Equity Funds: Performance Analysis

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To those who have supported me during this year.

Abstract

In the last 10 years, the number of investment funds had increased dramatically since they are a powerful asset to invest in due to its yields and tax advantages.

The aim of this study is to determine a criteria in order to choose one investment fund or another. With this purpose, an analysis of a numerous investment funds has been carried out during a period of five years, from 2013 to 2018. With the main goal in mind, the question is: Are investment funds' results persistent? In this context, persistence in returns and alphas has been analyzed.

The answer to this question corresponds to an exhaustive analysis concerning the returns of the funds and the calculus of the alphas of each fund. This last variable represents the ability of the manager to get a profitability higher than the market at a certain risk assumed.

Once the analysis was performed through a lineal regression model, the results of the sample shown that the variables were not significant despite the fact that looking at the funds individually there are funds that keep their good or bad results during a certain period of time.

At this point, future researches could be carried out identifying other variables in order to get more accurate results.

Key words: investment funds, persistence, returns, alpha, beta, analysis.

En los últimos 10 años, el número de fondos de inversión ha aumentado, ya que se trata de un activo potente para invertir debido a sus rendimientos y ventajas fiscales.

El objetivo de este estudio es determinar un criterio para elegir un fondo de inversión u otro. Con este fin, se ha llevado a cabo un análisis de numerosos fondos de inversión durante un período de cinco años, desde 2013 hasta 2018. Con el objetivo principal en mente, la pregunta es: ¿Son persistentes los resultados de los fondos de inversión? En este contexto, se ha analizado la persistencia en devoluciones y alfas.

La respuesta a esta pregunta corresponde a un análisis exhaustivo sobre los rendimientos de los fondos y el cálculo de las alfas de cada fondo. Esta última variable representa la habilidad del gerente para obtener una rentabilidad superior a la del mercado asumiendo cierto riesgo.

Una vez realizado el análisis a través de un modelo de regresión lineal, los resultados de la muestra mostraron que las variables no eran significativas a pesar de que, al observar los fondos de manera individual, existen fondos que mantienen sus buenos o malos resultados durante un cierto período de tiempo.

Llegados a este punto, se podrían realizar investigaciones futuras identificando otras variables para obtener resultados más precisos.

Palabras clave: fondos de inversión, persistencia, rentabilidad, alfa, beta, análisis.

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1   Introduction

The investment fund industry has an important role within the financial system, since it provides the possibility of channeling the savings of different types of investors, with different size and degree of sophistication towards financial instruments from a wide variety of sources and markets. They also allow accessing professional management, obtaining the advantages of diversification.

The investment funds arrived at Spain during the 80s but it was not until 90s when they had their biggest boom, to subsequently suffer a standstill during the first years of the 21st century, mainly, due to the global economic crisis.

An investment fund is a financial product that has a great power of diversification at low cost and with good taxation. It is a participation, so it is not until is sold when the investor has to pay taxes for it. All this makes them a very attractive product for increasingly more investors.

The growing number of investors entering to this market has increased the number of funds and now, the real problem we are facing is choosing well the fund in which invest. Through this study it is intended to analyze the existence of some kind of persistence in the results that funds obtain during consecutive periods of time. The aim is to provide the lector with some information that could be useful to choose a fund in the future. This document is structured as follows:

The objective of this study and a brief summary of how it has been carried out are presented in the next section.

The third section deals with the theoretical basis. Information regarding investment funds are explained, as well as different performance measures that exist, that will be used through the study in order to compare funds between them. It is distinguished between traditional ones (Jensen's alpha, Sharpe's ratio and Treynor's ratio) and other measures that have emerged later such as the Return to Risk Ratio, which resembles the Sharpe ratio in its formula; tracking Error, which measures the deviation of the results of the fund with respect to its benchmark; and the Information Ratio that uses the tracking error in the denominator.

In the fourth several studies that have been carried out throughout history related to the persistence between the performance of a fund and different variables will be reviewed. This part is related with the second analysis of the study.

The fifth part discusses why equity funds has been chosen for this study, the extraction of the data using the Thomson Reuters EIKON platform and the preparation of such data in order to be used for next analysis and next calculations. Returns and standard deviation of the different group of funds will be reflected, as well as, important information and data that will be used such as the risk-free asset or the different indexes that represent the benchmarks considered.

In the sixth section, the methodology carried out and the different steps taken for the calculations are described. It will be explained how to obtain beta and alpha, commenting the results through numerous tables. It will also set out the underlying theoretical basis in

the linear regression model indicating when the independent variable is considered significant and, therefore, when there is persistence in the results obtained.

In the seventh section, the results obtained in the regression analysis will be commented. In this part, it will be seen that the funds will have been divided into two groups, those with positive returns in a five year period and those with negative returns. The aim of this division is knowing whether the possible existence of persistence is more frequent in funds with negative returns or in those with positive performance.

Finally, this document concludes by discussing the different results that have been obtained to achieve relevant conclusions that could be useful in the future in order to choose between one fund or another one.

Bibliography and annexes with completed tables are added at the end of the document that provide further information.

2   Objective

The objective of this work is to study the behavior of the results of equities investment funds y observe if there is any kind of persistence in them.

Specifically, it is about analyzing fund returns by separating two statistics that represent fund returns, alpha and beta. Once the returns and the alphas have been calculated, the aim of the present study is to analyze if these variables are statistically significant, so if there is persistence of the results for both, the returns and the alphas. In such a way, that conclusions can be drawn about whether managers obtain good results due to their ability to choose investments or if it is pure coincidence. In other words, it is intended to show if the active management really adds value to the fund through the manager's skills.

This study will be addressed by choosing the equity funds that invest in United States, Europe and Spain which address is in Spain of the last five years. It has been considered five years since, from the point of view of the author, five years is a good timeframe for a fund as they are long-term perspective investments. Annual scenarios have been determined from 2018 to 2014 and two periods of time between the last three years (2018 to 2015) and the last five years (2018 to 2014). The returns of the funds will be differentiated between what part of the profitability has been obtained through the beta and which through the manager's ability, alpha.

After that, a linear regression analysis will be carried out in order to get some conclusions regarding the persistence of alpha and returns. In particular, it will be analyzed 2018 with respect to the last three and five years and also the possible persistence between two consecutive years.

3   Theoretical Framework

3.1.   Investment Funds

"Investment funds (IF) are separate assets without legal personality, belonging to a plurality of investors, including other collective investment institutions, whose management and representation corresponds to a Management Company, which exercises the powers of ownership without being the owner of the investment fund with the assistance of a depositary." (Inverco, n.d.)

It is, therefore, a patrimony formed by the contributions of a variable number of savers, known as participants. An entity, management company, that jointly invests such contributions in different financial assets following a set of guidelines established in advance. Each investor/ participant owns a part of the fund, which is proportional to the value of their contributions.

The objective of the fund is to obtain the highest possible return assuming the minimum risk. Through mutual funds, investors should achieve a more profitable and diversified investment with lower volatility than investing individually.

Depending on the type of investment, the funds are included in different categories. It is crucial to know in what category an investment fund is included as this will give us a clue of the level of risk that it may have. For instance, it is known that, in principle, an equity fund will have greater risk than a fixed income one.

Investment funds can be distinguished according to their investment mission:

- Monetary funds: its main objective is to maintain the principal and obtain a return according to market rates. In principle, they are usually used for short periods of time, although there are also long-term monetary investment funds.

- Fixed income funds are those that invest most of their money in fixed income, either short or long term. For this type of funds, it is important to identify in which continent or country the fund is investing. This fact is tremendously important, not only to avoid country risk, but because depending on where it is invested, it could also have exchange rate risk.

- Equity funds: funds that, at least, invest three quarters of their capital in equities. In general, they are quite volatile funds, although there are managers that achieve greater profitability than the market at a lower risk. They can invest in national or international equities.

- Mixed funds: they are investment funds that have exposure to both, equities and fixed income. They are an attractive product with moderate risk. Depending on the percentage invested in each category, the risk exposure will be higher or lower.
- Passive funds are funds that try to emulate the behavior of a stock index to which it is referenced or benchmark. This category usually includes funds that have a specific objective of unguaranteed profitability and quoted funds.

- Total or partially guaranteed funds: those that fully or partially insure the initial investment. Within this category, it can be found those that offer a fixed return or those that offer a return linked to another financial product.

- Global funds are funds whose investment policy does not fit in any of the previous mentioned.

Regarding the management, there are two main strategies, active management and passive management.

An active management fund is a type of investment fund in which the management company or manager changes at a certain frequency the combination of assets in which the fund is investing with the aim of maximizing the profitability and/ or minimizing risks. They may invest in both, equities and fixed income. This type of funds does not try to replicate an index, but they do use one to measure their performance and they main objective is to overcome it.

On the other hand, passive management is a type of investment strategy in fixed income or equity, whose objective is to replicate the evolution of a certain index. Therefore, the fund's manager attempt is just the opposite of beating the market. Within this category, passive funds are classified.

There is a lot of controversy about what kind of funds are better for the investor. On the one hand, the proponents of active management argue that good asset managers can obtain results superior to the benchmark and, therefore, cover their costs incurred in the research of those investments, offering a greater net benefit for investors. On the contrary, defenders of passive management argue that it is very difficult to identify the investments that achieve the best performance in such way that it is not worth paying higher costs for that effort. Therefore, they argue that passive management offers greater net return of long-term costs.

Despite the new trend in which passive management investment funds are increasing their subscriptions and more and more investors are opting for this type of funds, equity funds have performed better over the last five years and therefore, these will be the funds under this analysis.

3.2.   Traditional measures of performance

Traditionally, Jensen's alpha, Treynor ratio and Sharpe ratio have been the most common measures in order to quantify the performance of a portfolio. In recent years there have appeared others such as Return to risk ratio, Tracking error and Information Ratio. These measures are going to be explained hereby. It is important to point out that some of them are relative measures , this is the case of Sharpe Ratio, while Jensen's alpha is an absolute measure.

Jensen's Alpha

According to Jensen (1967), "The concept of performance of a portfolio has two dimensions: i) the ability of the manager to increase returns thanks to its ability to predict the evolution of the prices of the securities and ii) its ability to minimize the insurable

risk inherent in the type of assets in which the fund invests, through an adequate diversification of the portfolio". Jensen's alpha refers only to the first of these dimensions. Therefore, the ability that a manager may have in order to predict the evolution of the market is reflected by the variable alpha (α). This ability would provide an excess of profitability over what would be expected at a certain level of risk, given by the type of investment.

This measure is an indicator of absolute performance. That is, apart from being able to establish a ranking of funds by the alpha associated with each of them, it provides an absolute assessment of whether the fund is doing it right or wrong.

- If alpha < 0, the manager has obtained a performance lower than what would have been obtained by buying a portfolio of the reference market.
- If alpha $= 0$, the manager has obtained a return equal to the one provided by the reference market: his performance has been passive or neutral.
- If alpha > 0, the manager has obtained a better performance than the provided by the reference market.

Jensen's equation:

$$r_{i,t} - r_{rf,t} = \alpha_i + \beta_i\left(r_{m,t} - r_{rf,t}\right)$$

where:

α_i fund's alpha
β_i systematic risk
$r_{i,t}$ return of the fund i during the period t
$r_{rf,t}$ profitability of risk-free investments during the period t
$r_{m,t}$ profitability of the market index reference of the fund i during the period t

If the alpha is eliminated from the equation, it would express what the fund can overcome the risk-free rate ($r_{rf,t}$) given by its level of systematic risk (β_i).

Treynor's Ratio

Another measure of performance is introduced by Treynor (1965) from the concept of systematic risk inherent in an investment, this risk is known as beta. With this measure it is obtained the excess return obtained with respect to risk-free assets per unit of the systematic risk mentioned before. As it occurs with Jensen's alpha, this measure introduces a reference to the market. However, there is a main difference between both measures: Treynor does not consider the additional profitability that a manager can get and states that what the manager has to do is adequately diversify the portfolio regarding the risk of the investment as the assets are correctly valued.

In this way, assuming that the fund's portfolio is adequately diversified, the Treynor ratio can provide a good prediction of the fund's future performance.

$$\text{Treynor's ratio} = \frac{\text{mean}(r_{i,t} - r_{rf,t})}{\text{beta}_i}$$

Sharpe's Ratio

This ratio was introduced by William F. Sharpe in 1966. It is an absolute measure of a portfolio's performance since it is not considering a benchmark. It represents the additional profitability getting with respect to the risk-free asset. Moreover, within this theory, there is the possibility of not having a portfolio properly diversified, so the portfolio can be performing worse than the market justified by the non-systematic risk within. It is a more universal indicator since it considers the total risk within the portfolio, the specific and the systematic.

$$\text{Sharpe's ratio} = \frac{\text{mean } (r_{i,t} - r_{rf,t})}{\text{standard deviation } (r_{i,t} - r_{rf,t})}$$

The higher the ratio, the higher the return of the fund compared to the risk assumed.

Return to risk ratio

It is calculated by dividing the average profitability by the standard deviation for a given period of time.

$$\text{Return to risk} = \frac{\text{Mean Profitability}}{\text{Standard Deviation}}$$

Tracking error

When it is about analyzing a fund that replicate an index, this is the most common measure. It represents the volatility of the differences in the returns between a fund and its correspondent benchmark. Therefore, it is intuitive that the smaller this ratio, the better the fund replicates the index. A tracking error of 0 implies that the fund had the same behavior as the underlying index and therefore has been very efficient in indexing.

$$\text{Tracking error} = \sqrt{\frac{\Sigma(\text{Relative returns} - \text{Mean relative returns})}{\text{Number of periods} - 1}}$$

If it would be comparing active management funds with passive management funds, it will be very useful to use this indicator. However, this analysis does not focus on this comparison, so it will not be calculated.

Information ratio

Basically, this is a profitability/ risk measure. It measures the manager ability to obtain additional return coming from his management at a certain risk assumed. In order to determine that risk, it is necessary to make a comparison with the reference index of the fund. Having a high ratio does not mean that the fund is secure, it merely indicates that the risk is giving an extra profitability over the benchmark. However, it could be the case of having negative yields both, in the fund and in the market reference index.

$$\text{Information Ratio} = \frac{\text{Mean relative returns}}{\text{Tracking error}}$$

Related to this topic, it is important to mention one of the most influential models in history, CAPM Model.

CAPM Model

Capital asset pricing model (CAPM) is a model used to calculate the profitability that an investor must demand when making an investment in a financial asset based on the risk it is assuming.

It was introduced by Jack L. Treynor, William Sharpe, John Lintner and Jan Mossin independently. The investigations of all of them were published throughout the years 1962 and 1964. The aim of the investigation was about obtaining explanatory and predictive models regarding the guidelines that financial assets may follow. All these authors were influenced by Harry Markowitz's earlier models of diversification and Modern Portfolio Theory, published in 1952 and reformulated in 1959.

