendix II to simplify the level of detail shown on this section.

Table 6 – Descriptive Statistics for Selected Relevant Independent Variables under Study

Selected figures are taken at the beginning of the quarter under study. Panel A refers to quarter 2008-Q1 and panel B to quarter 2011-Q1. Return Variance is the variance of returns. Size is market capitalization in EUR millions. Liquidity is transaction volume in percentage of shares traded on the last month prior to the beginning of the quarter. Price is stock price, in euros. Dividend yield is the dividend distributed on the same year as the data sample, expressed in percentage of market price at the beginning of the quarter under analysis. Age is the number of months since the stock was first listed. 12-month momentum is the one-year returns. BTM is the book-to-market ratio of each stock. Data extracted from Thomson Reuters' Datastream / Datastream Worldscope.

	Panel A: 2008-Q1 sample							
Metric	Return Variance	Size (EUR Millions)	Liquidity	Price (EUR)	Div Yield	Age (months)	Momentum 12m	BTM
Mean	0.06	1,075	4.29	41.6	1.98	137.1	21.5	0.42
Median	0.01	46	1.24	4.4	0.85	103.4	-10.3	0.58
Maximum	0.29*	113,218	28.27*	593.3*	11.3*	524.4	157.7*	3.45*
Minimum	0.00	0.1	0.00	0.0	0.00	0.9	-99.8	-0.17**

	Panel B: 2011-Q1 sample							
Metric	Return Variance	Size (EUR Millions)	Liquidity	Price (EUR)	Div Yield	Age (months)	Momentum 12m	BTM
Mean	0.16	1,050	4.40	32.0	2.01	168.5	20.1	0.31
Median	0.02	40	1.26	3.2	0.00	136.9	6.7	0.76
Maximum	0.39*	107,366	30.66*	425.4*	11.4*	560.9	274.9*	5.88*
Minimum	0.00	0.0	0.00	0.0	0.00	0.9	-99.1	-0.17**

* Replaced by the 99.0% percentile to avoid extreme values

** Replaced by the 1.0% percentile to avoid extreme values

Correlation statistics between variables

Table 7 contains the correlation statistics between the independent variables used in the regressions. The values were extracted from the 2008-Q1 data sample. The statistics for 2011-Q1 sample are omitted since the correlation figures are very similar to the ones for 2008-Q1 sample and are available upon request.

Table 7 – Correlation Figures between Independent Variables under Study

From Thomson Reuters' One Banker – Ownership module and Thomson Reuters' Datastream / Datastream Worldscope, we take the independent variable figures and construct the correlation matrix between these variables for the 2008-Q1 data sample. The definition of each independent variable is available on section 3.3.2. The number of observations may vary according to availability.

	PRICE	*SIZE*	*LIQUIDITY*	*AGE*	*MOMENTUM*	*DIVYIELD*	*BTM*	*VARIANCE*	*DUMMY_STOXX600*	*DUMMY_LOCAL_CTY*
PRICE	1.00									
SIZE	0.55	1.00								
LIQUIDITY	-0.11	0.33	1.00							
AGE	0.34	0.35	0.04	1.00						
MOMENTUM	0.18	0.12	-0.06	0.03	1.00					
DIVYIELD	0.35	0.42	0.07	0.29	0.03	1.00				
BTM	0.00	-0.01	-0.03	0.01	-0.05	0.07	1.00			
VARIANCE	-0.12	-0.15	-0.02	-0.06	0.00	-0.13	-0.05	1.00		
DUMMY_STOXX600	0.19	0.57	0.44	0.22	0.02	0.24	-0.02	-0.06	1.00	
DUMMY_LOCAL_CTY	0.21	0.57	0.33	0.20	0.04	0.21	-0.03	-0.06	0.70	1.00

4. Results

4.1. Preferred Stock Characteristics by Investment Funds

Table 8 shows the regression results for the entire sample of investment funds (for all the 15 European countries). Panel A contains the results for 2008-Q1 data sample and panel B for 2011-Q1.

Our results suggest that institutional ownership increases with *SIZE*, *LIQUIDITY* (using transaction volume percentage as proxy) and *DIVIDEND YIELD*, and decreases with *PRICE*, *MOMENTUM*, and *VARIANCE* of returns. All these variables except *VARIANCE* are statistically significant for all estimations. Also, surprisingly, the dummy variables for presence in the EURO STOXX 600 and in the local main country indices have negative coefficients, indicating aversion to stocks present in these indices. As we will see later in this section, this occurs because the largest companies that belong to indices seem to be negatively discriminated relative to the smaller companies in those indices in our results. In reality, controlling for this effect, coefficients on these dummy variables become positive, indicating preference for stocks that belong to the main stock market indices.

Concerning the other independent variables, *AGE* and *BTM* are not statistically significant in almost all estimations. This means that it is not conclusive whether investment funds select high or low *AGE* or *BTM* stocks.

Table 8 – Regression for the Entire Sample of Investment Funds

Independent variables were measured at the beginning of each of the analyzed quarters, dependent variable at the end. The definition of the dependent and the independent variables is available on section 3.3.2. Columns represent separate estimations. We use a Censored (TOBIT) model left censored on 0 and right censored on 100. We use Huber-White-corrected standard errors to compensate for Heteroscedasticity (Huber (1967), White (1980)) (t-Statistics in parentheses).

	2008-Q1 data sample			2011-Q1 data sample		
Intercept	-8.24*	-8.21*	-8.46*	-10.63*	-10.54*	-10.45*
	(-24.99)	(-24.40)	(-27.54)	(-34.01)	(-34.43)	(-35.97)
PRICE	-0.26*	-0.26*	-0.26*	-0.29*	-0.29*	-0.29*
	(-10.84)	(-10.91)	(-11.21)	(-11.94)	(-11.88)	(-11.44)
SIZE	0.48*	0.48*	0.48*	0.58*	0.58*	0.59*
	(26.94)	(25.99)	(27.13)	(33.75)	(33.86)	(34.80)
LIQUIDITY	0.33*	0.28*	0.33*	0.33*	0.29*	0.33*
	(9.93)	(9.07)	(9.96)	(9.49)	(8.85)	(9.82)
AGE	-0.06	-0.07*		0.07	0.06	
	(-1.84)	(-2.10)		(1.95)	(1.65)	
MOMENTUM	-0.28*	-0.27*	-0.28*	-0.11*	-0.12*	-0.11*
	(-4.24)	(-4.12)	(-4.26)	(-3.57)	(-3.66)	(-3.57)
DIVYIELD	0.26*	0.25*	0.25*	0.18*	0.17*	0.19*
	(7.10)	(6.83)	(6.90)	(5.04)	(4.63)	(5.15)
BTM	0.14	0.12		-0.38	-0.32	
	(0.54)	(0.48)		(-1.32)	(-1.13)	
VARIANCE	-4.29*	-4.16*	-4.29*	-2.37*	-2.20*	-2.28
	(-3.29)	(-3.28)	(-3.32)	(-2.05)	(-2.00)	(-1.75)
DUMMY_STOXX600	-0.79*		-0.80*	-0.96*		-0.94*
	(-9.59)		(-9.76)	(-11.52)		(-11.20)
DUMMY_LOCAL_CTY		-0.75*			-0.97*	
		(-9.09)			(-11.87)	

*Significant at the 5% level

Discussion

As we further detail in section 4.2, the results on Table 8 suggest behaviors of "prudence" by investment funds. Supporting this argument is the observed positive preference for *SIZE*, *LIQUIDITY*, *DIVIDEND YIELD*, and also for the dummy variables that capture the presence in the main stock market indices. Also supporting this argument is the observed avoidance to stocks with higher *VARIANCE* of returns.

