

*Full Length Research Paper*

# The performance of Spanish pension plans in the period 2006 to 2010

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**Pension plans and funds represent a substantial part of the welfare systems in both Europe and Spain. One of the most important factors in the choice of a plan or fund is its performance, since if high returns are obtained; the participant will receive higher payments when the contingency covered by the plan or fund occurs. The main objective of this paper is therefore to analyse the performance of individual pension plans. To this end, we apply a multi-index model based on an extension of Jensen's alpha to a sample of data corresponding to 521 pension plans for the period between January 2006 and December 2010. The results obtained show that the performance of Spanish pension plan managers is, in general, close to zero. This suggests that in the Spanish pension plan market, the value added by active management does not compensate for its associated costs. Our analysis of whether the size and age of the plan might explain performance indicates that both factors are not related to risk-adjusted return. On the other hand, pension plan performance improves slightly when fees are not deducted, and positive risk-adjusted returns are obtained in some cases.**

**Key words:** Pension plans, performance, Jensen's alpha, multi-index model.

## INTRODUCTION

Pension plans and pension funds have undergone major development in recent years, at both international and national levels. At the end of 2009, total world assets managed by pension funds reached 12,740 billion euros, a figure that comes close to the 15,933 billion euros managed by mutual funds worldwide in the same year according to data from INVERCO, the Spanish Association of Collective Investment and Pension Funds and EFAMA, the European Fund and Asset Management Association. However, in Spain, pension plans are still at the development stage, with an accumulated volume of assets totalling 84,757 million euros, as of 31 December, 2010. This figure represents just 61.38% of the assets managed by mutual funds, which have reached a higher level of maturity in the Spanish market.

The significant development of collective investment institutions has aroused great interest in the financial community in general and among scholars in particular. This has given rise to numerous works: Levy and Mántey (2003), Shamsuddin (2001) and Thogersen (2001), which set out to explain the role of collective investment institutions in the financial market and in the economy in

general. In addition to these issues, others related to portfolio management in which fund performance has a more prominent role have been dealt with.

In this vein, works by Sharpe (1966), Treynor (1966) and Jensen (1968), pioneers in the assessment of fund performance, propose various measurements that they apply to a mutual fund sample. However, several authors have used these methods to measure pension fund performance.

Specifically, when analysing the US market, Coggin (2000) uses Jensen's model to examine the performance of 229 equity pension funds. The results obtained show that, overall, managers obtain positive returns. In this line, Collins and Fabozzi (2000) obtain similar results when they implement several models, among them the traditional model put forward by Jensen (1968), on a sample of 37 pension fund managers.

In spite of the fact that the methods proposed by Sharpe (1966), Treynor (1966) and Jensen (1968) to assess fund performance were widely accepted, such measures have caused controversy, as their capacity to identify the investors who have and use more information

has been questioned. In particular, most of the criticism made by Jensen (1972), Fama (1972) and Roll (1978) has focused on Jensen's alpha, possibly as a consequence of its extended use among professionals and scholars.

To this regard, various authors such as Cumby and Glen (1990) argue that Jensen's alpha has two shortcomings that may generate biased estimators. The first shortcoming takes place when the level of risk taken by the manager is assumed to be constant over time. This may give rise to abnormal return estimators when managers have market timing ability. This is according to Jensen (1972), Grant (1977), Dybvig and Ross (1985), Admati and Ross (1985), Grinblatt and Titman (1989a), Coggin et al. (1993), Cesari and Panetta (2000) and Collins and Fabozzi (2000).

To overcome these shortcomings, Jensen (1972), Grinblatt and Titman (1989a), Henriksson and Merton (1981), Kon and Jen (1978), and Bhattacharya and Pfleiderer (1983) propose various models to analyse the manager's skill for stock selection and market timing at the same time. Subsequently, several authors, Coggin et al. (1993), Collins and Fabozzi (2000), and Thomas and Tonks (2001), apply the above-mentioned models to assess performance obtained by pension fund managers in different markets.