The equation includes, which is one of the great advances of the model with respect to Markowitz's initial theory, the systemic or market risk, represented by β.

$$E(r_i) = r_f + \beta_{im}(E(r_m) - r_f)$$

In general terms, the model argues that the greater the beta of a financial asset, the greater must be the difference between its profitability and the one of the reference index. Therefore, this model does not consider the possible ability the manager might have in order to obtain returns above the benchmark, with risk adjusted.

However, despite the fame and disclosure of the model, many financial academics believe that, even being a theoretically well-developed model, it has no validity in practice. One of the most famous criticisms is the one of Fama and French in 1992 in which the authors divided the shares of ten portfolios and it could be shown that the correlation between the size and the Price/ Value ratio was much more representative than the correlation between the beta and profitability, which was practically nil.

4   Review of the Literature

The literature on the persistence of results in investment funds discuss the phenomenon called in the study of Hendricks et ál (1993) "hot hands", which refers to funds that obtain results above the average during consecutive periods of time. To be expected, the persistence in negative results has been called "cold hands". The different articles and studies related to investment funds have increased considerably in recent years due to the strong increase in their activity. From recent studies[1] on the subject, it has been possible to extract past literature and summarize it below:

"The persistence of results that beat the market is unlikely, however, persistence in lower results can occur due to the high cost incurred in the search for undervalued securities to try to beat the market. In this case, the persistence would be justified by an active mismanagement that entails high transaction costs and small capacity to predict the evolution of the markets". (Sharpe, "Mutual fund performance", 1966)

There are several researches conducted in order to obtain an answer to the question: Is there some persistence in fund's results during certain period of time? The results are not conclusive since there have been reached conclusions that can not be comparable. This is because of the fact that the researchers were not using the same variables (p.e. pure returns, returns adjusted by risk…). For instance, Carlson (1970) got the conclusion that achieving persistence in risk-adjusted returns was more difficult than in the case of pure returns. In this document, the pure profitability obtained by the fund will always be treated.

During the 1960s, 1970s and 1980s, United States' market was the largest one with very high activity. That is why it was in this country where researchers interested on the field started to carry out the first investigations, which actually the majority conclude that there was no persistence in the results. Studies carried out in recent times, reaches indeed, the opposite result. There is evidence of persistence in investment funds.

The work carried out can be grouped according to the conclusions obtained.

On the one hand, there are a series of studies that show that there is persistence in short-term results[2]. The most relevant jobs, generally carried out on US equity funds, have found persistence in profitability for short periods of time, between two and three years[3]. Within this same group, other studies[4] carried out had investigated the persistence of long-term results and their causes, concluding that there are managers with different levels of information and ability to select the winning values. And, generally, for higher periods, the results have been worse[5].

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[1] See work Cambón, M.I and R. Losada (2012), Ruiz, M. (2007).
[2] See Ferruz and Vargas (2004), Toledo y Marco (2006), Hendricks, Patel and Zeckhauser (1993), Goetzmann and Ibbotson (1994), Brown and Goetzmann (1995) and Wermers (1997).
[3] Carhart, Carpenter, Lynch and Musto (2000) and Droms and Walker (2001).
[4] See Ciriaco y Santamaría (2005), Elton, Gruber, Das and Hlavka (1993), Elton, Gruber, Das y Blake (1996) and Grinblatt and Titman (1992, 1993).
[5] See work of Carhart (2002).

In Europe, the most relevant works, which have mostly been carried out on the UK fund market, have obtained similar conclusions[6].

A second group of researchers show in their works the existence of persistence but in the obtaining of bad results. That is, funds that do not obtain good results are more likely to follow this behavior in the future. Carhart (1992) analyzed the persistence of long-term results attributing it to the persistence in expenses and commissions.

Other studies[7] attribute the existence of persistence to a certain "herd effect" among the managers of investment funds, that is, persistence appears simply because all managers use a common strategy. It has been observed that many managers buy securities based on their past returns and that, in addition, they all do at the same time.

Within this group, which affirms the existence of persistence, there are authors[8] who admit the persistence in the short term but pointing out that the main causes rely on the management expenses and the "momentum effect". That is, the accidental possession of the winning securities of the previous year due to the tendency to buy the values that performed better in the past.

Finally, there are studies[9] showing that there is no persistence in the results of investment funds. In this group we find the economist, Jensen (1967), who used the estimates of the alpha for a sample of funds reaching the conclusion that most managers had not the ability to predict the prices of securities. If some funds obtained better results than the market was purely by chance.

On the other hand, there are also those authors [10]who argue that the persistence in a certain sample of funds may be due to the so-called "survival bias". It is very common that the worst funds end up disappearing and therefore, the samples used for the studies only include existing funds at the end of the period, which normally are the ones with better results. Advocates of this theory recommend to investors the purchase of index funds instead of choosing an active manager that seems to have a "hot hand", since active management does not usually beat the market.

In this same trend, it has been found that the survival bias weakens the results on the existence of persistence. The funds that disappear are those that do it badly for several years, not the ones that do it badly during a year. Therefore, the fact of not taking into account these funds weakens the results of the persistence tests.

In this work, it will be studied the persistence between the profitability and the alphas of the funds during certain periods and also between a year and the previous one

- Persistence:

If really the active management adds value to the fund and some managers show an outstanding ability of selection and prediction or have higher levels of information, a tendency to repeat results during consecutive periods of time in the funds managed by

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[6] See work of Blake, Lunde and Timmermann (1988) and Allen and Tan (1999).
[7] Grinblat, Titman and Wermers (1995) and Wermers (1999).
[8] See Carhart (1997).
[9] See Menéndez and Álvarez (2000), Jensen (1967) and Kritzman (1983).
[10] Brown et Al. (1992) and Malkiel (1995).

said managers should be observed. The key question is to what extent historical values about the performance of a portfolio can be extended to future periods. In the literature on the subject, we talk about hot hands phenomena, that is, funds that obtain results above the average during consecutive periods of time. The persistence in negative results, therefore, has been called cold hands.

Summary of the most recent studies conducted in the USA on persistence.

Authors	Year	Period	Fund	Results
Carlos	1970	48-76	Equity	Yes
Grinblatt & Titman	1989	74-84	Equity	Partial
Grinblatt & Titman	1992	74-84	All	Yes
Brown, Goetzmann, Ibbotson & Ross	1992	76-87	All	Yes
Ippolito	1992	65-84	143 Funds	Yes
Hendricks, Patel & Zeckhauser	1993	65-84	Equity	Yes
Goetzmann & Ibbotson	1994	74-88	All	Yes
Kahn & Rudd	1994	83-90	Fixed Income and Equity	Yes
Volkman & Wohar	1995	80-89	International	Yes
Gringlatt, Titman & Wermers	1995	74-85	All	Yes
Malkiel	1995	71-90	Equity	Partial
Elton, Gruber & Blake	1996	77-93	Equity	Yes
Gruber	1996	84-94	All	Yes
Carhart	1997	62-93	All	Yes
Sauer	1997	76-92	All	Partial
Phelps & Detzel	1997	76-95	Equity	No
Hendricks, Patel & Zeckhauser	1997	Simulation	600 funds and 393 survivals	Yes
Wermers	1997	75-94	All	Yes
Carpenter & Lynch	1999	33 years (Simulation)	Simulation	Yes
Jain & Wu	2000	94-96	Fondos publicitados	No
Wermers	2001	74-94	All	Yes

Table 1: Source: Charles River Associates analysis.

5   Data

5.1.   General Overview

According to the data obtained from Inverco and reflected on the tables attached in the annex, the volatility present in the financial markets during 2018 has led investment funds to register negative yields in the year, being the inter-annual profitability for the group of funds of -4.1%. The most affected categories are those with equity exposure, in which profitability has even come to be below -10%. For instance, in the case of Japanese equities its profitability was -13.2%, in Emerging Markets Equities was -11.90%. And in the fixed income world also experienced negative performance.

However, in the medium and long term, investment funds continue to generate positive returns for their participants. Thus, according to Inverco, on average, the annual profitability of the funds stands at 1.92% at 10 years and 1.42% at 20 years.

More in deep, the differences in profitability between the different categories of funds are substantial, as a consequence of the different degree of risk assumed in each one of them.

Looking at the returns of the last five years, fixed income funds have shown a more stable return, its volatility has oscillated between 0,47% (Euro Fixed Income Short Term) and 3,59% (International Fixed Income).

On the other hand, the profitability of equity funds has undergone really significant fluctuations throughout the decade, the volatility is much higher. International equities in Japan has undergone a volatility above 10%, same happen with equities in emerging markets. The returns of mixed funds, funds investing in fixed income and equity, have been placed in an intermediate range, depending on the relative importance of investments in those securities. In particular, funds with higher investment on fixed income has lower volatility than those which main investment is placed on equities. For instance, Eurozone investments, in fixed income the volatility stands at 2,83% while in equities it reaches 5,30%. International investments behave same way, with 3,59% for those in which predominate fixed income and 4,05% for the ones in which equities are the main role.

All mentioned before is based on the calculated volatility from the data extracted from Inverco regarding the returns of the different categories of funds for 2014, 2015, 2016, 2017 and 2018.

Profitability	2014	2015	2016	2017	2018	Volatility
Monetary	0,58%	0,01%	-0,05%	-0,29%	-0,53%	0,41%
Euro Fixed Income Short Term	0,99%	-0,11%	0,22%	0,14%	.1,30	0,47%
Euro Fixed Income Long Term	6,06%	0,07%	1,20%	0,65%	-1,41%	2,83%
Euro Fixed Income Mixed	4,35%	0.17%	0,93%	0,90%	-4,26%	3,55%
Euro Equities Mixed	5,74%	1,81%	1,36%	3,39%	-8,14%	5,30%
Euro Equities National	3,50%	1,37%	2,55%	12,54%	-11,10%	8,45%
International Fixed Income	6,45%	4,06%	1,58%	-1,52%	-1,92%	3,59%
International Fixed Income Mixed	3,19%	0,17%	-0,02%	1,25%	-4,31%	2,75%
International Equities Mixed	4,11%	-0,30%	1,48%	3,15%	-6,12%	4,05%
Euro Equities Rest	1,05%	7,72%	2,56%	8,94%	-14,80%	9,49%
International Equities Europe	4,91%	9,29%	-0,73%	7,90%	-13,30%	9,18%

Profitability	2014	2015	2016	2017	2018	Volatility
International Equities EEUU	18,33%	5,11%	10,13%	10,59%	-5,18%	8,66%
International Equities Japan	6,28%	14,42%	3,02%	14,55%	-13,20%	11,37%
International Equities Emerging Markets	4,21%	-5,88%	11,08%	16,68%	-11,90%	11,78%
International Equities Rest	4,97%	8,26%	5,69%	10,08%	-12,90%	9,24%
Global	2,68%	4,44%	2,01%	4,49%	-5,58%	4,16%
Warrant Fixed Profitability	2,53%	0,28%	0,07%	0,66%	0,06%	1,04%
Warrant Variable Profitability	2,68%	1,17%	0,18%	1,51%	-1,21%	1,46%
Parcial Warranty	5,10%	2,91%	-1,10%	2,51%	-2,40%	3,08%
Pasive Management	7,86%	0,64%	1,42%	2,21%	-2,91%	3,89%
Absolut Return	1,96%	0,14%	0,38%	1,44%	-4,79%	2,69%
Free-Investment Funds (FIF)	5,47%	5,38%	3,79%	9,88%	-7,67%	6,57%
Funds of FIF	4,26%	1,70%	-1,92%	-1,45%	-2,65%	2,91%

Table 2: Investment Funds. Returns by year and volatility. Prepared by the author.

From Inverco it was also extracted the number of subscriptions (Annex) and according to them, during the last years, in overall, the investment funds have maintained their status as a financial asset of reference for Spanish savers. 2018 was the sixth consecutive year that they had positive flows. Moreover, the volatility presented in the financial markets has not prevented the funds with the greatest exposure to equities from heading net inflows in 2018.

In the same sense, the funds of mixed variable income (exposure to shares between 30% and 75% of its total portfolio), closes the year with 2 976 million euros of net subscriptions. While the Mixed Fixed Income led the net reimbursements in 2018, with net outflows of 2 520 million euros.

On the contrary, the most conservative categories register negative net flows. Thus, the funds of passive management accumulated 2 173 million euros of reimbursements in 2018, as well as fixed-income fixed-term, international fixed income and absolute returns, which recorded net outflows of 2 079, 1 120 and 1 966 million euros respectively.

NET SUBSCRIPTIONS (Mill EUROS)	2013	2014	2015	2016	2017	2018
Mutual Funds	**23 048**	**35 573**	**24 733**	**13 820**	**21 410**	**8 410**
Monetary	1 108	-647	-130	1 392	-2 446	-345
FIM Fixed Income Short Term	8 225	1 059	-5 790	2 071	132	-2 079
FIM Fixed Income Long Term	2 612	8 867	-3 453	-797	-7	193
FIM Fixed Income Mixed	1 054	8 632	4 297	-3	2 770	-3 528
FIM Equities Mixed	-58	408	484	-283	748	-47
FIM Equities National	1 199	2 074	-550	-424	946	860
FIM International Fixed Income	239	1 372	2 824	3 136	-1 796	-1 120
FIM International Fixed Income Mixed	1 108	7 353	16 294	-1 773	-331	1 722
FIM International Equities Mixed	1 879	5 654	7 690	-1 071	4 605	3 024
FIM Euro Equities	550	250	988	-178	1 417	994
FIM International Equities Europe	430	693	1 575	551	1 120	186
FIM International Equities US	-66	361	-117	239	-25	101
FIM International Equities Japan	1 16	32	204	-109	275	126
FIM International Equities Emerging Markets	-332	-148	-32	111	646	208
FIM International Equities Rest	742	143	2 039	-229	2 519	2 881
Partial Warranted	39	252	54	440	-300	-226
Passive Management	8 964	5 120	-5 858	5 992	-4 288	-2 173
Absolute Return	-40	1 420	4 473	618	4 132	-1 966
Free-Investment Funds (FIF)	14	168	123	-40	305	78

NET SUBSCRIPTIONS (Mill EUROS)	2013	2014	2015	2016	2017	2018
Funds of FIF	-10	3	-17	-1	-	0
Global	839	1 599	5 702	414	12 401	9 079
Warranted Fixed Profitability	-3 808	-8 743	-5 249	-1 672	-1 498	-52
Variable Profitability Warranted Investment Funds	-1 759	-346	-817	5 435	85	394
Investment Societies	**1 020**	**2 616**	**886**	**-2 367**	**-2 504**	**-1 479**
Real Estate Funds	**-32**	**-1 521**	**-1 539**	**0**	**0**	**0**
Foreign ICC	**9 000**	**20 000**	**25 000**	**3 500**	**30 000**	**10 000**
TOTAL IIC	**33 036**	**56 668**	**49 080**	**14 953**	**48 906**	**16 931**

Due to the large amount of existing funds in Spain (2 612) and according to this brief analysis of investment funds in Spain, it has been decided to focus this present document on equity investment funds whose domicile is located in Spain.