These results are generally in line with previous studies, at least for the most relevant variables. Falkenstein (1996) and Gompers and Metrick (2001) find that institutional preferences increase with Size and Liquidity, and also with presence in the main indices (this last variable only for Gompers and Metrick's study, since Falkenstein's study does not include it). Nevertheless, the results for the other variables described above are not always in line with the results found by these authors. Although we find a positive relation between institutional stock preferences and *DIVIDEND YIELD*, Gompers and Metrick find a negative, statistically significant relation with institutional preference (Falkenstein does not use the variable Dividend Yield). As for *VARIANCE*, our results are in line with Falkenstein's study but contrary to that of Gompers and Metrick, in that this variable is found positively related with investment fund preferences in the study of these authors.

Another result is the negative sign on *MOMENTUM* suggesting that investment funds are averse to stocks with recent higher returns. In other words, as stock returns increase, investment funds tend to lose their interest in buying those stocks, and as stock returns decrease, investment funds tend to be more inclined to buy them. This suggests that investment funds exhibit contrarian behavior, buying on low returns and not buying (or selling) on high returns. Falkenstein (1996) and Gompers and Metrick (2001) find similar results (although for the former researcher *MOMENTUM* is only found statistically significant for one of the two samples used).

Our results for *AGE* are somewhat surprising. Considering evidence of "prudent" behavior by investment funds, we would expect to find a statistically relevant, positive relation with institutional holdings, indicating that investment funds would prefer older, more mature companies. However, this variable was found not significant on almost all our estimations. Therefore, we find inconclusive results concerning institutional preferences regarding the age of stocks. These results are not similar to previous studies. Falkenstein (1996) and Gompers and Metrick (2001) find that this variable is statistically relevant and positively related with institutional ownership.

Our results further indicate that *BTM* is not statistically significant across all estimations; therefore it is inconclusive whether investment funds prefer or are averse to stocks with high or low *BTM*. This result is contrary to previous studies: Falkenstein

(1996) and Gompers and Metrick (2001) find a positive relation between this variable and institutional holdings.

Finally, we find that investment funds avoid stocks with high prices. Evidence provided in the studies referred above shows the opposite: in both studies, Price is found statistically significant but with a positive relation with institutional ownership.

Aversion to stocks that belong to stock market indices

The negative coefficients on the dummy variables for presence on the main stock market indices suggest that European investment funds demonstrate aversion to stocks that belong to these indices, even after the other characteristics have been controlled for. This is contrary to our expectations, as one would expect funds to favor stocks that belong to the main indices relative to others. Seeking to further understand this phenomenon, we added additional variables to capture the *SIZE* effect within the stocks that belong to indices. We include one variable for the EURO STOXX 600 dummy and another one for the local stock market indices.

Table 9 shows the results of this analysis. These new variables are called SIZE*DUMMY_STOXX600 for the EURO STOXX 600 index and SIZE*DUMMY_LOCAL_CTY for the country local indices. When these cross variables are added to the regressions, their coefficient is negative and the coefficients on the corresponding index dummy variables become positive. In other words, when we control for influence of *SIZE* on the dummy variables for presence in indices, we find that investment funds do prefer to invest in stocks that belong to those indices. As long as we control for this factor, the *SIZE* influence on the dummy variables is no longer visible.

Note that since the results obtained are very similar between the EURO STOXX 600 dummy and the local country indices dummy we will use only the EURO STOXX 600 dummy from now on in subsequent analyses.

Table 9 – Regression controlling for Size on Index Dummy Variables

From the results obtained for the entire samples of investment funds, we add two additional variables to control for Size in the index dummy variables. Independent variables were measured at the beginning of each of the analyzed quarters, dependent variable at the end. The definition of the dependent and the independent variables is available on section 3.3.2. Columns represent separate estimations. We use a Censored (TOBIT) model left censored on 0 and right censored on 100. We use Huber-White-corrected standard errors to compensate for Heteroscedasticity (Huber (1967), White (1980)) (t-Statistics in parentheses).

	2008-Q1 data sample		2011-Q1 data sample	
Intercept	-8.62*	-8.63*	-11.23*	-11.19*
	(-25.23)	(-24.46)	(-34.83)	(-35.26)
PRICE	-0.27*	-0.27*	-0.31*	-0.31*
	(-11.17)	(-11.29)	(-12.41)	(-12.56)
SIZE	0.50*	0.51*	0.62*	0.62*
	(26.90)	(25.78)	(34.38)	(34.59)
LIQUIDITY	0.31*	0.26*	0.31*	0.27*
	(9.23)	(8.29)	(9.07)	(8.10)
AGE	-0.07	-0.07*	0.07*	0.07
	(-1.89)	(-2.01)	(1.97)	(1.83)
MOMENTUM	-0.27*	-0.27*	-0.12*	-0.12*
	(-4.04)	(-4.10)	(-3.70)	(-3.74)
DIVYIELD	0.25*	0.24*	0.17*	0.16*
	(6.69)	(6.66)	(4.71)	(4.57)
BTM	0.10	0.01	-0.40	-0.40
	(0.37)	(0.48)	(-1.39)	(-1.37)
VARIANCE	-4.12*	-3.95*	-2.20	-2.03
	(-3.26)	(-3.23)	(-1.95)	(-1.91)
DUMMY_STOXX600	7.13*		11.83*	
	(8.37)		(14.49)	
SIZE*DUMMY_STOXX600	-0.35*		-0.57*	
	(-9.35)		(-15.74)	
DUMMY_LOCAL_CTY		6.23*		9.73*
		(6.65)		(12.48)
SIZE*DUMMY_LOCAL_CTY		-0.31*		-0.48*
		(-7.45)		(-13.74)

*Significant at the 5% level

Analysis excluding outliers

Descriptive statistics shown on the previous chapter suggest that there are some "outlier" funds. We define an "outlier" fund as one that meets at least one of the

following two criteria: (a) a fund having less than 15 positions in total in its portfolio, and (b) a fund owning at least one position with 50% or more shares outstanding of a specific company. With this analysis we examine whether (a) small funds or funds highly concentrated or (b) possible isolated cases of sizeable ownership by investment funds motivated by final investor's profile could significantly influence the results we report on Table 9.

Table 10 shows the results for the estimations excluding the "outlier" funds. For the sample 2008-Q1, we excluded 147 funds that had less than 15 positions and we excluded a total of 5 funds that owned at least 50% of a company's shares. For the sample 2011-Q1, we excluded 165 funds that had less than 15 positions and 4 funds that had positions above 50% of company outstanding shares.

From Table 10 we conclude that the results are very similar to the ones found for the entire sample of funds[3]. The coefficients have the same sign as before and are statistically significant in all cases. Therefore, we can conclude that the main results are not contaminated by "outlier" funds.