Specifically, in the US market, Coggin et al. (1993) analyse the results obtained by 71 pension fund managers who mainly invest in equities, and conclude that in general, managers possess stock selection skills for building their portfolios, which allows them to obtain positive performances. This finding coincides with results from Collins and Fabozzi's (2000) analysis of a sample of 37 equity pension fund managers using models proposed by Henriksson and Merton (1981), Bhattacharya and Pfleiderer (1983) and Treynor and Mazuy (1966).

In the UK market, Thomas and Tonks (2001) apply Treynor and Mazuy's (1966) models and Henriksson and Merton's (1981) model to evaluate the management of 2,175 equity pension funds. Their results show that, as in the US market, managers possess stock selection skills. In this way, the aforementioned authors implement various models that consider market timing in order to obtain unbiased estimators. Nevertheless, Grinblatt and Titman (1994) and Cumby and Glen (1990) show that biases occurring when Jensen's alpha (Jensen, 1968) is estimated in the presence of information on market evolution are of little significance. In addition, Jagannatham and Korojczyk (1986) point out that biased estimations can also occur when stock selection and market timing are evaluated with the same model.

The second criticism against the measure proposed by Jensen (1968) refers to the appropriateness of the benchmark used. Roll (1978) highlights the importance of using an efficient benchmark. In this respect, Lehman and Modest (1987), Grinblatt and Titman (1994), Coggin et al. (1993), and Coggin (2000) prove that the choice of

the benchmark affects the magnitude of Jensen's alpha. According to Elton et al. (1993), Ferson and Schadt (1996) and Sharpe (1992), the omission of benchmarks may generate biases in the measurement of results.

To avoid this bias, Gruber (1996) proposes models that integrate benchmarks representing the type of assets in which the sample funds could invest, as opposed to the 3-factor model put forward by Fama and French (1993) and subsequently extended by Carhart (1997) by adding the momentum factor. However, Cremers et al. (2010) show the models based on benchmarks outperform models based on factors.

Studies focusing on the pension fund industry tend to use multi-index models rather than factor models. Mittelstaedt and Olsen (2003) use the multi-index model to assess the management of 19 Chilean pension funds. Their results indicate that the pension fund administrators do not provide additional value when they implement active management strategies taking as reference a portfolio comprising the various types of assets in which they might invest.

On the other hand, Blake et al. (2002) focus on the UK market to analyse a sample of 306 pension funds, and conclude that in general, manager efficiency is low. Consistent with this result, Blake and Timmermann (2005) draw similar conclusions from an analysis of a sample of 247 UK pension funds whose portfolios contain equities from different countries.

As well as evaluating fund results, other studies also consider the effects that fund characteristics can have on performance. Some authors have shown that fund size, age and fees can explain differences in fund performance. In this vein, Droms and Walker (1996) demonstrate that funds bearing higher costs obtain high returns that compensate for these costs. However, according to Annaert et al. (2003), this finding may be due to the existence of survivorship bias. In contrast, Elton et al. (1993), Carhart (1997) and Malkiel (1995) find evidence of significantly negative correlation between costs and the mutual funds' risk-adjusted return.

Yet, when Malkiel (1995) and Andreu et al. (2007) distinguish between investment related costs and operative costs, they find a significantly positive relationship between management costs and gross risk-adjusted return. This result coincides with that obtained by Martí et al. (2009) in the evolution of pension plans, in which a significantly negative relationship is found between fees borne and the net-of-fees risk-adjusted return. In contrast, Ippolito (1989) finds that the mutual fund's risk-adjusted return has no relation to the management fee, which, according to Elton et al. (1993) may be due to errors in the data used.

A further characteristic of the fund that may be related to performance is its total accumulated size. Hence, larger funds may benefit from the existence of scale economies and consequently will be more efficient. However, Otten and Bams (2002) and Annaert et al. (2003) show

that in a situation where the volume of assets is too high, diseconomies of scale may appear that can lead to the dissolution of the fund. In this vein, Chen et al. (1992) and Indro et al. (1999) find a significantly positive relationship between size and risk-adjusted return. However, these authors indicate that the relationship is negative in funds in the top size decile.