5.2.   Study's Data

Below, the extracted data for this work and its sources will be explained in detail.

This analysis has been made based on the information that the fund managers send periodically to the CNMV and on data extracted from EIKON Thomson Reuters platform. The data have been taken from all existing equity investment funds between 31st December 2013 and 31st December 2018 which settlement is in Spain and invest in equities of Spain, Europe and United States. To avoid as far as possible the so-called "survival bias", all funds included in the sample have been active during this period of time. Guaranteed funds are not included on the understanding that the determinants of the profitability of these funds respond to factors of a different nature with respect to those that will be contemplated in this work.

As a consequence of the high number of funds (84) throughout the period under consideration, it has been decided to group these funds into a smaller number, distinguishing between:

- NatE: National equities. (48 Funds). Domestic equity funds with main exposure in Spanish companies.

- EuroE: Europe Equities (17 Funds). Domestic equity funds with main exposure in european companies.

- USE: United States Equities (19 Funds). Domestic equity funds with main exposure in US companies.

In order to being able to make the different calculations for this work. The aforementioned classification that meets the criterion of each class of investment fund will be used since each group of funds has a different reference index for calculating the regressions. The choice of reference index has an important influence on the calculation of the alpha. These indexes are intended to replicate the market in which the funds operate. Thereby the indexes used are the following:

- NatE: IBEX 35 Index. It is the main benchmark stock market index of the Spanish stock exchange drawn up by "Bolsas y Mercado Españoles". It is composed by 35th most liquid companies that are listed in the four Spanish stock exchanges.

- EuroE: STOXX Europe 50 EUR Price Index. The index provides a blue-chip representation of the leader sectors in the Eurozone. It covers 50 stocks from 11 Eurozone countries.

- USE: MSCI USA. It is an index designed to measure the performance of the large and mid-cap segments of the US market. With 641 constituents, the index covers approximately 85% of the free float-adjusted market capitalization in the US.

These indexes do not include dividends, which is a disadvantage compared to the funds since they do perceive them and reinvest them.

To be sure that the fund is being compared with the correct benchmark, the correlation between the benchmark and the funds will be checked. Obtaining a correlation coefficient close to one, it is ensured that the benchmark is the appropriate for the fund. The results are the following:

- **United States:**

Regarding the correlation between each fund and the index used. The results have varied from 1 in the case of Dunas Seleccion USA Cubierto, FI and to 0,32 for Renta 4 USA, FI. This means that the first fund has performed at the same path than the market and Renta 4 has performed the most differently compared to the benchmark. In overall the correlation coefficient is 0,84, therefore, the chosen benchmark can be validated.

	Average	Max	Min
1 Year	0,84	1,00	0,32
3 Years	0,82	0,99	0,51
5 Years	0,84	0,99	0,62

Table 3: Correlation coefficient between MSCI USA and US funds. Source: Prepared by the author.

- **Europe:**

In the case of Europe, there are more differences. "Ibercaja Bolsa Europa A, FI" has the better track to the benchmark in 5 years term whereas "CaixaBank Bolsa Selección Europa Estandar, FI" has the worst for the three periods. In overall, the correlation coefficient is above 0,80, so the index "STOXX Europe 50" is a good benchmark for these funds.

	Average	Max	Min
1 Year	0,83	0,96	0,03
3 Years	0,86	0,96	-0,08
5 Years	0,88	0,97	-0,05

Table 4: Correlation coefficient between the STOXX Europe 50 and European funds. Source: Prepared by the author.

- **Spain:**

In principle, it seems that the correlation between the Spanish benchmark and the correspondent funds are the best, as the average in all periods is above 0,92. Moreover, there are some funds that have performed as the market did, this is the case for "Bankia Indice Ibex Universal, FI" and "Caixabank Bolsa Indice Espana Estandar, FI". The fund with less correlation with the IBEX 35 is "Fonbilbao Acciones, FI", which has the lowest correlation for the three periods.

	Average	Max	Min
1 Year	0,92	1,00	0,01
3 Years	0,95	1,00	0,64
5 Years	0,96	1,00	0,79

Table 5: Correlation coefficient between the IBEX 35 and Spanish funds. Source: Prepared by the author.

Those funds which correlation coefficient is far from one should be excluded since this indicates that the reference index taken for that fund does not replicate with accuracy the market in which it operates.

5.3. Returns and Standard deviation

The data extracted from the EIKON Thomson Reuters platform has been the daily values of each of the funds between the dates of December 31st, 2013 and December 31st, 2018. In order to calculate 1-year annual return, it has been used straightforward the value on December 31st, 2018 and the value of December 31st, 2017.

$$r_t = \frac{Price_t - Price_{t-i}}{Price_{t-i}} = \ln\frac{Price_t}{Price_{t-i}}$$

Both formulas provide similar results, in this study the natural (Naperian) logarithm has been used.

However, in the case of three-year and five-year returns, it has been necessary to transform 3 year and 5 year returns into annual returns using the geometric mean.

$$(1 + \text{annual return}) = \sqrt[n]{\prod_{i=1}^{n}(1 + r_i)}$$

Being:

r_i annual return at year i, calculated with the previous formula, so that it has been necessary to calculate previously the annual return for each year from 2013 to 2018.
In practice, for 3 year return i=1,2,3 (n=3) and for 5 year return i=1,2,3,4,5 (n=5).

As it has been using annualized data, the standard deviation (σ) should also be annualized, both, for the benchmark and for each of the funds. First, the standard deviation has been calculated via the daily returns using the Excel tool and its DESVEST function. This is the daily standard deviation.

$$\text{Variance} = \sigma^2 = \frac{\sum_{i=1}^{N}(x_i - \bar{x})^2}{N}$$

$$\sigma_{daily} = \sqrt{\frac{\sum_{i=1}^{N}(x_i - \bar{x})^2}{N}}$$

In order to transform it into annual, it has been assumed that the standard deviation follows a normal distribution therefore, it is possible to use the following formula:

$$\sigma_{annual} = \sigma_{daily}\sqrt{252}$$

The daily result obtained must be multiplied by $\sqrt{252}$, since it is considered that one year has approximately 252 trading sessions. The standard deviations obtained from the daily returns during 3 and 5 years should also be multiplied by $\sqrt{252}$, since the result is still a daily standard deviation.

From now on, it is necessary to bear in mind that all the results are expressed in annualized terms and that all the calculated average variables have been obtained considering that all the funds have the same weight. A possible continuation of this study, with greater depth and more accurate, would be to calculate these variables but weighing each fund according to its capital.

- **United States:**

As expected, the average return in 2018 is negative, at -5,80%, the last three years return stands at 3,63% and for the last five years it is 6,33%.

In 2018, the majority of the funds have performed negatively reaching even below -10% ("BBVA Bolsa USA (Cubierto), FI"). There is only one fund with positive return which is "Renta 4 USA, FI", having a return of 3,63%. Regarding the market, "MSCI United States Price Index" closed 2018 in red points. Therefore, in general terms, the funds performed well compared to the market.

It must be taken into account that for 1 year and 5 year periods, there have been funds that have performed better than the market. In 1 year period, "Renta 4 USA, FI" has obtained 3,63% returns and in 5 year period, "ING Direct Fondo Naranja Standard&Poor's 500, FI" has a 9,91% return whereas "MSCI US Price Index" stayed below -6,00%

Focusing the study on the results to five years, it is appreciated:

- All funds have positive returns.
- The profitability is high, this is mainly due to the type of asset in which it is investing, it is equities, so the profitability is greater but also the risk. Hence, during 2018, the yields fall so much.

	Return	Standard Deviation	Max Return	Min Return	MSCI US Price Index
1 Year	-5,80%	4,23%	3,63%	-13,49%	-6,54%
3 Years	3,63%	1,39%	5,94%	1,39%	6,21%
5 Years	6,33%	2,23%	9,91%	2,10%	5,62%

Table 6: Results funds investing in U.S equities. Source: Prepared by the author.

- **Europe:**

In the case of the funds which investments are mainly in Europe the results in 2018 are worst, on average, the profitability is close to -20.00%. Over the last three years the return is still negative, at -4,49% and for the last five years is -1,22%.The fund which performed is the worst is "NB Valor Europa, FI" with a return of -26,90% and the ones which performed better were "Multifondo Europa A, FI" and "Ibercaja Bolsa Europa A, FI". The market, "EUROSTOXX", also closed 2018 negative, however, the market performed better than the active funds. The poor results in European market are because the poor

performance during 2018 and 2016 with annualized returns of -13,74% and -4,17% respectively.

	Return	Standard Deviation	Max Return	Min Return	STOXX Europe 50
1 Year	-18,98%	4,63%	-11,38%	-26,90%	-13,74%
3 Years	-4,49%	1,86%	0,41%	-7,52%	-4,17%
5 Years	-1,22%	1,92%	2,73%	-4,42%	-1,28%

Table 7: Results funds investing in Europ equities. Source: Prepared by the author.

- **Spain:**

Regarding Spanish market, the performance as it can be expected, is similar as the one in Europe. On average, the profitability for 2018 stands at -13,62%, for the last three years at -1,65% and for the last five years -0,44%. These results differ from the ones obtain in Europe.

2018 was neither a good year for the funds that invested in Spain since all of them have negative returns. The fund that performed the worst is "Caixa Bank Bolsa España 150, FI". The fund which has better results is "Tres Iberia Equity A, FI" with a profitability of -7,77%. Looking at the market, during the last year and the last five years, it has performed worse than Euro market, however, this is not the case if looking at its behavior over the last three years. The poor results of the market are due to the performance of the market in 2018 and 2015, with annualized returns of -16,57% in 2018 and -8,11% in 2015.

	Return	Standard Deviation	Max Return	Min Return	IBEX 35 Index
1 Year	-13,62%	2,91%	-7,77%	-21,28%	-16,57%
3 Years	-1,65%	2,55%	4,42%	-8,22%	-3,75%
5 Years	-0,44%	2,35%	5,92%	-5,18%	-2,93%

Table 8: Results funds investing in Spanish equities. Source: Prepared by the author.

5.4.   Risk-Free Asset

Additionally, in order to calculate the rest of the variables of this study it will be necessary to determine the risk-free asset. When dealing with Spanish funds, the reference will be government Spanish bonds. As it is been using annualized data, it must be considered Spanish T-Bills at 12 months as risk free asset. This value was obtained from the daily yields of the Spanish T-Bills at 12 months during the 2017 and 2018 calculating the period arithmetic average.

Yield (2018)	Average	2nd January	31st December	Min	Max
Treasury Bills 12 months	-0,37%	-0,44%	-0,35%	-0,48%	-0,02%

Table 9: Free-Risk Asset. Source: Thomson Reuters EIKON.

The maximum yield that T-Bills achieved during 2018 was on the 30th May -0,02% and the minimum level was on the 9th January, at -0,48%.

6   Methodology

6.1.   Data Preparation

Firstly, it has been prepared all the necessary data to calculate the variables which are going to be under study. This is what is exposed in the previous point.

Summarizing, it comprises the calculation of the daily returns and standard deviation of the funds and benchmark, the annualization of the results and the correlation analysis ensuring that the reference index is the proper for the funds.

6.2.   β and α Calculation

Once the funds have been determined, beta and the alpha of each of the funds will be calculated, taking into account Jensen's equation.

First, calculation of beta:

The beta coefficient measures the sensitivity of the net asset value of an investment fund to the movements recorded by its benchmark, it represents the systematic risk of an individual stock in comparison to the unsystematic risk of the entire market. In other words, the beta tells us the market exposure that the manager is taking on. Beta is used in the capital asset pricing model (CAPM), in order to calculate the expected return of an asset using beta and the expected market returns.

$$\beta_i = \frac{\text{Cov}_{i,m}}{\sigma_m^2} = \rho_{i,m} \frac{\sigma_i}{\sigma_m}$$

where:

$\text{Cov}_{i,m}$: covariance between the fund and the reference index.
σ_m^2: variance of the reference index (benchmark).
$\rho_{i,m}$: correlation coefficient between the fund and the reference index.
σ_i: standard deviation of the fund.
σ_m: standard deviation of the index.

If a stock has a beta of 1.0, it indicates that its price activity is strongly correlated with the market. A beta higher than 1.0 means that the security's price is theoretically more volatile than the market. Adding this stock to a portfolio will increase the portfolio's risk, but also increase its expected return. And a beta lower than 1.0 means that the security is theoretically less volatile than the market, meaning the portfolio is less risky with the stock included that without it.

Jensen's equation

$$r_i - r_{rf} = \alpha_i + \beta_i(r_m - r_{rf})$$

The average, maximum and minimum α and β for each group of funds have also been calculated in order to extract conclusions about the relation between the betas and alphas and the returns for the different periods comparing also with the benchmark.

- **United States:**

Period		Average	Max	Min
1 Year	β	0,85	1,10	0,23
	α	-0,02	0,54	-0,66
3 Years	β	0,85	1,00	0,44
	α	-0,16	0,34	-0,48
5 Years	β	0,91	1,07	0,64
	α	0,12	0,50	-0,36

Table 10: Results alpha and beta obtained US investments. Prepared by the author.

- **Europe:**

Period		Average	Max	Min
1 Year	β	0,87	1,23	0,03
	α	-0,21	1,76	-1,85
3 Years	β	0,92	1,39	-0,07
	α	-0,34	2,00	-2,20
5 Years	β	0,90	1,26	-0,05
	α	-0,30	1,94	-1,91

Table 11:Results alpha and beta obtained European investments. Prepared by the author.

- **Spain:**

Period		Average	Max	Min
1 Year	β	0,87	1,49	0,01
	α	0,09	0,52	-1,10
3 Years	β	0,91	1,54	0,57
	α	0,18	0,69	-0,40
5 Years	β	0,91	1,50	0,65
	α	0,22	0,81	-0,30

Table 12: Results alpha and beta obtained Spanish investments. Prepared by the author.

For the second part of the study a lineal regression will be performed which is explained in the next point.