[3] We exclude the dummy variable for inclusion in the local stock market indices *DUMMY_LOCAL_CTY* and its cross variable with *SIZE* (SIZE*DUMMY_LOCAL_CTY). Unreported results indicate that the results are similar using these variables.

Table 10 – Regression Results for entire Sample, Outliers excluded

Starting from the entire sample of investment funds, we exclude the ones considered "outliers" and re-generate the estimations. An outlier is a fund that fulfills at least one of two criteria: (a) having less than 15 positions in total in its portfolio, and (b) owning at least one position with 50% or more shares of a specific company. Independent variables were measured at the beginning of each of the analyzed quarters, dependent variable at the end. The definition of the dependent and the independent variables is available on section 3.3.2. Columns represent separate estimations. We use a Censored (TOBIT) model left censored on 0 and right censored on 100. We use Huber-White-corrected standard errors to compensate for Heteroscedasticity (Huber (1967), White (1980)) (t-Statistics in parentheses).

	2008-Q1 data sample	2011-Q1 data sample
Intercept	-8.64*	-11.22*
	(-25.25)	(-34.75)
PRICE	-0.27*	-0.31*
	(-11.74)	(-12.48)
SIZE	0.50*	0.62*
	(26.88)	(34.11)
LIQUIDITY	0.31*	0.32*
	(9.39)	(9.24)
AGE	-0.06	0.08*
	(-1.68)	(2.15)
MOMENTUM	-0.27*	-0.12*
	(-4.08)	(-3.65)
DIVYIELD	0.25*	0.17*
	(6.69)	(4.78)
BTM	0.09	-0.43
	(0.34)	(-1.47)
VARIANCE	-4.26*	-2.27*
	(-3.27)	(-1.96)
DUMMY_STOXX600	7.19*	11.85*
	(8.43)	(14.54)
SIZE*DUMMY_STOXX600	-0.36*	-0.58*
	(-9.43)	(-15.80)

*Significant at the 5% level

4.2. Evidence of Prudent Behavior

The findings in section 4.1 revealed that investment funds analyzed in our study prefer investing in larger, more liquid stocks and stocks that belong to indices and that pay higher dividends. This statement is generally in line with evidence related with investment in "safer" and "more prudent" stocks that we founded in section 2.2. After all, larger companies tend to be more mature and more well-known than smaller companies, and to have less probability of bankruptcy; higher levels of liquidity mean that these stocks are more easily negotiable; and stocks that belong to indices are associated with higher levels of reputation, popularity and credibility. All these factors help solidify theories of more "prudent" behavior by institutions since they can easily be used by institutions to argument in favor of an adequate investment policy, in the case of any legal action moved against those institutions.

4.3. Preferences by Region

The results discussed so far allow us to take conclusions about the general preferences of European investment funds. We now make additional analyses based on subsamples of funds or stocks so as to reveal other patterns of differences across sub-categories of funds.

<u>PIIGS versus non-PIIGS stocks</u>

An interesting analysis to complement the results already obtained is to verify whether funds exhibit geographical preferences. In this sub-section we test for preference or aversion to the subset of PIIGS countries (Portugal, Ireland, Italy, Greece and Spain). These countries received this designation for public finance imbalances that became evident after the recent European financial crisis. In addition to this fact, PIIGS

can be distinguished from other European countries because they are located in the periphery of Europe. Most of them are southern European countries, while Ireland is situated on the northwestern area of Europe, but in any case all are away from the center of Europe. With this analysis we intend to investigate whether these factors influence the financial decisions of investment funds. In addition, another possibility for analysis is to investigate whether the recent financial crisis that affected Europe in any way changed investment funds preferences for stocks on these countries. We can perform this analysis by comparing the preferences between the 2008-Q1 and 2011-Q1 data samples.

Table 11 displays the results of this analysis. Starting with the base variables (i.e. the variables already covered), we add two additional ones. The first one, that we've called *PIIGS*, is a dummy variable that assumes the value of 1 for stocks domiciled in the PIIGS countries and 0 otherwise. The second variable is the product between that variable and the variable *SIZE*. The objective of the second variable is to control for *SIZE* on the stocks domiciled on the PIIGS countries. As seen previously on section 4.1 for the dummy variables for presence in the main indices, not controlling for *SIZE* could lead to erroneous conclusions.

The results are somewhat mixed. After controlling for *SIZE* among the stocks that are domiciled on the PIIGS countries, the coefficient on the *PIIGS* variable becomes positive. However, this variable is only statistically significant for the 2011-Q1 data sample with a relatively low coefficient-to-standard error ratio. Therefore, there seems to be weak evidence that European investment funds may prefer to allocate their portfolios to stocks of PIIGS countries[4].

[4] Unreported analyses indicate that these results are similar including the cross variable for the EURO STOXX 600 dummy variable (SIZE* DUMMY_STOXX600).

Table 11 – Regression by PIIGS or non-PIIGS Stocks

For each stock we add the dummy variable PIIGS. This variable assumes the value of 1 if the stock is located in a PIIGS country and 0 otherwise. Independent variables were measured at the beginning of each of the analyzed quarters, dependent variable at the end. The definition of the dependent and the independent variables is available on section 3.3.2. Columns represent separate estimations. We use a Censored (TOBIT) model left censored on 0 and right censored on 100. We use Huber-White-corrected standard errors to compensate for Heteroscedasticity (Huber (1967), White (1980)) (t-Statistics in parentheses).

	2008-Q1		2011-Q1	
Intercept	-8.54*	-8.68*	-10.79*	-11.00*
	(-25.81)	(-25.84)	(-34.51)	(-34.62)
PRICE	-0.30*	-0.30*	-0.33*	-0.33*
	(-12.34)	(-12.35)	(-12.80)	(-12.86)
SIZE	0.51*	0.51*	0.60*	0.61*
	(28.14)	(27.81)	(33.94)	(33.81)
LIQUIDITY	0.34*	0.33*	0.32*	0.33*
	(10.26)	(10.20)	(9.43)	(9.57)
AGE	-0.06	-0.06	0.07	0.06
	(-1.60)	(-1.71)	(1.91)	(1.69)
MOMENTUM	-0.22*	-0.23*	-0.15*	-0.15*
	(-3.42)	(-3.52)	(-4.38)	(-4.44)
DIVYIELD	0.25*	0.25*	0.17*	0.18*
	(6.77)	(6.83)	(4.71)	(4.94)
BTM	0.14	0.10	-0.20	-0.20
	(0.54)	(0.50)	(-0.59)	(-0.77)
VARIANCE	-4.92*	-4.88*	-2.68*	-2.65*
	(-3.43)	(-3.41)	(-2.02)	(-2.00)
DUMMY_STOXX600	-0.86*	-0.85*	-0.98*	-0.97*
	(-10.77)	(-10.50)	(-11.95)	(-11.84)
PIIGS	-0.66*	0.58	-0.54*	1.36*
	(-10.57)	(0.97)	(-7.59)	(2.42)
SIZE*PIIGS		-0.06*		-0.10*
		(-2.16)		(-3.50)

*Significant at the 5% level

EURO versus non-EURO stocks

We also test for preference or aversion to stocks of companies in countries that belong to the Euro group. Out of the 15 countries considered in our analysis, 12

countries have adopted the Euro (Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal and Spain). The countries that did not adopt the Euro are Denmark, Sweden and the United Kingdom. With this analysis we aim to investigate whether the adoption of the single currency has had any effect on investment funds preferences.