In addition, Dahlquist et al. (2000) find evidence for the mutual fund market to show that size affects funds differently, depending on which category the fund belongs to. On the other hand, Droms and Walker (1996) find no evidence of the existence of a significant relationship between performance and size. This result coincides with that of Elton et al. (1996) when possible survivorship bias is not considered. In the pension funds market, Blake et al. (2002) apply a multi-index model and find that smaller funds obtain better results than those that accumulate a large volume. Lakonishok et al. (1992) also obtain similar results. In contrast, Thomas and Tonks (2001), using a single benchmark model, shows that large funds perform better than smaller ones.

The age of the fund can also be a relevant factor in its performance, since more recently created funds can benefit from the effect of experience and learning, and obtain better results with lower costs. In the mutual funds market, Annaert et al. (2003) find no correlation between fund age and performance. However, Blake and Timmermann (1998) demonstrate a significantly positive relationship between fund age and risk-adjusted return, which may be due to survivorship bias in the sample analysed. These results contrast with those obtained by Otten and Bams (2002), who show that more recently created funds obtain better results than funds that have been on the market for longer periods. In the pension funds sector, Thomas and Tonks (2001) find that the age of the pension fund does not account for differences in performance.

The aforementioned literature demonstrates the importance of establishing whether managers are capable of generating wealth for the participant, that is to say, of checking whether the objective for which the fund is set up is accomplished. The accomplishment of this objective is particularly relevant in the case of pension plans, since achieving high returns will generate wealth for the participant's retirement, disability and death benefits. For this reason, we will analyse the performance of Spanish pension plans in this paper. To this end, we use the multi-index model that includes an extension of the model put forward by Jensen (1968).

This proposal essentially differs from the aforementioned research in various aspects. First, the study is undertaken in the Spanish market, with a limited volume and growing demand. The private pensions industry in Spain is a relatively recent phenomenon, appearing for the first time in 1988, whereas previous studies analyse data on consolidated markets with a long tradition in the private pensions industry. Hence, the particular life-cycle stage of the various geographical pension fund markets

may influence the efficiency of the management companies. For this reason, the present paper allows us to compare the results obtained by management companies trading in a market at the development stage with those obtained in mature markets.

Secondly, the study covers pension plans with different management styles, which allows us to compare results in terms of the types of assets making up the portfolios, and to analyse the skills of the management entity according to the type of asset administered. In contrast, much of the existing empirical evidence, such as Carhart (1997), Thomas and Tonks (2001) and Coggin et al. (1993), examines funds with portfolios comprising, for the main part, equity securities.

Thirdly, the previous empirical evidence provided by Thomas and Tonks (2001) is based on the analysis of occupational pension funds, in which the participant intervenes, through a control commission, in its management. In this paper, by contrast, we evaluate the results of individual pension funds, in which the participant has no active participation, and the only decision he or she takes is whether or not to invest. This may give relevant implications on the results, since the individual pension plan management company enjoys greater independence in establishing the investment policy.

The fourth difference lies in the unit of analysis. While previous scholars (Brown et al., 1997; Coggin et al., 1993) take the management company or the pension fund as their unit of analysis, the present study uses the pension plan. This allows us to examine the extent to which the size and age of the plan might influence their management and to analyse managers' skills in various financial markets. This enables us to contribute new empirical evidence in a market that has not been extensively studied.

## METHODOLOGY

To evaluate the performance of pension plan management companies, we take monthly liquidating values for the period between 31 January, 2006 and 31 December, 2010, corresponding to 521 individual pension plans of various types. Following the classification criterion of the Spanish Association of Collective Investment Institutions and Pension Plans (INVERCO), our sample is made up of 77 short-term fixed income plans, 32 long-term fixed income plans, 181 mixed fixed income plans, 123 mixed equity plans and 108 equity plans, with liquidating value throughout the sampling period. Additionally, we use the monthly returns of the Ibex-35 index, the AFI Treasury bond index, and the Morgan Stanley Capital International style indexes for the Spanish market obtained from the Spanish Securities and Investments Board (CNMV), MSCI and AFI, respectively.