6.3. Linear Regression Model

This methodology determines through past values if the relationship between the performance of a certain period and that corresponding to the previous period is statistically significant. In particular, in this work it is going to be considered three scenarios: i) results in 2018, ii) results for three year period and iii) results for five year period. Therefore, the relationship between 2018 and the previous three years, 2018 and the previous five years and also between consecutive years (2018-2017, 2017-2016, 2016-2015, 2015-2014) will be conducted. The model proposed to estimate the determinants of investment funds is going to be a cross-sectional regression model, as the exhibits compiles information on N variables (alphas and returns) during T periods (five years).

$$y_{i,t} = x_{i,t}\beta_i + \varepsilon_i \,, < 1$$

Para i=1, ...N y t=1, ...T (T=5), where $y_{i,t}$ is the dependent variable, in the first analysis shown here will be the alpha in 2018 and in the second will be the return in 2018. $x_{i,t}$ is a row vector of regressors that contains a set of variables that characterize the fund i in period t and ε_i are the residual errors. For this study it can be found:

- Annualized alphas for three year and five year period.
- Annualized alphas for each year, from 2018 to 2014.
- Annualized return for three year and five year period.
- Annualized returns for each year, from 2018 to 2014.

Through Gretl software, the goodness-of-fit will be calculated by the coefficient of determination R^2. Indeed, R^2 reflects the proportion of variability in $y_{i,t}$, explained by variability in $x_{i,t}$. $(0 \leq R^2 \leq 1)$ The closest the R^2 to 1, the better is the fit of the model to the data which also means no autocorrelation. It should be taken into account that in a cross-sectional model, a not very high R^2 is frequent.

As this is an empirical research, it is needed to make a statistical validation. In other words, it is necessary to answer this question: are the chosen variables statistically significant?

According to notes and presentation from the course of Statistics and Econometrics, there will be two hypotheses:

$$H_o: \beta = 0$$
$$H_1: \beta \neq 0$$

H_o means that there is not persistence between the variable $y_{I,t}$ and $x_{i,t}$.

Then a test statistic:

$$t = \frac{b_i - \beta_i^0}{S_{b_i}}$$

if H_o is true then $t \sim t_{n-k}$

H_o is rejected if the differences between the sample information and the hypothesis (in terms of accuracy) are too large to be random (they are very unlikely to happen).

$$\text{reject } H_0 \text{ if } |t| \geq KR$$

In order to decide that those differences are "too large", significance or p-value will be used, so they depend on the risk we are going to take (the risk of rejecting a true H_0). For this work it is going to used t-value = 1,96 or p-value = 0,05 (which indeed is the same). If t-value > 1,96 the variable will be significant and it the null hypothesis will be rejected, this is the same as having p-value < 0,05.

Gretl program provides the p-values and t-values, but also shown visually through asterisks if the variable is significant or not, three asterisks will mean that there will be persistence (the variable is significant) whereas, the absence of them will mean the contrary, no persistence.

7   Results

The results obtained from each of the funds and for each period of both beta and alpha are shown in the annexes.

A total number of 84 funds have been used to make the analysis. As already mentioned, these funds invest in equities of United States, Europe and Spain, all of them with domicile in Spain. As it can be seen in the following graphs, for each period there is a concentration of alphas around zero. In the interval of alphas between 0 and 0,25. For one year there are 20 funds, for 3 years 23 funds and for 5 years 32 funds. The better results, where alpha is positive, are reached for the period of five years, in total, there are 63 funds with positive alpha. For three years, there are 49 funds and for last year, there were 45 funds which alpha was positive.

As shown in the graphs, there are funds which beta is very negative as the case of "GVC Gaesco Europa, FI" reaching -2,203 in a three year period and -1,911 for five year period. However, there are funds with positive betas close to 2, this is the case of "Caixabank Bolsa Seleccion Europa Estandar, FI" with 1,757, 1,997 and 1,937 for one year, three year and five year period respectively.

It seems that there is some persistence in these two funds, as "GVC Gaesco Europe, FI" is the one with worst alphas in the three scenarios and "Caixabank Bolsa Seleccion Europa Estandar, FI" has the highest alphas in these scenarios.

From the alphas obtained, it can be deduced that there are managers who do not have the ability to select winning values or may have different levels of information. However, there are managers who show a clear superiority in obtaining positive alphas.

Alpha's distribution calculated for the period 2018 – 2017.
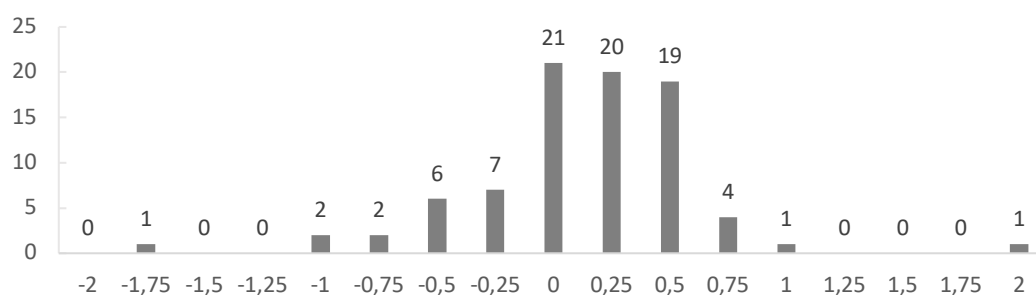
Source: Prepared by the author.

Alpha's distribution calculated for the period 2018 – 2015.
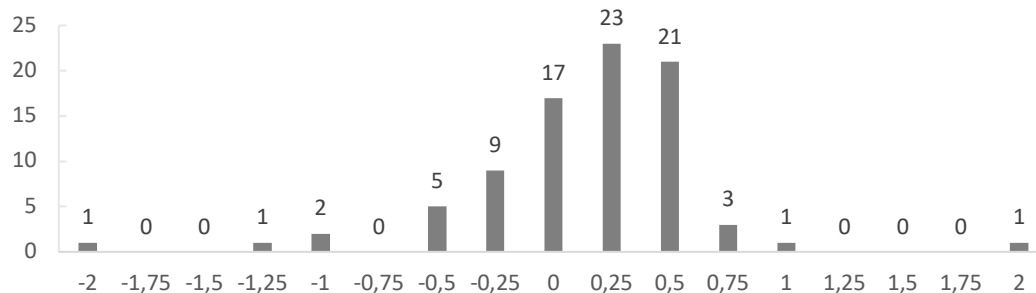
Source: Prepared by the author.

Alpha's distribution calculated for the period 2018 – 2013.
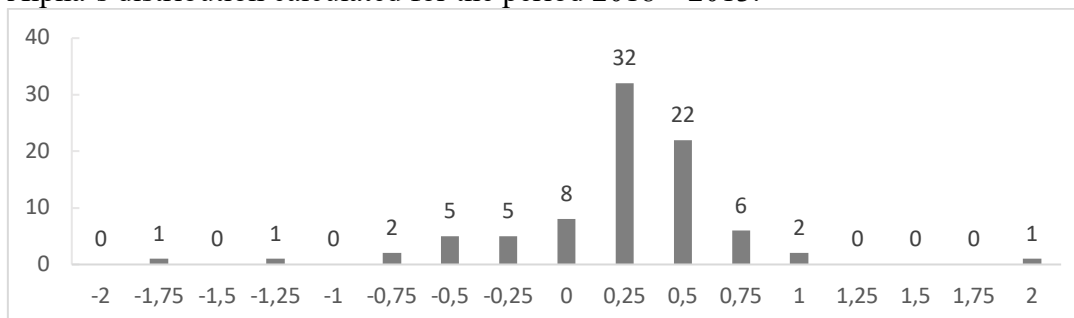
Source: Prepared by the author.

Then, there is the regression analysis explained above, in the short and long term using two mentioned indicators: alpha and returns. It has been made by differentiating two groups among the funds, those that in the 5 year period have had positive returns and those in which the return is negative. In the first group, there are a total of 42 funds while, in the second, there are another 42 funds. 5 years period has been chosen since, from the point of view of the author, it is the time frame that best reflects the performance of a fund, and not taking only a year or two. Through this analysis it is tried to observe if in the case of having persistence it has more to do with funds with good results or with funds with bad results.

7.1.   Alpha de Jensen

-    Positive returns:

The study of persistence has been done taking longer periods of time for the explanatory variable (alpha). Considering the relation between the alphas in 2018 of the different funds and the alphas of 3 years period and 5 years period of the funds there is persistence between 2018 and 5 year period as the following image reflects.

```
Modelo 1: MCO, usando las observaciones 1-42
Variable dependiente: alpha1

                 Coeficiente   Desv. Típica   Estadístico t   valor p
      ---------------------------------------------------------------------
      const       -0.217923      0.0770641        -2.828       0.0074  ***
      alpha3      -0.366785      0.274568         -1.336       0.1893
      alpha5       1.21760       0.318877          3.818       0.0005  ***

Media de la vble. dep.    0.058310    D.T. de la vble. dep.    0.397544
Suma de cuad. residuos    3.638791    D.T. de la regresión     0.305454
R-cuadrado                0.438430    R-cuadrado corregido     0.409632
F(2, 39)                  15.22409    Valor p (de F)           0.000013
Log-verosimilitud        -8.229035    Criterio de Akaike       22.45807
Criterio de Schwarz       27.67108    Crit. de Hannan-Quinn    24.36884
```

Table 13: Regression Model. Alphas three scenarios. Prepared by the author.

The results of the analysis between funds' alpha of year "n" and alpha's of year "n-1", show that there is just persistence between 2016 and 2015.

```
Modelo 2: MCO, usando las observaciones 1-42
Variable dependiente: alpha2018

                 Coeficiente   Desv. Típica   Estadístico t   valor p
   -------------------------------------------------------------------
   const          0.0288660      0.114601         0.2519       0.8024
   alpha2017      -0.252685      0.129084        -1.958        0.0573  *

Media de la vble. dep.   -0.138295    D.T. de la vble. dep.     0.512128
Suma de cuad. residuos    9.813220    D.T. de la regresión      0.495308
R-cuadrado                0.087422    R-cuadrado corregido      0.064608
F(1, 40)                  3.831872    Valor p (de F)            0.057289
Log-verosimilitud       -29.06270    Criterio de Akaike        62.12539
Criterio de Schwarz      65.60073    Crit. de Hannan-Quinn     63.39924
```
Table 14: Regression Model. Alphas 2018-2017. Prepared by the author.

```
Modelo 3: MCO, usando las observaciones 1-42
Variable dependiente: alpha2017

                 Coeficiente   Desv. Típica   Estadístico t   valor p
   -------------------------------------------------------------------
   const          0.637346       0.176819         3.605        0.0009  ***
   alpha2016      0.0360625      0.223631         0.1613       0.8727

Media de la vble. dep.    0.661538    D.T. de la vble. dep.     0.599252
Suma de cuad. residuos   14.71368    D.T. de la regresión      0.606500
R-cuadrado                0.000650    R-cuadrado corregido     -0.024334
F(1, 40)                  0.026004    Valor p (de F)            0.872701
Log-verosimilitud       -37.56868    Criterio de Akaike        79.13737
Criterio de Schwarz      82.61271    Crit. de Hannan-Quinn     80.41122
```
Table 15: Regression Model. Alphas 2017-2016. Prepared by the author.

```
Modelo 4: MCO, usando las observaciones 1-42
Variable dependiente: alpha2016

                 Coeficiente   Desv. Típica   Estadístico t   valor p
   -------------------------------------------------------------------
   const          0.460328       0.101273         4.545        4.98e-05 ***
   alpha2015      0.292305       0.112067         2.608        0.0127    **

Media de la vble. dep.    0.670850    D.T. de la vble. dep.     0.423552
Suma de cuad. residuos    6.286084    D.T. de la regresión      0.396424
R-cuadrado                0.145359    R-cuadrado corregido      0.123993
F(1, 40)                  6.803272    Valor p (de F)            0.012732
Log-verosimilitud       -19.70946    Criterio de Akaike        43.41892
Criterio de Schwarz      46.89426    Crit. de Hannan-Quinn     44.69277
```
Table 16: Regression Model. Alphas 2016-2015. Prepared by the author.

```
Modelo 5: MCO, usando las observaciones 1-42
Variable dependiente: alpha2015

                 Coeficiente   Desv. Típica   Estadístico t   valor p
   -------------------------------------------------------------------
   const          0.689594       0.125374         5.500        2.38e-06 ***
   alpha2014      0.0344211      0.102363         0.3363       0.7384

Media de la vble. dep.    0.720213    D.T. de la vble. dep.     0.552447
Suma de cuad. residuos   12.47783    D.T. de la regresión      0.558521
R-cuadrado                0.002819    R-cuadrado corregido     -0.022111
F(1, 40)                  0.113073    Valor p (de F)            0.738430
Log-verosimilitud       -34.10738    Criterio de Akaike        72.21476
Criterio de Schwarz      75.69010    Crit. de Hannan-Quinn     73.48861
```
Table 17: Regression Model. Alphas 2015-2014. Prepared by the author.