Table 12 displays the results of this analysis. As performed on the PIIGS analysis, we include a dummy variable for the countries that adopted the Euro and another variable for the product of this variable with variable *SIZE*. Again, the dummy variable takes the value of 1 if the stock is located in a Euro country and a value of zero otherwise.

The results presented on Table 15 are inconclusive. On one hand, the coefficient on the dummy variable is negative and statistically significant whenever it is considered alone. However, when we control for *SIZE* with the cross-variable, the dummy variable is not statistically significant, for both data samples[5].

[5] Unreported analyses indicate that these results are similar including the cross variable for the EURO STOXX 600 dummy variable (SIZE* DUMMY_STOXX600).

Table 12 – Regression by EURO or non-EURO Stocks

We add the dummy variable EURO. This variable assumes the value of 1 if the stock is located in a country that belongs to the Euro Group and 0 otherwise. Independent variables were measured at the beginning of each of the analyzed quarters, dependent variable at the end. The definition of the dependent and the independent variables is available on section 3.3.2. Columns represent separate estimations. We use a Censored (TOBIT) model left censored on 0 and right censored on 100. We use Huber-White-corrected standard errors to compensate for Heteroscedasticity (Huber (1967), White (1980)) (t-Statistics in parentheses).

	2008-Q1		2011-Q1	
Intercept	-8.05*	-8.41*	-10.04*	-10.21*
	(-25.07)	(-20.82)	(-33.41)	(-27.90)
PRICE	-0.15*	-0.15*	-0.17*	-0.17*
	(-6.60)	(-6.66)	(-7.13)	(-7.12)
SIZE	0.49*	0.51*	0.58*	0.59*
	(28.22)	(22.68)	(34.96)	(28.57)
LIQUIDITY	0.27*	0.27*	0.25*	0.25*
	(8.40)	(8.21)	(7.59)	(7.59)
AGE	-0.08*	-0.08*	0.04	0.03
	(-2.26)	(-2.35)	(1.04)	(1.00)
MOMENTUM	-0.24*	-0.25*	-0.17*	-0.18*
	(-3.80)	(-3.88)	(-4.94)	(-4.99)
DIVYIELD	0.22*	0.22*	0.14*	0.15*
	(6.25)	(6.17)	(4.16)	(4.18)
BTM	0.15	0.16	-0.14	-0.14
	(0.61)	(0.62)	(-0.47)	(-0.46)
VARIANCE	-4.11*	-4.03*	-2.46*	-2.41*
	(-3.06)	(-3.05)	(-2.03)	(-2.01)
DUMMY_STOXX600	-0.88*	-0.88*	-1.02*	-1.03*
	(-11.13)	(-11.18)	(-12.93)	(-12.97)
EURO	-0.74*	-0.10	-0.84*	-0.51
	(-14.01)	(-0.23)	(-15.83)	(-1.26)
SIZE*EURO		-0.03		-0.02
		(-1.60)		(-0.81)

*Significant at the 5% level

PIIGS versus non-PIIGS funds (domiciliation)

We also test for different preferences in funds according to their geographic domiciliation. Specifically, we analyze whether funds located in PIIGS have different preferences compared with funds located in or non-PIIGS countries.

Table 13 shows the results. The majority of explanatory variables are still statistically significant in all or almost all cases, including *SIZE*, *PRICE*, *LIQUIDITY*, *MOMENTUM*, and the dummy variable for presence on the EURO STOXX600. The signs of the coefficients are also generally the same. The main difference is for Dividend Yield (statistically significant only for non-PIIGS countries, positive sign). Overall the results of this evaluation suggest that there are close to no relevant differences between investment fund preferences for PIIGS and non-PIIGS countries and also that no relevant changes occurred between the period before the Euro financial crisis and the one within the crisis.

Table 13 – Regression by PIIGS or non-PIIGS Fund Preferences

Independent variables were measured at the beginning of each of the analyzed quarters, dependent variable at the end. The definition of the dependent and the independent variables is available on section 3.3.2. Columns represent separate estimations. We use a Censored (TOBIT) model left censored on 0 and right censored on 100. We use Huber-White-corrected standard errors to compensate for Heteroscedasticity (Huber (1967), White (1980)) (t-Statistics in parentheses).

	2008-Q1		2011-Q1	
	PIIGS	non-PIIGS	PIIGS	non-PIIGS
Intercept	-7.06*	-8.74*	-6.54*	-11.32*
	(-16.32)	(-25.40)	(-17.01)	(-34.31)
PRICE	-0.06*	-0.26*	-0.09*	-0.29*
	(-2.62)	(-10.68)	(-4.35)	(-11.54)
SIZE	0.30*	0.51*	0.31*	0.62*
	(14.42)	(26.70)	(15.78)	(33.55)
LIQUIDITY	0.18*	0.31*	0.02	0.34*
	(5.06)	(9.06)	(0.53)	(9.64)
AGE	0.00	-0.07*	-0.02	0.07
	(0.00)	(-2.07)	(-0.74)	(1.92)
MOMENTUM	0.09*	-0.34*	-0.59*	-0.08*
	(2.15)	(-4.95)	(-7.78)	(-2.66)
DIVYIELD	0.07	0.23*	-0.03	0.17*
	(1.47)	(6.11)	(-0.74)	(4.77)
BTM	-0.04	0.12	0.43*	-0.69*
	(-0.10)	(0.46)	(3.12)	(-2.32)
VARIANCE	-7.27*	-3.54*	-6.67*	-1.97*
	(-2.02)	(-3.03)	(-3.49)	(-1.97)
DUMMY_STOXX600	2.47*	7.13*	5.07*	11.75*
	(3.78)	(8.24)	(8.71)	(14.45)
SIZE*DUMMY_STOXX600	-0.12*	-0.35*	-0.23*	-0.57*
	(-4.02)	(-9.13)	(-8.64)	(-15.67)

*Significant at the 5% level

EURO versus non-EURO Funds

We now test for differences in preferences between investment funds located in Euro-countries and those in other European countries (Denmark, Sweden and the United Kingdom).

Table 14 contains the results for Euro and non-Euro funds. The results are similar except for the variable *PRICE*.

Further results suggest no substantial differences between EURO and non-EURO fund preferences before and after the financial crisis.

Table 14 – Regression by EURO or non-EURO Fund Preferences

Independent variables were measured at the beginning of each of the analyzed quarters, dependent variable at the end. The definition of the dependent and the independent variables is available on section 3.3.2. Columns represent separate estimations. We use a Censored (TOBIT) model left censored on 0 and right censored on 100. We use Huber-White-corrected standard errors to compensate for Heteroscedasticity (Huber (1967), White (1980)) (t-Statistics in parentheses).