We thereby omit plans created after 31 January, 2006, those dissolved during the period, or those with missing data for any of the months considered. From these data, provided by CNMV, we calculated the plans' monthly return according to the standard procedure in the literature.

Management and custodial fees for 521 pension plans as of 31 December, 2010 were obtained from the Directorate-General of Insurance and Pension Funds. Table 1 presents some basic

**Table 1.** Pension plan sample and descriptive statistics.

Variable		STFI	LTFI	MFI	ME	EQ
Number of plans		77	32	181	123	108
Asset	Mean	68,379.71	113,043.27	72,861.39	31,848.03	26,198.90
	Median	20,882.57	20,611.82	17,314.42	10,196.57	11,043.85
	Max	443,025.62	634,694.08	1,399,276.35	238,317.55	221,464.15
	Min	112.03	21.38	7.58	34.05	12.82
Age	Mean	10.94	13.14	15.76	11.87	10.26
	Median	9.68	12.82	14.56	12.32	10.28
	Max	22.02	22.02	22.02	22.04	21.97
	Min	4.95	4.96	5.19	5.14	5.16
Management fee (%)	Mean	1.14	1.45	1.51	1.65	1.74
	Median	1.15	1.50	1.60	1.92	2.00
	Max	2.00	2.00	2.00	2.00	2.00
	Min	0.20	0.60	0.09	0.07	0.40
Custodial fee (%)	Mean	1.17	0.16	0.23	0.21	0.22
	Median	1.10	0.10	0.18	0.15	0.15
	Max	0.50	0.50	0.50	0.50	0.50
	Min	0.03	0.00	0.00	0.00	0.00
Management Co. (N Plans)	Bank	16	4	45	16	16
	Saving B.	26	20	50	33	44
	Independent	35	8	86	74	48

statistics on the pension plan sample. The asset is measured in millions of euros, the age in years and the fees are shown as percentages of the assets.

In light of the comments made in the previous paragraph, and according to Brown et al. (1997), survival bias may appear as a result of excluding dissolved portfolios from the sample, or omitting, for methodological reasons, certain funds that existed in the period. Carhart (1997) differentiates between the two and refers to the latter as *look-ahead bias*. Since we do not consider dissolved pension plans in our study, and eliminate those operating for fewer than five years, our sample may show a slight bias.

## RESULTS

Collective investment institutions, and pension plans in particular, accumulate large volumes of capital from a large number of participants who expect to enjoy certain financial advantages: professional management, security and information. Professional management implies that the managing entity will follow the evolution of the markets and financial assets they trade with, and will ensure the appropriate diversification of these assets in their portfolio composition. From this perspective, the participant may be able to obtain a higher level of security and return on his or her investment. Thus, efficient

pension fund management implies that the beneficiary will receive higher payments when the contingency covered by this financial product occurs. Consequently, good or bad management of the accumulated capital may have important social repercussions.

In this section, we therefore evaluate the efficiency with which Spanish pension plans are managed in order to discover whether managing entities that implement active management strategies create added value as compared to a passively managed reference portfolio. The traditional methods used to measure efficiency are unconditional; in other words, they assume that the expected return and risk remain constant over time. The measure of efficiency presented by Sharpe (1966) is the quotient between the excess return of the fund and the risk-free asset and standard deviation of the return, which allows adjustment for total risk. Subsequently, Jensen (1968) took the CAPM model as a base to estimate regression (1):

$$r_{pt} = \alpha_p + \beta_p r_{mt} + \mu_{pt}(1)$$

where  $r_{pt}$  is the excess performance of fund  $p$  at moment  $t$  over the risk-free asset,  $r_{mt}$  is the excess return of the benchmark over the risk-free asset, coefficient  $\beta_p$  is the