- Negative returns:

It has been done the same two analysis for those funds which 5 years period return is negative. Obtaining, in this case, persistence between 2018 and three years period. And also, between 2017 and 2016, 2016 and 2015, 2015 and 2014.

```
Modelo 1: MCO, usando las observaciones 1-42
Variable dependiente: alpha1

             Coeficiente   Desv. Típica   Estadístico t   valor p
    ---------------------------------------------------------------
    const      0.0427429     0.0264766        1.614        0.1145
    alpha3     1.02381       0.188509         5.431        3.19e-06 ***
    alpha5    -0.185547      0.200753        -0.9243       0.3610

Media de la vble. dep. -0.051101   D.T. de la vble. dep.    0.547326
Suma de cuad. residuos  1.071129   D.T. de la regresión     0.165725
R-cuadrado              0.912790   R-cuadrado corregido     0.908318
F(2, 39)              204.0987     Valor p (de F)           2.19e-21
Log-verosimilitud      17.45266    Criterio de Akaike     -28.90533
Criterio de Schwarz   -23.69232    Crit. de Hannan-Quinn  -26.99455
```
Table 18: Regression Model. Alphas three scenarios. Prepared by the author.

```
Modelo 2: MCO, usando las observaciones 1-42
Variable dependiente: alpha2018

             Coeficiente   Desv. Típica   Estadístico t   valor p
    ---------------------------------------------------------------
    const     -0.108702      0.0962004       -1.130        0.2652
    alpha2017  0.171707      0.109347         1.570        0.1242

Media de la vble. dep. -0.034356   D.T. de la vble. dep.    0.552336
Suma de cuad. residuos 11.78177    D.T. de la regresión     0.542719
R-cuadrado              0.058066   R-cuadrado corregido     0.034518
F(1, 40)                2.465829   Valor p (de F)           0.124224
Log-verosimilitud     -32.90198    Criterio de Akaike      69.80396
Criterio de Schwarz    73.27929    Crit. de Hannan-Quinn   71.07781
```
Table 19: Regression Model. Alphas 2018-2017. Prepared by the author.

```
Modelo 3: MCO, usando las observaciones 1-42
Variable dependiente: alpha2017

             Coeficiente   Desv. Típica   Estadístico t   valor p
    ---------------------------------------------------------------
    const      0.375724      0.0807809        4.651        3.57e-05 ***
    alpha2016  0.783216      0.109909         7.126        1.25e-08 ***

Media de la vble. dep.  0.432982   D.T. de la vble. dep.    0.775136
Suma de cuad. residuos 10.85448    D.T. de la regresión     0.520924
R-cuadrado              0.559375   R-cuadrado corregido     0.548359
F(1, 40)               50.78014    Valor p (de F)           1.25e-08
Log-verosimilitud     -31.18049    Criterio de Akaike      66.36098
Criterio de Schwarz    69.83632    Crit. de Hannan-Quinn   67.63483
```
Table 20: Regression Model. Alphas 2017-2016. Prepared by the author.

```
Modelo 4: MCO, usando las observaciones 1-42
Variable dependiente: alpha2016

                 Coeficiente   Desv. Típica   Estadístico t   valor p
   ----------------------------------------------------------------------
   const          -0.125284     0.0899873        -1.392        0.1715
   alpha2015       0.576663     0.0957521         6.022        4.39e-07 ***

Media de la vble. dep.   0.073107   D.T. de la vble. dep.   0.740198
Suma de cuad. residuos  11.78110   D.T. de la regresión    0.542704
R-cuadrado               0.475547   R-cuadrado corregido    0.462436
F(1, 40)                36.27000   Valor p (de F)          4.39e-07
Log-verosimilitud      -32.90079   Criterio de Akaike     69.80157
Criterio de Schwarz     73.27691   Crit. de Hannan-Quinn  71.07542
```
Table 21: Regression Model. Alphas 2016-2015. Prepared by the author.

```
Modelo 5: MCO, usando las observaciones 1-42
Variable dependiente: alpha2015

                 Coeficiente   Desv. Típica   Estadístico t   valor p
   ----------------------------------------------------------------------
   const           0.308071     0.0989203         3.114        0.0034   ***
   alpha2014       0.799318     0.128932          6.200        2.48e-07 ***

Media de la vble. dep.   0.344032   D.T. de la vble. dep.   0.885162
Suma de cuad. residuos  16.38264   D.T. de la regresión    0.639973
R-cuadrado               0.490018   R-cuadrado corregido    0.477269
F(1, 40)                38.43419   Valor p (de F)          2.48e-07
Log-verosimilitud      -39.82503   Criterio de Akaike     83.65006
Criterio de Schwarz     87.12539   Crit. de Hannan-Quinn  84.92390
```
Table 22: Regression Model. Alphas 2015-2014. Prepared by the author.

7.2.   Pure Returns

Following the same methodology used for alphas, through this analysis it is tried to observe the persistence in returns.

- Positive returns:

In this group, there are some persistence between the returns of a year and the returns of the previous year for 2018-2017 and 2015-2014, whereas there is not persistence between 2017-2016.

```
Modelo 4: MCO, usando las observaciones 1-42
Variable dependiente: r2018

                 Coeficiente   Desv. Típica   Estadístico t   valor p
   ----------------------------------------------------------------------
   const          -0.0402062    0.0135676        -2.963        0.0051   ***
   r2017          -0.578490     0.129573         -4.465        6.40e-05 ***

Media de la vble. dep.  -0.093864   D.T. de la vble. dep.   0.049329
Suma de cuad. residuos   0.066586   D.T. de la regresión    0.040800
R-cuadrado               0.332583   R-cuadrado corregido    0.315898
F(1, 40)                19.93257   Valor p (de F)          0.000064
Log-verosimilitud       75.79000   Criterio de Akaike   -147.5800
Criterio de Schwarz   -144.1047   Crit. de Hannan-Quinn -146.3062
```
Table 23: Regression Model. Returns 2018-2017. Prepared by the author.

```
Modelo 5: MCO, usando las observaciones 1-42
Variable dependiente: r2017

               Coeficiente   Desv. Típica   Estadístico t    valor p
   -------------------------------------------------------------------
   const        0.108472      0.0132885          8.163      4.76e-010  ***
   r2016       -0.240142      0.167682          -1.432      0.1599

Media de la vble. dep.   0.092754   D.T. de la vble. dep.    0.049176
Suma de cuad. residuos   0.094315   D.T. de la regresión     0.048558
R-cuadrado               0.048774   R-cuadrado corregido     0.024993
F(1, 40)                 2.050990   Valor p (de F)           0.159876
Log-verosimilitud        68.47909   Criterio de Akaike      -132.9582
Criterio de Schwarz     -129.4828   Crit. de Hannan-Quinn   -131.6843
```
Table 24: Regression Model. Returns 2017-2016. Prepared by the author.

```
Modelo 6: MCO, usando las observaciones 1-42
Variable dependiente: r2016

               Coeficiente   Desv. Típica   Estadístico t    valor p
   -------------------------------------------------------------------
   const        0.0561625     0.00824094         6.815      3.40e-08   ***
   r2015        0.246694      0.125673           1.963      0.0566     *

Media de la vble. dep.   0.065450   D.T. de la vble. dep.    0.045225
Suma de cuad. residuos   0.076490   D.T. de la regresión     0.043729
R-cuadrado               0.087868   R-cuadrado corregido     0.065065
F(1, 40)                 3.853301   Valor p (de F)           0.056628
Log-verosimilitud        72.87819   Criterio de Akaike      -141.7564
Criterio de Schwarz     -138.2810   Crit. de Hannan-Quinn   -140.4825
```
Table 25: Regression Model. Returns 2016-2015. Prepared by the author.

```
Modelo 7: MCO, usando las observaciones 1-42
Variable dependiente: r2015

               Coeficiente   Desv. Típica   Estadístico t    valor p
   -------------------------------------------------------------------
   const        0.0130006     0.0143127          0.9083     0.3691
   r2014        0.228398      0.109591           2.084      0.0436     **

Media de la vble. dep.   0.037646   D.T. de la vble. dep.    0.054342
Suma de cuad. residuos   0.109217   D.T. de la regresión     0.052254
R-cuadrado               0.097950   R-cuadrado corregido     0.075399
F(1, 40)                 4.343458   Valor p (de F)           0.043583
Log-verosimilitud        65.39839   Criterio de Akaike      -126.7968
Criterio de Schwarz     -123.3214   Crit. de Hannan-Quinn   -125.5229
```
Table 26:Regression Model. Returns 2015-2014. Prepared by the author.

As well as it was done in the previous analysis, there has been taken into account longer periods. In both, three year and five years period, some persistence has been observed.

```
Modelo 1: MCO, usando las observaciones 1-42
Variable dependiente: r1

               Coeficiente   Desv. Típica   Estadístico t    valor p
   -------------------------------------------------------------------
   const       -0.147358      0.00694184        -21.23      4.95e-023  ***
   r3           0.0987073     0.253757           0.3890     0.6994
   r5           1.33176       0.225265           5.912      6.86e-07   ***

Media de la vble. dep.  -0.093864   D.T. de la vble. dep.    0.049329
Suma de cuad. residuos   0.023876   D.T. de la regresión     0.024743
R-cuadrado               0.760684   R-cuadrado corregido     0.748411
F(2, 39)                 61.98226   Valor p (de F)           7.76e-13
Log-verosimilitud        97.32824   Criterio de Akaike      -188.6565
Criterio de Schwarz     -183.4435   Crit. de Hannan-Quinn   -186.7457
```
Table 27: Regression Model. Returns three scenarios. Prepared by the author.

- Negative returns:

From the analysis, it can be said that there is some persistence between the annual return of a year and the returns of the previous one, except for 2017-2016.

```
Modelo 11: MCO, usando las observaciones 1-42
Variable dependiente: r2018

             Coeficiente   Desv. Típica   Estadístico t   valor p
   --------------------------------------------------------------
   const       -0.101598     0.0176037        -5.771      9.91e-07 ***
   r2017       -0.774123     0.209732         -3.691      0.0007   ***

Media de la vble. dep. -0.162956   D.T. de la vble. dep.   0.042922
Suma de cuad. residuos  0.056344   D.T. de la regresión    0.037531
R-cuadrado              0.254060   R-cuadrado corregido    0.235411
F(1, 40)               13.62360    Valor p (de F)          0.000666
Log-verosimilitud      79.29760    Criterio de Akaike    -154.5952
Criterio de Schwarz  -151.1199     Crit. de Hannan-Quinn -153.3214
```
Table 28: Regression Model. Returns 2018-2017. Prepared by the author.

```
Modelo 6: MCO, usando las observaciones 1-42
Variable dependiente: r2017

             Coeficiente   Desv. Típica   Estadístico t   valor p
   --------------------------------------------------------------
   const       0.0791983    0.00434485       18.23       5.57e-021 ***
   r2016      -0.0784572    0.122512         -0.6404      0.5256

Media de la vble. dep.  0.079262   D.T. de la vble. dep.   0.027947
Suma de cuad. residuos  0.031698   D.T. de la regresión    0.028150
R-cuadrado              0.010149   R-cuadrado corregido   -0.014597
F(1, 40)                0.410117   Valor p (de F)          0.525562
Log-verosimilitud      91.37737    Criterio de Akaike    -178.7547
Criterio de Schwarz  -175.2794     Crit. de Hannan-Quinn -177.4809
```
Table 29: Regression Model. Returns 2017-2016. Prepared by the author.

```
Modelo 9: MCO, usando las observaciones 1-42
Variable dependiente: r2016

             Coeficiente   Desv. Típica   Estadístico t   valor p
   --------------------------------------------------------------
   const      -0.00479753   0.00563094       -0.8520      0.3993
   r2015      -0.160824     0.0754385        -2.132       0.0392   **

Media de la vble. dep. -0.000817   D.T. de la vble. dep.   0.035885
Suma de cuad. residuos  0.047410   D.T. de la regresión    0.034428
R-cuadrado              0.102028   R-cuadrado corregido    0.079579
F(1, 40)                4.544835   Valor p (de F)          0.039211
Log-verosimilitud      82.92286    Criterio de Akaike    -161.8457
Criterio de Schwarz  -158.3704     Crit. de Hannan-Quinn -160.5719
```
Table 30: Regression Model. Returns 2016-2015. Prepared by the author.

```
Modelo 10: MCO, usando las observaciones 1-42
Variable dependiente: r2015

              Coeficiente   Desv. Típica   Estadístico t   valor p
    ---------------------------------------------------------------
    const        0.0293631    0.0144970          2.025      0.0495   **
    r2014       -1.20214      0.253962          -4.734      2.76e-05 ***

Media de la vble. dep.  -0.024754    D.T. de la vble. dep.    0.071272
Suma de cuad. residuos   0.133493    D.T. de la regresión     0.057770
R-cuadrado               0.359041    R-cuadrado corregido     0.343017
F(1, 40)                22.40647     Valor p (de F)           0.000028
Log-verosimilitud       61.18352     Criterio de Akaike    -118.3670
Criterio de Schwarz   -114.8917      Crit. de Hannan-Quinn -117.0932
```
Table 31: Regression Model. Returns 2015-2014. Prepared by the autor.

Finally, there is also persistence in the returns when considering periods of longer years, as it is shown in the following results.

```
Modelo 1: MCO, usando las observaciones 1-42
Variable dependiente: r1

              Coeficiente   Desv. Típica   Estadístico t   valor p
    ---------------------------------------------------------------
    const       -0.108582     0.00926752       -11.72       2.40e-014 ***
    r3           1.72443      0.264643           6.516       9.96e-08  ***
    r5          -0.382247     0.401408          -0.9523      0.3468

Media de la vble. dep.  -0.162956    D.T. de la vble. dep.    0.042922
Suma de cuad. residuos   0.032110    D.T. de la regresión     0.028694
R-cuadrado               0.574890    R-cuadrado corregido     0.553090
F(2, 39)                26.37052     Valor p (de F)           5.70e-08
Log-verosimilitud       91.10587     Criterio de Akaike    -176.2117
Criterio de Schwarz   -170.9987      Crit. de Hannan-Quinn -174.3010
```
Table 32: Regression Model. Returns Three scenarios. Prepared by the author.

8   Conclusions

This document was started carrying out a review of the literature on the existence of persistence in investment funds results, mentioning that the oldest results (50s, 60s, 70s) states that there is not persistence, no matter the variable that was analyzed. However, recent studies despite not being able to be compared one with each other, they do demonstrate this persistence, stating that some variable do are significant.

What really matter to an investor is the manager's ability to select winning positions or predict the market in order to obtain better results than the market, beating it. In such manner that positive results are not because a chance situation or the survival bias, already mentioned in Chapter 4.

Indeed, there are managers that increase the profitability of their portfolios by increasing the risk, that is, the beta while the alpha does not vary. However, is the alpha what it was looking for in the study, the managers' ability to choose winning investments that will derivate in the increase of the profitability.

From the performance analysis carried out at the first place, it has been extracted the following conclusions:

- **United States:**

In a period of one year and five years, the yields are slightly higher than in the market, while in a period of three years, the yields are below the market. The fund with the best performance in 2018 has a low beta, this could be one of the reasons why it achieved a positive return since, by not assuming much risk, it was protected from market drops. In addition, its positive alpha indicates that the manager probably chose the assets appropriately. This fund also corresponds to the one that has better performance in a period of three and five years, since during the last five years it has never had negative returns. In addition, the beta and alpha values of the fund increase with the duration of the period. Regarding the funds with the worst performance, their betas are, in general, above 1. This explains their results, because if the market drops, the funds will even more. In the majority of the cases it is observed a negative alpha, which means that the manager has not the ability to choose the appropriate investments.

- **Europe:**

It is only in five years period when the performance of the funds beats the market. During the last year, there is not a single fund that had positive return. Therefore, focusing on the three year and five years period: i) The funds with better performance corresponds with betas slightly below one and with positive alphas, proving the results obtained. The ability of a good manager to choose the assets and not assuming greater risk than the market one, is reflected on having positive return at the time that the market is dropping. ii) Funds with negative results corresponds with either, betas higher than one and with negative alphas (in some cases both situations are complied). Since the market had not a good performance those funds, with betas above one, had dropped even more and in most of the cases with betas below one, the alphas are negative which corresponds with bad decisions when choosing the investments.

- **Spain:**

In the three periods of time considered in this study, the funds obtained better results than the market. This may be due to the fact that on average, the beta is below one, which prevents the funds from losing even more when the market falls. Once again, the worst funds have positive betas and those with better results have betas below one and positive alphas.

Regarding the second analysis carried out in this document about the persistence of results with both, the calculated alphas and the returns of the different funds, the results are not conclusive, but some conclusions can be drawn.

- Persistence between 2018 and longer periods.