	2008-Q1		2011-Q1	
	EURO	non-EURO	EURO	non-EURO
Intercept	-7.48*	-9.18*	-7.89*	-12.26*
	(-23.74)	(-25.12)	(-27.07)	(-33.37)
PRICE	0.07*	-0.36*	0.05*	-0.41*
	(3.49)	(-13.55)	(2.84)	(-14.18)
SIZE	0.37*	0.52*	0.41*	0.65*
	(22.05)	(25.92)	(27.02)	(31.67)
LIQUIDITY	0.17*	0.34*	0.08*	0.39*
	(6.05)	(9.99)	(2.77)	(10.38)
AGE	-0.08*	-0.06	-0.07*	0.10*
	(-2.63)	(-1.48)	(-2.38)	(2.53)
MOMENTUM	0.01	-0.32*	-0.26*	-0.07*
	(0.32)	(-4.35)	(-5.31)	(-2.20)
DIVYIELD	0.15*	0.22*	0.02	0.19*
	(4.20)	(5.60)	(0.56)	(4.79)
BTM	0.74	-0.04	0.45*	-0.90*
	(1.61)	(-0.15)	(2.75)	(-2.72)
VARIANCE	-2.55*	-3.56*	-2.49*	-1.69
	(-1.97)	(-2.83)	(-2.14)	(-1.79)
DUMMY_STOXX600	4.66*	7.81*	6.90*	12.66*
	(7.32)	(8.41)	(11.54)	(14.16)
SIZE*DUMMY_STOXX600	-0.23*	-0.38*	-0.33*	-0.61*
	(-7.96)	(-9.23)	(-12.22)	(-15.20)

*Significant at the 5% level

4.4. Preferences by Investment Fund Characteristics

Investment styles

We also compare investment fund preferences by investment style. Thomson Reuters categorizes investment funds into a total of 16 groups based on its specific knowledge of the historic investment behavior of these funds. These groups include Growth, Value, Yield, Sector specific, Mixed style and Hedge Funds, among other categories (Thomson Reuters (2013) provides a detailed description of each category it uses to categorize funds). Since several of these groups have only a small number of funds, and therefore are unsuitable for comparison purposes, we further grouped these categories into four classes of funds based on their description. The four final classes were Growth, Value, Specialty and Others.

Growth funds are funds that generally invest in mid or large capitalization and are willing to pay a premium in Price-to-Earnings ratio for growth over the long term. On the other hand, Value funds focus on buying companies at relatively low valuations when measured by the Price-to-Earnings ratio. These funds prefer companies that are undervalued when compared to the industry sector, the overall market or themselves at an earlier date.

Specialty funds, on the other hand, are one of the 16 groups defined by Thomson Reuters and are used to categorize a fund that does not meet the criteria for any of the other 15 investment styles. These may be funds that hold a particularly high concentration of a single stock or a very small set of stocks, or specialize in convertible securities. Specialty funds are the ones in the highest number, as categorized by Thomson Reuters. Finally, funds we classify as "Others" are the funds that do not meet any of the requirements described for the groups above (i.e. Thomson Reuters attributes them to other groups) but are not enough to be used on a comparison alone due to lack of observations. We include all these funds on this specific group.

Table 15 shows the estimation results for the four instrument styles. Panel A contains the estimations for the 2008-Q1 data sample and panel B the estimations for

the 2011-Q1 sample. Coefficients for almost all independent variables have the same signal, statistical significance is almost always the same and the absolute values are in the same range. The results suggest that regardless of the investment style, the preferred characteristics of funds are the same.

Table 15 – Regression by Investment Style

Independent variables were measured at the beginning of each of the analyzed quarters, dependent variable at the end. The definition of the dependent and the independent variables is available on section 3.3.2. Columns represent separate estimations. We use a Censored (TOBIT) model left censored on 0 and right censored on 100. We use Huber-White-corrected standard errors to compensate for Heteroscedasticity (Huber (1967), White (1980)) (t-Statistics in parentheses).

Panel A: 2008-Q1 data sample				
	Specialty	Growth	Value	Others
Intercept	-7.61*	-8.51*	-7.15*	-6.64*
	(-24.22)	(-24.50)	(-27.26)	(-23.66)
PRICE	-0.22*	-0.22*	-0.08*	-0.09*
	(-9.98)	(-8.98)	(-5.20)	(-4.76)
SIZE	0.41*	0.43*	0.35*	0.34*
	(23.95)	(23.13)	(25.11)	(21.33)
LIQUIDITY	0.32*	0.25*	0.21*	0.15*
	(10.35)	(8.42)	(9.58)	(6.20)
AGE	0.01	-0.01	-0.03	-0.08*
	(0.28)	(-0.34)	(-1.13)	(-2.57)
MOMENTUM	-0.23*	-0.01	-0.13*	-0.09
	(-3.58)	(-0.27)	(-2.60)	(-1.67)
DIVYIELD	0.25*	0.07	0.09*	0.19*
	(7.24)	(1.75)	(3.54)	(5.86)
BTM	-0.13	-0.09	0.14	0.44
	(-0.59)	(-0.34)	(0.41)	(1.33)
VARIANCE	-4.19*	-2.71	-0.70	-1.00
	(-3.42)	(-1.69)	(-1.31)	(-1.30)
DUMMY_STOXX600	7.67*	6.55*	4.98*	4.03*
	(10.18)	(9.79)	(10.04)	(6.09)
SIZE*DUMMY_STOXX600	-0.38*	-0.31*	-0.23*	-0.19*
	(-11.39)	(-10.45)	(-10.50)	(-6.36)
Number of funds	404	166	141	222

*Significant at the 5% level

Panel B: 2011-Q1 data sample				
	Specialty	Growth	Value	Others
Intercept	-9.79*	-8.54*	-10.11*	-7.71*
	(-30.43)	(-28.95)	(-34.88)	(-25.31)
PRICE	-0.29*	-0.21*	-0.10*	-0.10*
	(-12.57)	(-9.34)	(-5.66)	(-4.81)
SIZE	0.51*	0.43*	0.50*	0.38*
	(29.47)	(26.70)	(30.95)	(22.75)
LIQUIDITY	0.36*	0.10*	0.27*	0.09*
	(11.39)	(3.26)	(11.54)	(3.40)
AGE	0.10*	0.05	0.05	0.01
	(2.86)	(1.64)	(1.77)	(0.50)
MOMENTUM	-0.08*	-0.05*	-0.15*	-0.05*
	(-2.70)	(-2.20)	(-4.71)	(-2.09)
DIVYIELD	0.13*	0.07*	0.04	0.14*
	(4.01)	(2.29)	(1.52)	(4.41)
BTM	-0.26	-0.50*	-0.23	-0.53
	(-1.39)	(-1.99)	(-0.75)	(-1.96)
VARIANCE	-4.40*	-0.30	0.27	-0.05
	(-4.04)	(-0.51)	(0.97)	(-0.09)
DUMMY_STOXX600	10.87*	7.44*	9.51*	6.90*
	(14.02)	(12.03)	(19.04)	(10.36)
SIZE*DUMMY_STOXX600	-0.53*	-0.35*	-0.45*	-0.32*
	(-15.34)	(-12.55)	(-19.67)	(-10.71)
Number of funds	393	160	137	205

*Significant at the 5% level

Investment fund turnover

Another classification that is available from Thomson Reuters' One Banker – Ownership module is the turnover[6] of each fund. Thomson Reuters classifies each fund into one of three classes (Low, Moderate and High turnover), but some funds have this classification empty. A fund with turnover classified as "Low" has an annual turnover rate that is less than 50%, or an average holding period of above two years, indicating that the fund has a general preference for long-term investment. Funds with Moderate turnover have an annual turnover rate of between 50% and 100%, or an average holding

[6] A fund's turnover represents the portion of a fund's holdings that are bought and sold during the course of a year.

period of between 1 and 2 years, and therefore we assume they belong to a profile of medium term investment horizon. Funds classified as “High” turnover have an annual portfolio turnover rate higher than 100%, an indication of either a short term investment horizon or more frequent trading around a core position.