**Table 2.** Pension plan performance.

Class	Number of plans			>0	p-value ≤0.05	Min.	Max.	Mean	Median
	Total	<0	p-value ≤0.05						
STFI	77	47	14	30	4	-3.83	15.31	0.05	-0.26
LTFI	32	11	2	21	7	-3.48	3.67	0.60	0.57
MFI	181	146	3	35	0	-8.48	3.84	-1.10	-1.09
ME	123	109	5	14	0	-10.12	6.12	-1.65	-1.73
EQ	108	80	0	28	6	-9.36	7.11	-1.29	-1.90

beta with the market that we assume to be constant and represents systematic risk, intercept  $\alpha_p$  represents Jensen's alpha which measures the skill of the plan manager, and  $\mu_{pt}$  is the error term.

We apply this model using the Ibex-35 as a benchmark in the case of mixed equity and equity plans. We also apply the model (2) using treasury bill (l) and treasury bond (d) returns as benchmarks to evaluate the performance of mixed fixed income pension plans, short-term fixed income plans and long-term fixed income plans:

$$r_{pt} = \alpha_p + \beta_d r_{dt} + \beta_l r_{lt} + \mu_{pt} \quad (2)$$

Table 2 shows the results using these evaluation models. The heteroskedasticity and autocorrelation consistent covariance estimator is by Newey and West (1987). The performance is presented as an annualised percentage. The Spanish Association of Collective Investment Institutions and Pension Plans (INVERCO) classification criteria are followed to group the pension plans according to management styles, such that STFI includes plans with portfolios comprising fixed income securities with an average portfolio duration of two years or less, LTFI is made up of fixed income securities with an average portfolio duration of over two years, MFI includes plans whose portfolio comprises at least 30% of equities, ME represents pension plans with portfolios comprising between 30 and 75% of equities, and EQ represents a portfolio comprising more than 75% of equities. The results indicate that significantly negative performance only exists in 4.61% of the sample pension plans, and no evidence is found in performance significantly different from zero in 92.14% of the plans analysed. However, in general, the equity pension plans do not perform as well as the fixed income plans.

The statistics showing the distribution of performance in the different categories analysed show a negative risk-adjusted return in mixed fixed income plans, mixed equity plan and equity plans, with an annualised value that oscillates between 0.60% in the long term fixed income plans and -1.65% in mixed equity plans. The original model proposed by Jensen (1968) assumes that the investor's behaviour can be examined by using a single benchmark. On this point, abundant literature analyses the consequences of incorporating an inefficient bench-

mark in the assessment of results. Thus, Lemann and Modest (1987), Grinblatt and Titman (1989b) and Elton et al. (1993) state that the results obtained by US equity mutual funds could vary depending on the benchmark used.

In line with this finding, Elton et al. (1993), Ferson and Schadt (1996) and Sharpe (1992) indicate that the omission of benchmarks in the interest of a single general stock exchange index may give rise to biases in the measurement of results. In order to overcome the shortcomings of the traditional model, as in Elton et al. (1996), our model (3) incorporates various benchmarks that represent the types of assets in which the sample plans could invest:

$$r_{pt} = \alpha_p + \beta_m r_{mt} + \beta_d r_{dt} + \beta_l r_{lt} + \beta_s r_{st} + \beta_g r_{gt} + \beta_v r_{vt} + \mu_{pt} \quad (3)$$

where  $r_{pt}$  is the excess performance of fund p at moment t over the risk-free asset. The benchmarks used are as follows. First, the Ibex-35 index was used as a proxy for investment in the Spanish stock market (m). This index is the best-known and most widespread reference for the Spanish market at an international level; it is taken as the main underlying asset in the Spanish futures and options market and is used as a reference by the financial press and other media to compare risky mutual funds with the Spanish Stock Market.

The AFI index (d) and (l), which represents the return of the portfolio made up of Treasury bonds and debentures, as well as the return of a portfolio made up of Treasury bills with one year maturity. To extend the number of benchmarks, we used the Morgan Stanley Capital International (MSCI) style indexes for the Spanish market: the small-cap index (s), the growth index (g) and the value index (v). To determine the monthly excess return, both for the plans and for the benchmarks, the one-day AFI Repos index was used as risk-free asset. These data were obtained from AFI and MSCI.