Funds with positive returns to five years period show persistence between 2018 and the five year period for both variables, alpha and return. However, in the funds whose return is negative, the persistence is just the opposite, for the period of 3 years it shows persistence, but it does not do so for the 5-year period. Despite of having mentioned previously the possible persistence of positive or negative alphas throughout 3 year and 5 year period in different funds. The results obtained from this study do not reflect this reality as it is reflecting just one persistence for each case.

It should be mentioned that in all the cases R^2 was close to 1, which means that there is not autocorrelation.

- Persistence between "n" and "n-1" year.

When analyzing the persistence of a variable between one year and the previous year, it has been observed that funds whose performance is worse show greater persistence than those belonging to the group of good results, this is a possible sign of the failed attempt of some managers to beat markets through active management strategies.

In this document only the alpha and the yields of the funds have been analyzed, a possible continuation of this study would be analyzing other indicators such as the Sharpe ratio that already provides information about the total risk of the fund and also It could include variables such as commissions and the size of the fund.

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10 Annex and tables

ANNUAL AVERAGE YIELDS OF THE INVESTMENT FUNDS AS OF 31/12/2014

Profitability (%)	1 Year	3 Years	5 Years	10 Years	15 Years	20 Years	24 Years
Monetary	0,58%	1,36%	1,24%	1,57%	1,82%	2,55%	3,43%
Euro Fixed Income Short Term	0,99%	1,81%	1,34%	1,58%	1,92%	2,81%	3,46%
Euro Fixed Income Long Term	6,06%	5,98%	3,66%	2,84%	3,10%	3,86%	4,41%
Euro Fixed Income Mixed	4,35%	5,07%	2,58%	2,47%	1,92%	3,57%	4,14%
Euro Equities Mixed	5,74%	8,85%	3,14%	3,07%	1,01%	4,39%	4,68%
Euro Equities National	3,50%	11,62%	1,74%	4,30%	1,67%	7,27%	7,33%
International Fixed Income	6,45%	4,84%	3,37%	2,34%	2,40%	3,56%	4,32%
International Fixed Income Mixed	3,19%	3,59%	1,69%	1,39%	0,80%	2,76%	3,39%
International Equities Mixed	4,11%	7,60%	4,12%	2,80%	0,15%	3,79%	4,32%
Euro Equities Rest	1,05%	14,19%	7,31%	1,00%	-4,82%	-2,14%	-0,45%
International Equities Europe	4,91%	12,08%	4,98%	3,10%	-1,29%	4,58%	4,73%
International Equities EEUU	18,33%	18,10%	14,09%	5,50%	-0,39%	1,72%	0,26%
International Equities Japan	6,28%	14,81%	7,31%	1,00%	-4,82%	-2,14%	-0,45%
International Equities Emerging Markets	4,21%	2,54%	0,61%	6,66%	3,62%	5,37%	5,58%
International Equities Rest	4,97%	14,88%	9,48%	5,35%	-1,79%	3,85%	4,49%
Global	2,68%	5,82%	2,74%	2,21%	0,13%	3,47%	3,99%
Warrant Fixed Profitability	2,53%	4,12%	2,98%	2,71%	2,97%		
Warrant Variable Profitability	2,68%	4,23%	2,18%	2,25%	1,94%		
Parcial Warranty	5,10%	6,10%	1,56%				
Pasive Management	7,86%	8,36%	2,54%				
Absolut Return	1,96%	2,70%	1,43%				
Free-Investment Funds (FIF)	5,47%	10,42%	6,14%				
Funds of FIF	4,26%	4,59%	2,10%				
TOTAL FUNDS	**3,70%**	**5,07%**	**2,93%**	**2,58%**	**1,54%**	**3,05%**	**3,75%**

Table 33: 2014 Investment Funds returns. (Source: Inverco). Prepared by the author.

ANNUAL AVERAGE YIELDS OF THE INVESTMENT FUNDS AS OF 31/12/2015

Profitability (%)	1 Year	3 Years	5 Years	10 Years	15 Years	20 Years	24 Years
Monetary	0,01%	0,64%	1,19%	1,46%	1,62%	2,15%	3,29%
Euro Fixed Income Short Term	-0,11%	0,86%	1,33%	1,41%	1,71%	2,35%	3,31%
Euro Fixed Income Long Term	0,07%	3,62%	3,75%	2,64%	2,83%	3,37%	4,23%
Euro Fixed Income Mixed	0.17%	3,40%	2,81%	2,01%	1,93%	3,08%	3,97%
Euro Equities Mixed	1,81%	7,18%	4,32%	2,15%	1,58%	4,00%	4,56%
Euro Equities National	1,37%	10,37%	4,78%	2,55%	3,09%	6,68%	7,07%
International Fixed Income	4,06%	3,68%	3,74%	2,45%	2,18%	3,39%	4,30%
International Fixed Income Mixed	0,17%	2,04%	1,77%	89,00%	0,84%	2,34%	3,26%
International Equities Mixed	-0,30%	4,35%	3,07%	1,56%	55,00%	3,23%	4,12%
Euro Equities Rest	7,72%	11,76%	6,95%	3,40%	0,97%	5,91%	6,42%
International Equities Europe	9,29%	11,20%	6,16%	1,87%	0,18%	4,57%	4,91%
International Equities EEUU	5,11%	16,20%	11,75%	4,92%	0,43%	2,35%	0,46%
International Equities Japan	14,42%	15,95%	7,82%	-1,01%	-1,59%	-1,08%	0,13%
International Equities Emerging Markets	-5,88%	3,00%	-4,09%	1,54%	4,49%	5,40%	5,08%
International Equities Rest	8,26%	12,77%	7,96%	4,36%	0,08%	3,94%	4,64%
Global	4,44%	5,09%	3,19%	2,07%	85,00%	3,32%	4,01%
Warrant Fixed Profitability	0,28%	2,52%	3,18%	2,56%	2,73%	3,86%	
Warrant Variable Profitability	1,17%	3,18%	2,78%	1,98%	2,10%	4,33%	
Parcial Warranty	2,91%	6,08%	3,72%				
Pasive Management	0,64%	6,29%	3,03%				
Absolut Return	0,14%	1,48%	1,24%				

ANNUAL AVERAGE YIELDS OF THE INVESTMENT FUNDS AS OF 31/12/2015

Profitability (%)	1 Year	3 Years	5 Years	10 Years	15 Years	20 Years	24 Years
Free-Investment Funds (FIF)	5,38%	9,88%	5,70%				
Funds of FIF	1,70%	3,57%	2,22%				
TOTAL FUNDS	**0,99%**	**3,66%**	**3,11%**	**2,20%**	**1,79%**	**2,67%**	**3,63%**

Table 34: 2015 Investment Funds returns. (Source: Inverco). Prepared by the author.

ANNUAL AVERAGE YIELDS OF THE INVESTMENT FUNDS AS OF 31/12/2016

Profitability (%)	1 Year	3 Years	5 Years	10 Years	15 Years	20 Years	24 Years
Monetary	-0,05%	0,18%	0,80%	1,26%	1,39%	1,81%	3,15%
Euro Fixed Income Short Term	0,22%	0,37%	1,10%	1,22%	1,47%	1,91%	3,18%
Euro Fixed Income Long Term	1,20%	2,41%	3,81%	2,74%	2,67%	2,91%	4,10%
Euro Fixed Income Mixed	0,93%	1,80%	3,24%	1,62%	2,04%	2,48%	3,85%
Euro Equities Mixed	1,36%	2,95%	5,88%	1,05%	2,18%	3,11%	4,43%
Euro Equities National	2,55%	2,47%	7,65%	-0,01%	3,92%	5,15%	6,90%
International Fixed Income	1,58%	4,01%	4,02%	2,62%	2,10%	2,98%	4,19%
International Fixed Income Mixed	-0,02%	1,10%	2,16%	0,61%	0,95%	1,78%	3,12%
International Equities Mixed	1,48%	1,75%	4,74%	1,30%	1,32%	2,34%	4,01%
Euro Equities Rest	2,56%	3,74%	10,47%	1,89%	2,52%	4,39%	6,26%
International Equities Europe	-0,73%	4,41%	8,84%	23,00%	1,56%	3,28%	4,68%
International Equities EEUU	10,13%	11,05%	13,77%	5,50%	2,27%	3,88%	0,83%
International Equities Japan	3,02%	7,80%	12,28%	-0,07%	0,95%	-0,97%	24,00%
International Equities Emerging Markets	11,08%	2,90%	2,42%	0,61%	5,35%	5,02%	5,31%
International Equities Rest	5,69%	6,30%	11,65%	3,83%	2,29%	3,29%	4,68%
Global	2,01%	2,04%	4,77%	1,88%	1,57%	2,67%	3,93%
Warrant Fixed Profitability	0,07%	0,95%	2,52%	2,48%	2,45%	2,99%	
Warrant Variable Profitability	0,18%	1,34%	2,79%	1,54%	2,13%	3,44%	
Parcial Warranty	-1,10%	2,27%	3,99%				
Pasive Management	1,42%	3,25%	5,37%				
Absolut Return	0,38%	0,82%	1,71%				
Free-Investment Funds (FIF)	3,79%	4,95%	8,09%				
Funds of FIF	-1,92%	1,42%	2,74%				
TOTAL FUNDS	**1,14%**	**1,93%**	**3,45%**	**1,82%**	**2,03%**	**2,26%**	**3,53%**

Table 35: 2016 Investment Funds returns. (Source: Inverco). Prepared by the author.

ANNUAL AVERAGE YIELDS OF THE INVESTMENT FUNDS AS OF 31/12/2017

Profitability (%)	1 Year	3 Years	5 Years	10 Years	15 Years	20 Years	24 Years
Monetary	-0,29%	-0,11%	0,32%	0,95%	1,20%	1,58%	2,72%
Euro Fixed Income Short Term	0,14%	0,08%	0,58%	0,96%	1,30%	1,69%	2,84%
Euro Fixed Income Long Term	0,65%	0,53%	2,53%	2,68%	2,40%	2,66%	3,78%
Euro Fixed Income Mixed	0,90%	0,67%	2,40%	1,48%	2,37%	2,11%	3,57%
Euro Equities Mixed	3,39%	2,12%	5,20%	1,02%	3,68%	2,39%	4,40%
Euro Equities National	12,54%	5,37%	9,19%	0,48%	6,92%	4,20%	7,57%
International Fixed Income	-1,52%	1,39%	2,20%	2,56%	2,07%	2,41%	3,71%
International Fixed Income Mixed	1,25%	0,45%	1,46%	0,64%	1,30%	1,43%	2,86%
International Equities Mixed	3,15%	1,41%	3,51%	1,58%	2,92%	1,64%	3,87%
Euro Equities Rest	8,94%	6,43%	9,30%	2,40%	5,97%	3,38%	6,80%
International Equities Europe	7,90%	5,39%	8,05%	1,05%	4,53%	2,23%	5,19%
International Equities EEUU	10,59%	8,55%	13,82%	6,77%	5,92%	3,58%	2,20%
International Equities Japan	14,55%	10,53%	12,97%	3,11%	3,88%	-0,14%	1,00%
International Equities Emerging Markets	16,68%	6,86%	3,41%	0,11%	8,67%	4,47%	5,39%
International Equities Rest	10,08%	7,96%	10,80%	5,05%	6,15%	2,57%	4,68%
Global	4,49%	3,69%	4,33%	2,12%	2,66%	2,03%	3,80%

ANNUAL AVERAGE YIELDS OF THE INVESTMENT FUNDS AS OF 31/12/2017

Profitability (%)	1 Year	3 Years	5 Years	10 Years	15 Years	20 Years	24 Years
Warrant Fixed Profitability	0,66%	0,32%	1,65%	2,26%	2,20%	2,60%	
Warrant Variable Profitability	1,51%	0,94%	2,24%	1,46%	2,18%	2,69%	
Parcial Warranty	2,51%	1,41%	3,89%				
Pasive Management	2,21%	1,42%	4,48%				
Absolut Return	1,44%	0,65%	1,25%				
Free-Investment Funds (FIF)	9,88%	7,39%	9,29%				
Funds of FIF	-1,45%	0,01%	1,79%				
TOTAL FUNDS	**2,64%**	**1,59%**	**2,95%**	**1,84%**	**2,50%**	**2,04%**	**3,26%**

Table 36: 2017 Investment Funds returns. (Source: Inverco). Prepared by the author.

ANNUAL AVERAGE YIELDS OF THE INVESTMENT FUNDS AS OF 31/12/2018

Profitability (%)	1 Year	3 Years	5 Years	10 Years	15 Years	20 Years	24 Years
Monetary	-0,53%	-0,29%	-0,06%	0,65%	1,07%	1,39%	2,26%
Euro Fixed Income Short Term	.1,30	-0,32%	-0,02%	0,70%	1,09%	1,42%	2,26%
Euro Fixed Income Long Term	-1,41%	0,14%	1,28%	2,30%	2,13%	2,30%	3,14%
Euro Fixed Income Mixed	-4,26%	-0,81%	0,40%	1,68%	1,74%	1,49%	2,76%
Euro Equities Mixed	-8,14%	-11,30%	0,69%	2,76%	2,36%	1,17%	3,23%
Euro Equities National	-11,10%	0,80%	1,46%	4,13%	4,31%	2,17%	5,61%
International Fixed Income	-1,92%	-0,63%	1,68%	2,39%	1,85%	2,13%	2,74%
International Fixed Income Mixed	-4,31%	-1,09%		1,24%	0,89%	0,71%	1,98%
International Equities Mixed	-6,12%	-0,61%	0,38%	3,54%	1,98%	0,70%	2,69%
Euro Equities Rest	-14,80%	-1,58%	0,75%	6,32%	3,80%	1,31%	4,62%
International Equities Europe	-13,30%	-2,46%	1,25%	4,87%	2,72%	0,49%	3,34%
International Equities EEUU	-5,18%	4,92%	7,51%	10,83%	5,01%	2,45%	1,60%
International Equities Japan	-13,20%	0,81%	4,49%	5,94%	2,16%	-0,31%	0,87%
International Equities Emerging Markets	-11,90%	4,51%	2,29%	6,62%	5,96%	5,01%	3,15%
International Equities Rest	-12,90%	0,48%	2,89%	9,06%	4,46%	1,06%	3,06%
Global	-5,58%	0,19%	1,52%	2,58%	1,96%	1,14%	2,80%
Warrant Fixed Profitability	0,06%	0,25%	0,70%	1,94%	2,05%	2,19%	
Warrant Fixed Profitability	-1,21%	0,15%	0,86%	1,62%	1,87%	1,80%	
Parcial Warranty	-2,40%	.0,35	1,37%				
Pasive Management	-2,91%	0,21%	1,78%				
Absolut Return	-4,79%	-1,04%	1,37%				
Free-Investment Funds (FIF)	-7,67%	2,68%	3,81%				
Funds of FIF	-2,65%	-1,77%	0,06%				
TOTAL FUNDS	**-4,81%**	**-0,39%**	**0,69%**	**1,92%**	**1,91%**	**1,42%**	**2,54%**

Table 37: 2018 Investment Funds returns. (Source: Inverco). Prepared by the author.