We analyze whether the time horizon of each fund manager may impact the fund’s stock preferences.

Table 16 presents the estimation results. Panel A contains the estimations for the 2008-Q1 data sample; panel B contains the estimations for the 2011-Q1 sample.

The sign of the coefficients shown on Table 16 are the same as observed for the entire sample of investment funds (section 4.1). Yet we can observe a somewhat cascading effect when we compare the Low, Moderate and High turnover funds especially on the *SIZE*, *LIQUIDITY* and EURO STOXX 600 dummy variable. Investment funds classified with Low turnover generally are more inclined to invest in larger, more liquid companies and that pay higher dividends when compared with funds classified with Moderate turnover or High turnover. Moreover, funds classified with Moderate turnover seem also more inclined to invest in larger and more liquid companies than funds classified with High turnover. This suggests that funds that are more inclined to invest in the long-term exhibit more strictly the preferences towards “prudent” stocks, as referred on section 2.2. The same principle can be used inversely: the results suggest that funds with short term horizon are less conservative, in terms of investing in larger, more “prudent” stocks.

While the coefficient on *DIVYIELD* is statistically significant for Low turnover funds, it is not for Moderate or High turnover funds. And while low turnover funds seem to dislike *MOMENTUM* stocks, high turnover funds seem to praise that characteristic.

Table 16 – Regression by Turnover Rate

We use the Turnover Rate classification as given by Thomson Reuters to divide investment funds into four categories: Low, Moderate, High and unclassified (empty). Independent variables were measured at the beginning of each of the analyzed quarters, dependent variable at the end. The definition of the dependent and the independent variables is available on section 3.3.2. Columns represent separate estimations. We use a Censored (TOBIT) model left censored on 0 and right censored on 100. We use Huber-White-corrected standard errors to compensate for Heteroscedasticity (Huber (1967), White (1980)) (t-Statistics in parentheses).

Panel A: 2008-Q1 data sample				
	Low	Moderate	High	(Not available)
Intercept	-8.67*	-7.79*	-4.52*	-6.14*
	(-24.78)	(-26.54)	(-21.88)	(-23.73)
PRICE	-0.24*	-0.19*	-0.05*	-0.10*
	(-9.85)	(-9.39)	(-4.76)	(-5.47)
SIZE	0.46*	0.43*	0.21*	0.31*
	(24.49)	(27.21)	(18.85)	(21.76)
LIQUIDITY	0.29*	0.28*	0.15*	0.20*
	(8.85)	(9.74)	(9.93)	(9.19)
AGE	0.00	-0.14*	0.03	-0.02
	(-0.03)	(-4.66)	(1.49)	(-0.88)
MOMENTUM	-0.30*	-0.10	0.06*	-0.15*
	(-4.48)	(-1.64)	(2.31)	(-2.84)
DIVYIELD	0.23*	0.08*	0.08*	0.13*
	(6.01)	(2.38)	(3.92)	(4.81)
BTM	-0.04	0.03	0.13	-0.13
	(-0.15)	(0.12)	(0.60)	(-0.65)
VARIANCE	-4.29*	-2.46*	-1.66*	-1.19
	(-2.75)	(-1.97)	(-1.99)	(-1.88)
DUMMY_STOXX600	7.14*	6.87*	2.73*	4.44*
	(8.81)	(10.58)	(7.96)	(7.68)
SIZE*DUMMY_STOXX600	-0.35*	-0.33*	-0.14*	-0.21*
	(-9.75)	(-11.50)	(-8.80)	(-8.04)
Number of funds	386	288	88	171

*Significant at the 5% level

Panel B: 2011-Q1 data sample				
	Low	Moderate	High	(Not available)
Intercept	-11.15*	-8.71*	-4.45*	-6.82*
	(-34.53)	(-30.89)	(-22.36)	(-25.31)
PRICE	-0.30*	-0.17*	-0.04*	-0.12*
	(-11.75)	(-9.05)	(-4.14)	(-7.13)
SIZE	0.58*	0.46*	0.21*	0.33*
	(32.13)	(29.64)	(20.57)	(23.52)
LIQUIDITY	0.31*	0.18*	0.10*	0.18*
	(9.26)	(6.80)	(7.22)	(8.09)
AGE	0.12*	-0.05	0.02	0.06*
	(3.45)	(-1.81)	(1.43)	(2.33)
MOMENTUM	-0.12*	-0.05*	0.00	-0.10*
	(-3.80)	(-1.99)	(1.05)	(-3.71)
DIVYIELD	0.20*	0.04	0.01	0.07*
	(5.51)	(1.52)	(0.59)	(2.70)
BTM	-0.55	-0.36	-0.28*	-0.02
	(-1.95)	(-1.21)	(-4.17)	(-0.13)
VARIANCE	-1.87	-0.16	-0.33	-2.14*
	(-1.73)	(-0.28)	(-1.50)	(-2.61)
DUMMY_STOXX600	11.44*	9.14*	4.41*	5.73*
	(15.06)	(15.91)	(15.34)	(10.24)
SIZE*DUMMY_STOXX600	-0.56*	-0.43*	-0.21*	-0.27*
	(-16.30)	(-16.68)	(-15.75)	(-10.74)
Number of funds	384	283	91	137

*Significant at the 5% level

4.5. Preferences by Domestic or Foreign Investment

We further analyze preferences of the investment funds included in our sample when they engage in domestic or foreign investment. Our goal is to understand up to which extent investment funds use the same criteria to invest in domestic and in foreign markets. In order to calculate stock ownership by investment funds on “Domestic” investment, for each stock we sum the total ownership by funds located in the same country as that stock. To calculate institutional ownership on “Foreign” investment, we

sum the total ownership by funds in countries other than that of the stock. We then perform the regressions based on this data.

Table 17 displays the estimation results. Except for *VARIANCE*, the most relevant variables such as *SIZE*, *LIQUIDITY* and the EURO STOXX 600 dummy are still statistically significant in all cases. In terms of the sign of the estimated coefficients, the coefficients are consistent except for *PRICE*. For *PRICE*, intermittent signals on this variable may suggest that investment funds tend to prefer lower-priced stocks on their respective domestic markets and higher-priced stocks on foreign markets.

Note that in accordance with the other analyses we perform in this dissertation the figures on Table 17 only consider funds and stocks located in the 15 countries under analysis (i.e. we exclude funds located in other countries and stocks from other markets, which could impact the results obtained).

Table 17 – Regression by Domestic or Foreign Investment

Independent variables were measured at the beginning of each of the analyzed quarters, dependent variable at the end. The definition of the dependent and the independent variables is available on section 3.3.2. Columns represent separate estimations. We use a Censored (TOBIT) model left censored on 0 and right censored on 100. We use Huber-White-corrected standard errors to compensate for Heteroscedasticity (Huber (1967), White (1980)) (t-Statistics in parentheses).