Table 3 summarises the results of estimating performance with model (3) for each pension plan. The heteroskedasticity and autocorrelation consistent covariance estimator is by Newey and West (1987). The performance is presented as an annualised percentage. At an aggregate level, the results indicate that 51.44% of the pension plans have a negative performance, which is statistically significant in 4.48% of the plans. In contrast,

**Table 3.** Evaluation of the extended performance model.

Class	Number of plans			>0	p-value $\leq 0.05$	Min.	Max.	Mean	Median
	Total	<0	p-value $\leq 0.05$						
STFI	77	49	8	28	4	-3.83	10.35	0.08	-0.22
LTFI	32	5	1	27	7	-3.68	3.47	0.85	0.97
MFI	181	83	3	98	4	-6.37	5.16	0.09	0.06
ME	123	72	0	51	1	-10.76	7.78	-0.36	-0.51
EQ	108	59	0	49	7	-7.18	22.82	0.53	-0.22

we find evidence of positive performance in 48.56% of the pension plans, of which 9.09% are statistically significant. A closer look at performance by investment category shows that in the case of the short-term fixed income plans, 16.33% of the total show significantly negative performance.

In the long-term fixed income plan category, 3.13% of the plans, that only include fixed income securities in their portfolios and over two years old, obtain a significantly negative performance, while 21.88% of the cases are positive and statistically significant. In the case of mixed fixed income plans, there is evidence of positive performance in 98 of the 181 plans analysed, of which 2.21 % of the whole category are statistically significant. Results for the mixed equity plan category show evidence of positive and statistically significant performance in 0.81% of the plans. In the case of equity plans, only 6.48 % in this category show statistically significant positive performance.

Thus, the results do not provide any great evidence of performance significantly different from zero, except in the long-term fixed income plan category. On the other hand, the greater the proportion of equity securities in the portfolio, the worse the mean performance of the pension plans is. The right hand section of Table 3 provides some statistics on the distribution of performance within the five pension plan groups analysed. The mean is positive in four of the five categories analysed, with an annualised value that oscillates between -0.36 and 0.85% for the mixed equity plans and long-term fixed income plans, respectively.

This result is consistent with the previous empirical evidence both for pension funds (Mittelstaedt and Olsen, 2003; Blake et al., 2002; Blake and Timmermann, 2005) and for mutual funds (Detzler and Wiggins, 1997; Cai et al., 1997). This finding suggests that active management, in aggregate terms and after management costs, does not provide better results than those of passive management. However, the degree of inefficiency of a plan can vary according to its characteristics. The previous international literature establishes that funds which accumulate large volumes of assets may benefit from the existence of scale economies and achieve better results. We therefore analyse the size effect of the plan on the performance obtained by the management companies for the Spanish market. To this end, we apply model (3) to

the pension plans classified according to size, measured as the mean of the plan's monthly asset over the period running from January, 2006 to December, 2010. We then group these plans by size quintiles, in such a way that the plans with the highest asset appear in quintile "high mean asset" and those with the lowest size are included in quintile "low mean asset".