United States

	MSCI US Price	BBVA Bolsa Indice USA (Cubierto), FI	Multifondo America A, FI	Kutxabank Bolsa EEUU Estandar, FI	Ibercaja Bolsa USA A, FI	Fondmapfre Bolsa America, FI	Bankia Bolsa USA Universal, FI	Dunas Seleccion USA Cubierto, FI	Caixabank Bolsa USA Estandar, FI	Laboral Kutxa Bolsa USA, FI	BBVA Bolsa USA (Cubierto), FI	ING Direct Fondo Naranja Standard&Poor's 500, FI	Caja Ingenieros Bolsa USA A, FI	Caixabank Bolsa Seleccion USA Estandar, FI	Eurovalor Estados Unidos, FI	Santander Seleccion RV Norteamerica, FI	BBVA Bolsa USA A, FI	Renta 4 USA, FI	Bankia Indice S&P 500 Plus, FI	BBVA Bolsa USA (Cubierto), FI	Sabadell Estados Unidos Bolsa Base, FI
Return 1 year	-6,54%	-9,04%	-10,34%	-9,31%	-4,60%	-3,27%	-2,23%	-7,60%	-2,85%	-8,64%	-13,49%	-1,48%	-4,35%	-3,07%	-2,77%	-3,80%	-5,39%	3,63%	-8,47%	-13,49%	-5,44%
Return 3 years	6,21%	4,54%	3,11%	4,37%	3,83%	4,56%	1,87%	5,35%	4,14%	2,84%	1,39%	5,37%	1,93%	3,16%	3,41%	3,20%	2,50%	5,94%	5,58%	1,39%	4,20%
Return 5 years	5,62%	4,80%	4,55%	4,23%	7,11%	8,08%	6,49%	5,49%	8,67%	3,46%	2,10%	9,91%	6,43%	7,50%	7,70%	7,72%	7,27%	8,81%	5,60%	2,10%	8,53%
T-Bills (12 months)	-0,37%																				
1 YEAR																					
Correlation Coef.	0,99	0,83	0,96	0,85	0,90	0,92	1,00	0,91	0,63	0,97	0,85	0,87	0,89	0,50	0,57	0,90	0,32	0,99	0,97	0,90	0,99
Stand. Deviation	15,72%	16,66%	13,19%	15,04%	17,00%	14,96%	17,10%	17,36%	17,11%	13,66%	17,16%	16,48%	14,42%	16,21%	13,08%	13,01%	17,41%	11,19%	16,60%	17,16%	16,99%
Beta 1 year		1,05	0,70	0,92	0,92	0,85	1,00	1,10	0,99	0,55	1,06	0,89	0,79	0,91	0,41	0,47	0,99	0,23	1,04	1,06	0,98
Alpha		-0,217	-0,568	-0,329	0,144	0,236	0,431	-0,045	0,360	-0,487	-0,656	0,438	0,092	0,294	0,015	-0,050	0,110	0,541	-0,166	-0,656	0,095
3 YEARS																					
Correlation Coef	0,99	0,86	0,94	0,81	0,82	0,85	0,99	0,85	0,67	0,97	0,79	0,82	0,81	0,56	0,61	0,84	0,51	0,99	0,97	0,84	—
Stand. Deviation	12,80%	12,81%	10,35%	11,69%	14,88%	13,15%	14,36%	12,87%	14,49%	11,49%	13,13%	14,55%	13,12%	13,95%	12,40%	12,27%	14,90%	11,19%	12,65%	13,13%	15,33%
Beta 3 years		0,99	0,69	0,86	0,95	0,84	0,95	0,99	0,96	0,60	0,99	0,90	0,84	0,89	0,54	0,58	0,98	0,44	0,98	0,99	1,00
Alpha		-0,162	-0,108	-0,094	-0,203	-0,063	-0,402	-0,083	-0,183	-0,072	-0,478	-0,018	-0,321	-0,231	0,020	-0,027	-0,356	0,338	-0,049	-0,478	-0,204
5 YEARS																					
Correlation Coef	0,99	0,89	0,95	0,82	0,81	0,84	0,99	0,84	0,76	0,97	0,81	0,82	0,80	0,62	0,65	0,84	0,65	0,99	0,97	0,84	—
Stand. Deviation	13,01%	12,99%	11,09%	11,97%	15,56%	14,06%	15,88%	13,04%	15,88%	11,79%	13,53%	15,92%	14,68%	14,91%	13,48%	13,82%	16,27%	13,74%	12,91%	13,53%	16,62%
Beta 5 years		0,99	0,76	0,88	0,99	0,88	1,02	0,99	1,03	0,69	1,01	0,99	0,93	0,92	0,64	0,69	1,05	0,69	0,98	1,01	1,07
Alpha		-0,075	0,039	-0,066	0,158	0,318	0,074	-0,008	0,288	-0,028	-0,358	0,436	0,123	0,239	0,423	0,394	0,133	0,505	0,009	-0,358	0,249

Table 38: Results funds investing in US equities. Prepared by the author.

Europe

	STOXX Europe 50 EUR Price Index	Sabadell Europa Bolsa Base, FI	Ibercaja Bolsa Europa A, FI	March Europa Bolsa A, FI	Mediolanum Europa R.V. S, FI	Sabadell Europa Valor Base, FI	Caixabank Bolsa Gestion Europa Estandar, FI	BBVA Bolsa Europa A, FI	Renta 4 Valor Europa, FI	Eurovalor Europa, FI	GVC Gaesco Europa, FI	Acacia Reinverplus Europa, FI	Caixabank Bolsa Seleccion Europa Estandar, FI	Multifondo Europa A, FI	NB Valor Europa, FI	Fondmapfre Bolsa Europa, FI	Abanca Renta Variable Europa, FI	Sabadell Europa Valor Base, FI
Return 1 year	-13,74%	-19,90%	-11,83%	-23,02%	-17,81%	-23,35%	-18,88%	-12,70%	-15,13%	-15,39%	-26,75%	-21,16%	-18,76%	-11,38%	-26,90%	-17,15%	-19,22%	-23,35%
Return 3 years	-4,17%	-5,47%	-2,22%	-5,09%	-5,24%	-6,29%	-5,40%	-4,77%	0,41%	-3,60%	-4,77%	-3,62%	-5,35%	-2,29%	-7,52%	-2,84%	-5,05%	-6,29%
Return 5 years	-1,28%	-1,93%	0,08%	-1,55%	-1,38%	-2,28%	-1,63%	-2,01%	2,68%	0,33%	-3,55%	0,27%	-0,99%	2,73%	-4,42%	-0,65%	-3,66%	-2,28%
T-Bills (12 months)	-0,37																	
1 YEAR																		
Corr. Coeffient		0,90	0,91	0,81	0,91	0,92	0,90	0,86	0,88	0,74	0,90	0,88	0,03	0,88	0,79	0,96	0,90	0,92
Standard Deviation	12,77%	13,19%	12,41%	13,26%	13,23%	13,98%	14,10%	12,91%	12,90%	11,24%	17,48%	13,24%	11,65%	10,53%	13,92%	12,50%	13,94%	13,98%
Beta 1 year		0,93	0,88	0,84	0,94	1,00	0,99	0,87	0,89	0,65	1,23	0,92	0,03	0,73	0,87	0,94	0,98	1,00
Alpha		-0,463	0,464	-0,563	-0,277	-0,968	-0,492	0,402	0,110	0,652	-1,847	-0,546	1,757	0,868	-1,005	-0,198	-0,5119	-0,968
3 YEARS																		
Corr. Coeffient		0,94	0,96	0,89	0,94	0,94	0,95	0,93	0,92	0,82	0,91	0,94	-0,08	0,90	0,90	0,95	0,92	0,94
Standard Deviation	14,38%	15,00%	14,98%	14,44%	14,77%	15,70%	16,55%	14,94%	12,87%	13,20%	21,84%	15,23%	13,18%	12,45%	16,00%	15,83%	16,22%	15,70%
Beta 3 years		0,98	1,00	0,89	0,97	1,03	1,09	0,97	0,82	0,75	1,39	1,00	-0,07	0,78	1,00	1,04	1,04	1,03
Alpha		-0,564	0,196	-0,670	-0,334	-1,026	-0,720	0,172	0,280	0,415	-2,203	-0,733	1,997	0,754	-1,313	-0,437	-0,636	-1,026
5 YEARS																		
Corr. Coeffient		0,95	0,97	0,91	0,95	0,95	0,96	0,95	0,93	0,82	0,91	0,95	-0,05	0,91	0,92	0,95	0,93	0,95
Standard Deviation	15,66%	15,89%	15,66%	14,38%	15,56%	16,56%	17,79%	16,16%	13,58%	13,53%	21,61%	16,17%	14,16%	13,55%	16,75%	16,56%	18,02%	16,56%
Beta 5 years		0,96	0,96	0,84	0,95	1,01	1,09	0,99	0,81	0,71	1,26	0,98	-0,05	0,78	0,99	1,00	1,07	1,01
Alpha		-0,533	0,273	-0,551	-0,287	-0,976	-0,719	0,139	0,304	0,509	-1,911	-0,707	1,937	0,740	-1,283	-0,348	-0,714	-0,976

Table 39: Results funds investing in European equities. Prepared by the author.

Spain

	IBEX 35 Index | Price History	Caixabank Bolsa Indice Espana Estandar, FI	Bankoa Bolsa, FI	Kutxabank Bolsa Estandar, FI	Unifond Renta Variable Espana A, FI	Santander Indice Espana Openbank, FI	Bankia Indice Ibex Universal, FI	Trea Iberia Equity A, FI	Santander Acciones Espanolas A, FI	Caixabank Bolsa Gestion Espana Estandar, FI	Sabadell Espana Dividendo Base, FI	Rural Renta Variable Espana Estandar, FI	Bankia Dividendo Espana Universal, FI	UBS Espana Gestion Activa P, FI	Abanca Renta Variable Espana, P, FI	NB Bolsa Seleccion, FI	Liberbank Renta Variable Espana A, FI	PBP Bolsa Espana A, FI	GVCGaesco Bolsalider A, FI	DWS Acciones Espanolas A, FI	EDM Inversion R, FI	DP Bolsa Espanola A, FI	Laboral Kutxa Bolsa, FI	Sabadell Espana Bolsa Base, FI
Return 1 year	-16,57%	-13,57%	-13,70%	-15,02%	-14,16%	-13,32%	-13,48%	-7,77%	-10,92%	-12,28%	-18,04%	-18,13%	-9,24%	-15,31%	-16,59%	-14,45%	-15,69%	-10,78%	-15,15%	-9,27%	-9,21%	-11,99%	-15,99%	-20,10%
Return 3 year	-3,75%	-1,12%	-2,68%	-2,61%	-2,49%	-0,80%	-0,90%	0,17%	1,32%	-2,82%	-3,00%	-3,30%	0,14%	-1,67%	-4,99%	-3,20%	-4,72%	0,34%	-2,38%	1,73%	3,11%	-2,12%	-3,05%	-8,22%
Return a 5 year	-2,93%	-0,25%	-0,61%	-0,56%	-1,40%	0,04%	-0,17%	-5,18%	3,20%	-2,04%	-1,20%	-2,56%	2,07%	-0,50%		-1,20%	-1,24%	0,98%	-1,40%	3,91%	3,20%	-1,90%	-1,94%	-4,64%
T-Bills (12 months)	0,37%																							
1 YEAR																								
Correl. Coeff		1,00	0,96	0,98	0,99	0,94	1,00	0,86	0,90	0,98	0,90	0,92	0,99	0,95	0,93	0,97	0,87	0,94	0,93	0,85	0,87	0,97	0,97	0,95
Standard Deviation	0,87%	0,86%	0,74%	0,83%	0,82%	0,85%	0,86%	0,78%	0,78%	0,84%	1,00%	0,84%	0,75%	0,81%	0,77%	0,87%	0,86%	0,73%	0,85%	0,85%	0,70%	0,74%	0,77%	1,10%
Beta		0,98	0,82	0,93	0,94	0,91	0,98	0,77	0,81	0,95	1,03	0,88	0,84	0,88	0,83	0,97	0,86	0,79	0,91	0,82	0,70	0,82	0,86	1,19
Alpha		0,270	-0,012	0,043	0,137	0,181	0,282	0,506	0,251	0,342	-0,104	-0,346	0,482	-0,066	-0,282	0,156	-0,137	0,238	-0,004	0,436	0,246	0,167	-0,175	-0,048
3 YEARS																								
Correl. Coeff		1,00	0,98	0,99	0,99	0,98	1,00	0,89	0,94	0,98	0,93	0,97	0,99	0,96	0,93	0,98	0,95	0,97	0,96	0,94	0,87	0,96	0,99	0,97
Standard Deviation	1,13%	1,16%	1,01%	1,12%	1,08%	1,16%	1,16%	0,95%	1,00%	1,18%	1,15%	1,11%	1,00%	0,96%	1,00%	1,05%	1,02%	1,00%	1,15%	1,00%	0,82%	1,00%	1,05%	1,32%
Betas		1,02	0,87	0,97	0,94	1,00	1,02	0,74	0,84	1,02	0,95	0,95	0,87	0,81	0,82	0,90	0,85	0,86	0,97	0,82	0,63	0,85	0,92	1,13
Alpha		0,270	0,060	0,104	0,105	0,296	0,293	0,295	0,446	0,099	0,055	0,025	0,342	0,137	-0,192	0,019	-0,152	0,355	0,127	0,483	0,547	0,106	0,040	-0,397
5 YEARS																								
Correl. Coeff.		1,00	0,99	0,99	0,99	0,98	1,00	0,80	0,95	0,98	0,95	0,97	0,99	0,96		0,98	0,93	0,97	0,97	0,96	0,88	0,96	0,99	0,97
Standard Deviation	1,20%	1,19%	1,07%	1,13%	1,12%	1,20%	1,20%	1,06%	1,00%	1,24%	1,16%	1,13%	1,05%	1,02%		1,08%	0,97%	1,08%	1,17%	1,04%	0,89%	1,06%	1,09%	1,32%
Beta		0,99	0,88	0,94	0,93	0,98	1,00	0,71	0,79	1,01	0,92	0,92	0,87	0,82		0,89	0,76	0,88	0,95	0,83	0,65	0,86	0,91	1,07
Alpha		0,266	0,202	0,221	0,135	0,293	0,276	-0,300	0,559	0,092	0,152	0,016	0,468	0,198		0,144	0,107	0,361	0,140	0,642	0,523	0,066	0,075	-0,152