	2008-Q1		2011-Q1	
	Domestic	Foreign	Domestic	Foreign
Intercept	-8.48*	-8.27*	-11.10*	-9.69*
	(-23.17)	(-25.69)	(-30.65)	(-30.79)
PRICE	-0.37*	0.07*	-0.44*	0.07*
	(-13.67)	(3.66)	(-15.55)	(3.91)
SIZE	0.46*	0.43*	0.57*	0.51*
	(22.96)	(25.39)	(28.56)	(30.13)
LIQUIDITY	0.32*	0.24*	0.28*	0.28*
	(9.12)	(8.29)	(7.15)	(10.52)
AGE	0.00	-0.12*	0.17*	-0.11*
	(0.06)	(-4.08)	(4.26)	(-3.76)
MOMENTUM	-0.24*	-0.14*	-0.08*	-0.15*
	(-3.23)	(-2.26)	(-2.48)	(-4.22)
DIVYIELD	0.33*	0.03	0.26*	-0.06*
	(8.15)	(0.90)	(6.40)	(-2.06)
BTM	-0.05	0.71	-0.64*	0.28*
	(-0.22)	(1.55)	(-2.07)	(2.72)
VARIANCE	-4.34*	-2.55	-2.77	-1.45
	(-3.03)	(-1.91)	(-1.88)	(-1.85)
DUMMY_STOXX600	8.51*	4.54*	11.86*	8.55*
	(8.11)	(6.42)	(11.05)	(12.91)
SIZE*DUMMY_STOXX600	-0.41*	-0.22*	-0.58*	-0.41*
	(-8.92)	(-7.02)	(-11.96)	(-13.70)

*Significant at the 5% level

5. Conclusions

We find evidence that European investment funds tend to invest primarily in larger, more liquid, high dividend, low volatility stocks that belong to the main stock market indices and tend to avoid stocks with higher levels of 12-month positive momentum.

The findings in this dissertation are generally consistent with previous studies examining U.S. funds (e.g. Falkenstein (1996) and Gompers and Metrick (2001)). These studies also find a predominance of preference for larger, more liquid stocks and an avoidance of stocks with positive Momentum. Furthermore, our results that investment funds tend to prefer stocks that belong to the main stock market indices are in accordance to Gompers and Metrick's results (Falkenstein does not use this variable).

Our findings are also in line with previous studies that suggest that funds tilt their portfolios to more "prudent" stocks (e.g. Badrinath *et al.* (1989)). The main observed tendency for funds to prefer larger, more liquid, less volatile stocks that belong to the main stock market indices suggests that funds choose stocks they perceive as more prudent when managing their portfolios.

We find no statistically significant differences in preferences between PIIGS (Portugal, Ireland, Italy, Greece and Spain) and non-PIIGS funds, and between different fund investment styles.

We find no statistically significant difference between funds located in countries that adopted the Euro versus funds located in other countries, except for the variable Stock Price; and between domestic or foreign investment, also except for the variable Stock Price. When comparing preferences by fund turnover, our results suggest that low-turnover funds (typically with a long-term horizon) exhibit more strongly "prudent" man law investment behavior than high-turnover funds.

Our results contribute to fill a gap in research since previous studies of the preferences of institutions were almost entirely based on U.S. institutional fund data. This dissertation may help individual investors become more informed about the behavior of institutions that manage their savings in a fiduciary relationship, and our

results and those of similar studies may be useful to the regulation and supervision of prudent-man laws.

Although covering different aspects of institutional preference, this investigation has important limitations. Our studies use only two snapshots of data, the first quarter of 2008 and the first quarter of 2011. Also, our research is based only on European stocks from 15 countries. This does not allow for a full description of institutional preferences throughout the World.

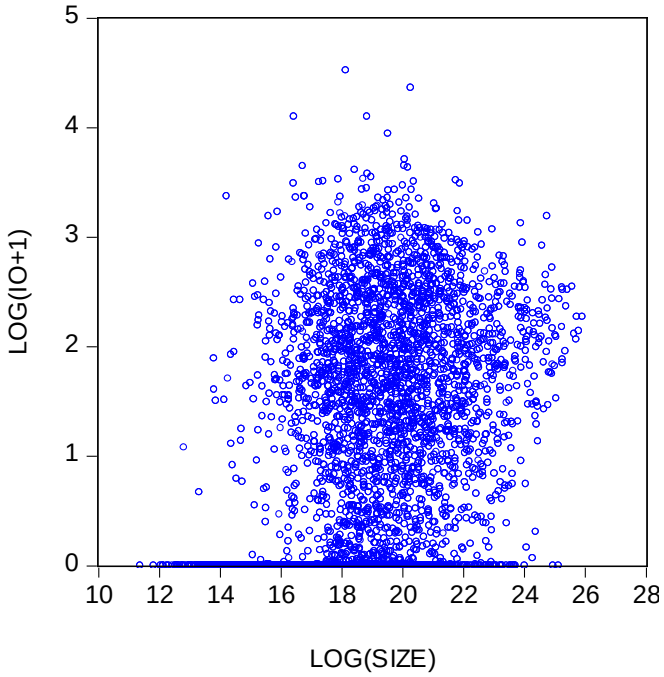
Due to these limitations, future studies could make use of time-series cross-sectional variation in the data to learn more about investment fund preferred stock characteristics.

Appendix I: Evidence of Heteroscedasticity

As shown below, we have evidence of heteroscedasticity on the data samples used in our study. Heteroscedasticity, or the absence of homoscedasticity, exists when the variance of the dependent variable varies between subsamples of the data sample under study. Figure I.1 shows a graphical representation of the relationship between our dependent variable, Institutional Ownership, and company size as given by each company's market capitalization. Both variables are in natural logarithms, as seen on the figure. Our evidence of heteroscedasticity based on this figure comes intuitively from the fact that the dispersion of the dependent variable for log(*SIZE*) between 18 and 22 is higher than between, say, 12 and 16. Figure I.2 displays the average variance for subgroups of log(*SIZE*) based on the same data. Since more formally the existence of heteroscedasticity should be proven by using a statistical test designed specifically to test for this effect, we use the White's test for Heteroscedasticity (White, 1980). The null hypothesis of homoscedasticity is rejected, as shown in table I.1.

Figure I.1 – Evidence of Heteroscedasticity on Sample.

Scatter plot of our dependent variable, Institutional Ownership, by company size. The dependent variable is expressed as the natural logarithm of one plus a value between 0 and 100 that is equal to the percentage of each stock that is owned by European investment funds multiplied by 100. Size is the natural logarithm of the market value of each stock, expressed in Euros. It is also expressed in natural logarithms on the chart. Source: data sample for 2008-Q1.



Note that due to the inexistence of a more adequate test, this test was performed based on a known biased and inconsistent OLS regression of the dependent variable on the independent variables. The cause for the bias and inconsistency is the inclusion of observations with institutional ownership equal to zero (i.e. stocks not owned by any investment fund).

Figure I.2 - Evidence of Heteroscedasticity on Sample (complement to Figure I.1).
Institutional ownership variance figures by sub-segments of Size. The dependent variable, Institutional Ownership, is expressed as the natural logarithm of one plus a value between 0 and 100 that is equal to the percentage of each stock that is owned by European investment funds multiplied by 100. Size is the natural logarithm of the market value of each stock, expressed in Euros. It is also expressed in natural logarithms on the chart. Source: data sample for 2008-Q1.