	Credit Suisse Bolsa B, FI	Bankinter Futuro Ibex R, FI	Caixabank Bolsa Gestion Espana Estandar, FI	Eurovalor Bolsa, FI	Sabadell Espana Bolsa Base, FI	Bankinter Bolsa Espana R, FI	BBVA Bolsa Indice, FI	BBVA Bolsa, FI	Fonbilbao Acciones, FI	Santander Small Caps Espana A, FI	BBVA Bolsa Plus, FI	Eurovalor Bolsa Espanola, FI	Bankia Small & Mid Caps Espana Universal, FI	ING Direct Fondo Naranja Ibex 35, FI	Renta 4 Bolsa R, FI	Caixabank Bolsa All Caps Espana Estandar, FI	BNP Paribas Bolsa Espanola, FI	Caixabank Bolsa Espana 150 Estandar, FI	Catalana Occidente Bolsa Espanola, FI	Gestifonsa Renta Variable Espana Minorista, FI	Ibercaja Bolsa A, FI	Bankia Bolsa Espanola Universal, FI	Bankia Banca Privada RV Espana Universal, FI	Santander Indice Espana Openbank, FI
Return 1 year	-11,42%	-13,27%	-12,28%	-16,91%	-20,10%	-12,81%	-13,52%	-14,58%	-11,48%	-13,05%	-11,19%	-14,60%	-14,56%	-13,43%	-9,45%	-14,23%	-13,06%	-21,28%	-10,74%	-12,13%	-14,80%	-11,81%	-11,76%	-13,32%
Return 3 year	-2,18%	-0,83%	-2,82%	-4,83%	-8,22%	-0,65%	-1,05%	-4,69%	-0,54%	4,42%	-2,25%	-3,19%	0,71%	-0,78%	4,10%	-0,44%	-0,55%	-3,61%	1,01%	0,25%	-2,48%	-3,15%	-1,70%	-0,80%
Return a 5 year	-2,20%	-0,02%	-2,04%	-2,01%	-4,64%	1,07%	-0,18%	-4,17%	0,39%	5,92%	-1,31%	-0,63%	1,91%	0,09%	5,22%	-0,62%	0,54%	-2,60%	1,43%	0,90%	-1,12%	-2,65%	-0,37%	0,04%
1 YEAR																								
Correl. Coeff	0,98	0,98	0,98	0,91	0,95	0,97	0,99	0,87	0,01	0,78	0,85	0,91	0,87	0,91	0,90	0,91	0,99	0,99	0,97	0,93	0,94	0,96		
Standard Deviation	0,89%	0,89%	0,84%	0,86%	1,10%	0,83%	0,86%	0,80%	0,77%	0,75%	0,75%	0,82%	0,74%	0,83%	0,71%	0,81%	0,79%	1,30%	0,75%	0,67%	0,82%	0,77%		
Beta	1,00	0,99	0,95	0,89	1,19	0,92	0,97	0,79	0,01	0,68	0,74	0,85	0,73	0,87	0,73	0,84	0,89	1,49	0,83	0,71	0,89	0,84	0,92	0,91
Alpha	0,516	0,321	0,342	-0,205	-0,048	0,243	0,262	-0,143	-1,101	-0,174	0,110	-0,040	-0,229	0,105	0,274	-0,029	0,173	0,316	0,315	-0,018	-0,003	0,220	0,355	0,181
3 YEARS																								
Correl. Coeff	0,98	0,98	0,98	0,96	0,97	0,97	0,99	0,95	0,64	0,85	0,94	0,95	0,90	0,96	0,94	0,95	0,99	1,00	0,98	0,93	0,98	0,98	1,00	0,98
Standard Deviation	1,05%	1,17%	1,18%	1,10%	1,32%	1,06%	1,17%	1,14%	1,01%	0,89%	1,06%	1,04%	0,86%	1,16%	0,88%	1,12%	1,06%	1,75%	0,94%	0,82%	1,12%	1,32%	1,08%	1,16%
Beta 3	0,90	1,01	1,02	0,92	1,13	0,91	1,02	0,96	0,57	0,67	0,88	0,87	0,68	0,98	0,72	0,94	0,93	1,54	0,81	0,67	0,97	1,14	0,95	1,00
Alpha	0,120	0,296	0,099	-0,137	-0,397	0,275	0,278	-0,109	0,159	0,693	0,104	0,008	0,327	0,292	0,682	0,308	0,294	0,215	0,405	0,276	0,116	0,113	0,185	0,296
5 YEARS																								
Correl. Coeff	0,97	0,98	0,98	0,96	0,97	0,97	0,99	0,96	0,79	0,87	0,95	0,96	0,91	0,97	0,95	0,96	0,97	1,00	0,98	0,95	0,98	0,99	0,99	0,98
Standard Deviation	1,10%	1,21%	1,24%	1,16%	1,32%	1,10%	1,20%	1,21%	1,04%	0,94%	1,13%	1,10%	0,94%	1,21%	0,94%	1,16%	1,02%	1,80%	1,00%	0,90%	1,13%	1,44%	1,13%	1,20%
Beta	0,89	0,99	1,01	0,93	1,07	0,90	1,00	0,97	0,68	0,69	0,90	0,89	0,71	0,98	0,75	0,93	0,83	1,50	0,82	0,71	0,93	1,17	0,94	0,98
Alpha	0,047	0,290	0,092	0,075	-0,152	0,374	0,275	-0,131	0,252	0,805	0,136	0,200	0,411	0,297	0,751	0,212	0,304	0,162	0,390	0,308	0,162	0,072	0,240	0,293

Table 40: Results funds investing in Spanish equities. Prepared by the author.

Name	1 Year		3 Years		5 Years	
	β	α	β	α	β	α
Abanca Renta Variable Europa, FI	0,98	-0,512	1,04	-0,636	1,07	-0,714
Acacia Reinverplus Europa, FI	0,92	-0,546	1,00	-0,733	0,98	-0,707
BBVA Bolsa Europa A, FI	0,87	0,402	0,97	0,172	0,99	0,139
Caixabank Bolsa Gestion Europa Estandar, FI	0,99	-0,492	1,09	-0,720	1,09	-0,719
Caixabank Bolsa Seleccion Europa Estandar, FI	0,03	1,757	-0,07	1,997	-0,05	1,937
Eurovalor Europa, FI	0,65	0,652	0,75	0,415	0,71	0,509
Fondmapfre Bolsa Europa, FI	0,94	-0,198	1,04	-0,437	1,00	-0,348
GVC Gaesco Europa, FI	1,23	-1,847	1,39	-2,203	1,26	-1,911
Ibercaja Bolsa Europa A, FI	0,88	0,464	1,00	0,196	0,96	0,273
March Europa Bolsa A, FI	0,84	-0,563	0,89	-0,670	0,84	-0,551
Mediolanum Europa R.V. S, FI	0,94	-0,277	0,97	-0,334	0,95	-0,287
Multifondo Europa A, FI	0,73	0,868	0,78	0,754	0,78	0,740
NB Valor Europa, FI	0,87	-1,005	1,00	-1,313	0,99	-1,283
Renta 4 Valor Europa, FI	0,89	0,110	0,82	0,280	0,81	0,304
Sabadell Europa Bolsa Base, FI	0,93	-0,463	0,98	-0,564	0,96	-0,533
Sabadell Europa Valor Base, FI	1,00	-0,968	1,03	-1,026	1,01	-0,976
Sabadell Europa Valor Base, FI	1,00	-0,968	1,03	-1,026	1,01	-0,976
Bankia Bolsa USA Universal, FI	1,00	0,431	0,95	-0,402	1,02	0,074
Bankia Indice S&P 500 Plus, FI	1,04	-0,166	0,98	-0,049	0,98	0,009
BBVA Bolsa Indice USA (Cubierto), FI	1,05	-0,217	0,99	-0,162	0,99	-0,075
BBVA Bolsa USA (Cubierto), FI	1,06	-0,656	0,99	-0,478	1,01	-0,358
BBVA Bolsa USA (Cubierto), FI	1,06	-0,656	0,99	-0,478	1,01	-0,358
BBVA Bolsa USA A, FI	0,99	0,110	0,98	-0,356	1,05	0,133
Caixabank Bolsa Seleccion USA Estandar, FI	0,91	0,294	0,89	-0,231	0,92	0,239
Caixabank Bolsa USA Estandar, FI	0,99	0,360	0,96	-0,183	1,03	0,288
Caja Ingenieros Bolsa USA A, FI	0,79	0,092	0,84	-0,321	0,93	0,123
Dunas Seleccion USA Cubierto, FI	1,10	-0,045	0,99	-0,083	0,99	-0,008
Eurovalor Estados Unidos, FI	0,41	0,015	0,54	0,020	0,64	0,423
Fondmapfre Bolsa America, FI	0,85	0,236	0,84	-0,063	0,88	0,318
Ibercaja Bolsa USA A, FI	0,92	0,144	0,95	-0,203	0,99	0,158
ING Direct Fondo Naranja Standard&Poor's 500, FI	0,89	0,438	0,90	-0,018	0,99	0,436
Kutxabank Bolsa EEUU Estandar, FI	0,92	-0,329	0,86	-0,094	0,88	-0,066
Laboral Kutxa Bolsa USA, FI	0,55	-0,487	0,60	-0,072	0,69	-0,028
Multifondo America A, FI	0,70	-0,568	0,69	-0,108	0,76	0,039
Renta 4 USA, FI	0,23	0,541	0,44	0,338	0,69	0,505
Sabadell Estados Unidos Bolsa Base, FI	0,98	0,095	1,00	-0,204	1,07	0,249
Santander Seleccion RV Norteamerica, FI	0,47	-0,050	0,58	-0,027	0,69	0,394
Abanca Renta Variable Espana, FI	0,83	-0,282	0,82	-0,192	0,00	0,000

Bankia Banca Privada RV Espana Universal, FI	0,92	0,355	0,95	0,185	0,94	0,240
Bankia Bolsa Espanola Universal, FI	0,84	0,220	1,14	0,113	1,17	0,072
Bankia Dividendo Espana Universal, FI	0,84	0,482	0,87	0,342	0,87	0,468
Bankia Indice Ibex Universal, FI	0,98	0,282	1,02	0,293	1,00	0,276
Bankia Small & Mid Caps Espana Universal, FI	0,73	-0,229	0,68	0,327	0,71	0,411
Bankinter Bolsa Espana R, FI	0,92	0,243	0,91	0,275	0,90	0,374
Bankinter Futuro Ibex R, FI	0,99	0,321	1,01	0,296	0,99	0,290
Bankoa Bolsa, FI	0,82	-0,012	0,87	0,060	0,88	0,202
BBVA Bolsa Indice, FI	0,97	0,262	1,02	0,278	1,00	0,275
BBVA Bolsa Plus, FI	0,74	0,110	0,88	0,104	0,90	0,136
BBVA Bolsa, FI	0,79	-0,143	0,96	-0,109	0,97	-0,131
BNP Paribas Bolsa Espanola, FI	0,89	0,173	0,93	0,294	0,83	0,304
Caixabank Bolsa All Caps Espana Estandar, FI	0,84	-0,029	0,94	0,308	0,93	0,212
Caixabank Bolsa Espana 150 Estandar, FI	1,49	0,316	1,54	0,215	1,50	0,162
Caixabank Bolsa Gestion Espana Estandar, FI	0,95	0,342	1,02	0,099	1,01	0,092
Caixabank Bolsa Gestion Espana Estandar, FI	0,95	0,342	1,02	0,099	1,01	0,092
Caixabank Bolsa Indice Espana Estandar, FI	0,98	0,270	1,02	0,270	0,99	0,266
Catalana Occidente Bolsa Espanola, FI	0,83	0,315	0,81	0,405	0,82	0,390
Credit Suisse Bolsa B, FI	1,00	0,516	0,90	0,120	0,89	0,047
DP Bolsa Espanola A, FI	0,82	0,167	0,85	0,106	0,86	0,066
DWS Acciones Espanolas A, FI	0,82	0,436	0,82	0,483	0,83	0,642
EDM Inversion R, FI	0,70	0,246	0,63	0,547	0,65	0,523
Eurovalor Bolsa Espanola, FI	0,85	-0,040	0,87	0,008	0,89	0,200
Eurovalor Bolsa, FI	0,89	-0,205	0,92	-0,137	0,93	0,075
Fonbilbao Acciones, FI	0,01	-1,101	0,57	0,159	0,68	0,252
Gestifonsa Renta Variable Espana Minorista, FI	0,71	-0,018	0,67	0,276	0,71	0,308
GVCGaesco Bolsalider A, FI	0,91	-0,004	0,97	0,127	0,95	0,140
Ibercaja Bolsa A, FI	0,89	-0,003	0,97	0,116	0,93	0,162
ING Direct Fondo Naranja Ibex 35, FI	0,87	0,105	0,98	0,292	0,98	0,297
Kutxabank Bolsa Estandar, FI	0,93	0,043	0,97	0,104	0,94	0,221
Laboral Kutxa Bolsa, FI	0,86	-0,175	0,92	0,040	0,91	0,075
Liberbank Renta Variable Espana A, FI	0,86	-0,137	0,85	-0,152	0,76	0,107
NB Bolsa Seleccion, FI	0,97	0,156	0,90	0,019	0,89	0,144
PBP Bolsa Espana A, FI	0,79	0,238	0,86	0,355	0,88	0,361
Renta 4 Bolsa R, FI	0,73	0,274	0,72	0,682	0,75	0,751
Rural Renta Variable Espana Estandar, FI	0,88	-0,346	0,95	0,025	0,92	0,016
Sabadell Espana Bolsa Base, FI	1,19	-0,048	1,13	-0,397	1,07	-0,152
Sabadell Espana Bolsa Base, FI	1,19	-0,048	1,13	-0,397	1,07	-0,152
Sabadell Espana Dividendo Base, FI	1,03	-0,104	0,95	0,055	0,92	0,152
Santander Acciones Espanolas A, FI	0,81	0,251	0,84	0,446	0,79	0,559
Santander Indice Espana Openbank, FI	0,91	0,181	1,00	0,296	0,98	0,293

Santander Indice Espana Openbank, FI	0,91	0,181	1,00	0,296	0,98	0,293
Santander Small Caps Espana A, FI	0,68	-0,174	0,67	0,693	0,69	0,805
Trea Iberia Equity A, FI	0,77	0,506	0,74	0,295	0,71	-0,300
UBS Espana Gestion Activa P, FI	0,88	-0,066	0,81	0,137	0,82	0,198
Unifond Renta Variable Espana A, FI	0,94	0,137	0,94	0,105	0,93	0,135