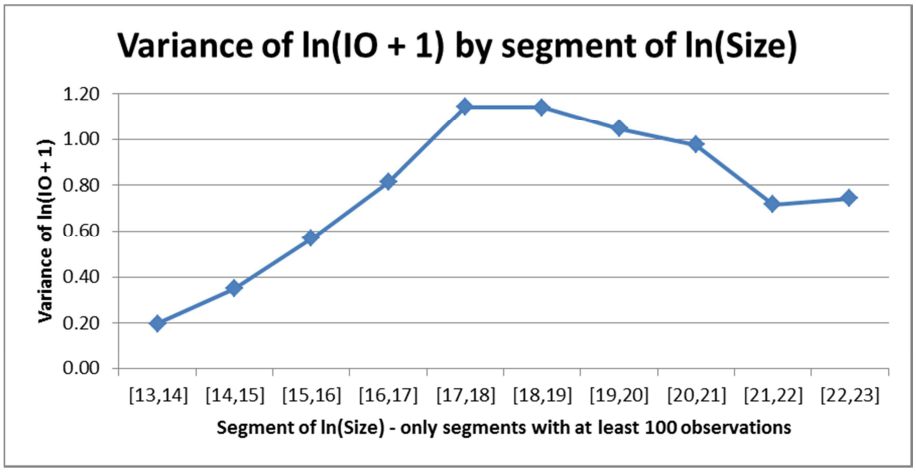


Table I.1 – Results of White's test for Heteroscedasticity (White, 1980).
As shown on the table, the null hypothesis of homoscedasticity is rejected. The dependent variable, Institutional Ownership, is expressed as the natural logarithm of one plus a value between 0 and 100 that is equal to the percentage of each stock that is owned by European investment funds multiplied by 100. Independent variables are Price, Size, Liquidity, Age, 12-month Momentum, Dividend Yield, Book-to-market ratio, Variance, and the dummy variable for presence on the EURO STOXX 600 index. Independent variables are expressed in logarithms whenever possible. Due to the inexistence of a more adequate test, this test was performed based on a known biased and inconsistent OLS regression of the dependent variable on the independent variables due to the inclusion of observations with institutional ownership equal to zero (i.e. stocks not owned by any investment fund). Source: data sample for 2008-Q1.

Heteroscedasticity Test: White			
F-statistic	5.628711	Prob. F(75,4175)	0.00
Obs*R-squared	390.3663	Prob. Chi-Square(75)	0.00
Scaled explained SS	396.7233	Prob. Chi-Square(75)	0.00

Appendix II: Summary Statistics on Selected Independent Variables

Table II.1 – Summary Statistics on Selected Independent Variables Used on this Study, divided by Country.

Selected statistics were calculated based on Thomson Reuters' Datastream / Datastream Worldscope data. All values are mean values. Only data sample 2008-Q1 was included since the values for data sample 2011-Q1 are similar. The definition of each independent variable is available on section 3.3.2.

Country	Return Variance	Size (€ Millions)	Liquidity	Price (€)	Div Yield	Age	Momentum 12m	BTM	Number of stocks*
United Kingdom	0.03	886	5.1	9.1	1.7	136	-16.7	0.4	1780
Germany	0.03	997	0.6	78.3	2.1	133	3.5	0.4	892
France	0.13	1416	3.3	85.3	2.1	132	2.2	1.4	814
Sweden	0.36	561	9.7	5.4	2.1	94	-2.5	0.3	423
Italy	0.01	1555	5.9	7.7	2.1	138	-6.7	0.5	294
Greece	0.03	380	3.7	6.6	1.7	139	14.7	0.4	282
Denmark	0.02	571	2.8	100.0	1.5	172	-8.4	0.4	201
Netherlands	0.01	2033	6.3	22.3	2.7	217	-3.2	0.4	153
Spain	0.01	3138	6.7	22.0	1.9	153	-4.2	0.3	152
Belgium	0.02	1069	2.4	216.1	2.4	153	4.9	0.3	147
Finland	0.01	1166	4.7	11.3	3.6	135	1.9	0.4	130
Austria	0.02	1064	4.2	52.7	1.8	145	2.1	0.2	102
Ireland	0.02	787	3.5	4.6	1.5	168	-20.5	0.7	68
Portugal	0.03	1141	3.0	5.5	1.9	168	14.4	0.4	54
Luxembourg	0.01	2619	2.0	117.3	3.5	120	10.6	0.3	31

*Reference number (varies according to the availability of each of the indicators)

Appendix III: Summary Statistics for Stocks Not Owned by any Fund in Sample

Table III.1 shows summary statistics for explanatory variables considering only the 43% and 46% stocks not owned by any fund for the data samples 2008-Q1 and 2011-Q1, as described in Table 4. Comparing these figures with those obtained for the entire sample, as given in Table 6, we find that stocks not owned by any fund are considerably smaller, have higher variance of returns, have less liquidity, distribute less dividends, refer on average to younger companies and generally have higher book-to-market ratios. These findings are consistent with the results we obtain for the entire sample of investment funds in section 4.1 in that these funds tend to prefer larger, more liquid, less volatile stocks.

Table III.1 - Descriptive Statistics for Stocks not owned by any fund

Selected figures are taken at the beginning of the quarter under study. Panel A refers to quarter 2008-Q1 and panel B to quarter 2011-Q1. Return Variance is the variance of returns. Size is market capitalization in EUR millions. Liquidity is transaction volume in percentage of shares traded on the last month prior to the beginning of the quarter. Price is stock price, in euros. Dividend yield is the dividend distributed on the same year as the data sample, expressed in percentage of market price at the beginning of the quarter under analysis. Age is the number of months since the stock was first listed. 12-month momentum is the one-year returns. BTM is the book-to-market ratio of each stock. Data extracted from Thomson Reuters' Datastream / Datastream Worldscope.

	Panel A: 2008-Q1 sample							
Metric	Return Variance	Size (€ Millions)	Liquidity	Price (€)	Div Yield	Age (months)	Momentum 12m	BTM
Mean	0.11	178	3.60	50.5	1.51	113.4	-3.0	0.44
Median	0.02	15	0.61	2.5	0.00	92.2	-9.8	0.62
Maximum	0.54*	51,366	27.65*	942.7*	12.7*	524.4	169.8*	3.57*
Minimum	0.00	0.1	0.00	0.0	0.00	0.9	-97.2	-0.13**

	Panel B: 2011-Q1 sample							
Metric	Return Variance	Size (€ Millions)	Liquidity	Price (€)	Div Yield	Age (months)	Momentum 12m	BTM
Mean	0.28	108	4.95	36.8	1.69	141.4	21.9	0.25
Median	0.02	13	0.67	1.5	0.00	124.7	1.1	0.85
Maximum	0.62*	19,429	41.73*	589.9*	14.4*	560.9	366.8*	7.14*
Minimum	0.00	0.0	0.00	0.0	0.00	0.9	-99.1	-0.11**

* Replaced by the 99.0% percentile to avoid extreme values

** Replaced by the 1.0% percentile to avoid extreme values

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