Table 4 presents the results of this regression. The heteroskedasticity and autocorrelation consistent covariance estimator is by Newey and West (1987). The performance is presented as an annualised percentage. The Spanish Association of Collective Investment Institutions and Pension Plans (INVERCO) classification criteria are followed to group the pension plans according to management styles. The results show that the larger pension plans obtain a lower mean risk-adjusted return than that achieved by plans with more modest volumes. However, T-tests fail to identify any significant differences between large and modest pension plans relating to risk-adjusted return. Only in the case of mixed equity plans is the T-test significant. In this case, performance improves slightly as the size of the plan decreases. This result is consistent with the findings of Droms and Walter (1996). In addition, various authors such as Blake and Timmermann (1998) and Otten and Bams (2002) have demonstrated that the age of a plan could represent a relevant factor to explain the transversal distribution of performance. Consequently, we apply model (3) to the pension plans classified according to their length of time on the market as of 31 December, 2010. We then group these plans by age quintiles, in such a way that the plans with the highest age were included in the older sub-group, while those with the lowest age comprise the recently created pension plan sub-group. Table 5 shows the results obtained from regression (3). The heteroskedasticity and autocorrelation consistent covariance estimator is by Newey and West (1987). The performance is presented as an annualised percentage. The Spanish Association of Collective Investment Institutions and Pension Plans (INVERCO) classification criteria are followed to group the pension plans. The results indicate that in the case of the equity, mixed equity, mixed fixed income and long-term fixed income plans, the period of operation has a negative influence on performance. In this case, the mean risk-adjusted return is higher in recently created pension plans.

**Table 4.** Performance-size relationship.

Class	Quintile	Number of plans			>0	p-value ≤0.05	Min	Max	Mean	Median	T-test
		Total	<0	p-value ≤0.05							
STFI	Low mean asset	15	7	1	8	2	-2.54	10.18	0.74	0.04	1.455
	High mean asset	15	13	4	2	0	-3.03	1.59	-0.51	-0.47	
LTFI	Low mean asset	6	2	1	4	1	-1.32	3.03	0.63	0.79	-1.458
	High mean asset	6	0	0	6	3	0.33	3.47	1.89	2.11	
MFI	Low mean asset	36	16	0	20	0	-5.34	5.16	0.24	0.07	0.561
	High mean asset	36	16	1	20	1	-6.37	2.47	-0.01	0.32	
ME	Low mean asset	25	8	0	17	1	-2.39	6.84	0.86	0.65	2.316**
	High mean asset	25	15	0	10	0	-10.76	7.78	-1.04	-0.66	
EQ	Low mean asset	22	13	0	9	0	-5.37	5.43	0.24	-0.22	1.274
	High mean asset	22	13	0	9	2	-7.18	5.91	-0.65	-0.87	

**Table 5.** Performance-age relationship.

Class	Quintile	Number of plans			>0	p-value ≤0.05	Min.	Max.	Mean	Median	T-test
		Total	<0	p-value ≤0.05							
STFI	Early creation	15	7	1	8	1	-1.90	0.98	-0.17	0.05	-1.488
	Recent creation	15	9	3	6	0	-3.83	10.35	1.43	-0.08	
LTFI	Early creation	6	2	1	4	1	-1.32	2.57	0.85	1.50	1.04
	Recent creation	6	1	0	5	0	-3.68	1.31	-0.17	0.34	
MFI	Early creation	36	11	1	25	3	-5.22	5.16	0.46	0.69	1.728
	Recent creation	39	23	0	16	1	-2.27	2.27	-0.15	-0.22	
ME	Early creation	25	13	0	12	0	-4.26	6.84	0.36	0.00	0.632
	Recent creation	25	15	0	10	0	-3.94	7.78	-0.06	-0.66	
EQ	Early creation	22	10	0	12	4	-4.32	6.67	1.38	0.63	0.879
	Recent creation	22	12	0	10	0	-4.76	13.26	0.45	-0.11	

In contrast, the mean risk-adjusted returns in short-term fixed income plans are higher in plans that have been operating for shorter periods. However, no significant relation is found between the age of the plan and its performance when T-tests are carried out, in line with Thomas and Tonks (2001) and Annaert et al. (2003). In these cases, the results show that the age factor is not relevant in explaining the transversal distribution of performance. This fact may be due to the market's lack of maturity, which prevents the larger plans from taking advantage of economies based on the effects of experience and learning.

Furthermore, Brown et al. (1992), Otten and Bams (2002) and Dellva and Olson (1998) observe that the fees

set by managers may contribute to negative performance. In this line, Klumpes and McCrae (1999) and Blake et al. (1999) find that high fees do not necessarily imply efficient management and good results, but rather a reduction in the assets accumulated by participants and beneficiaries. By contrast, Ippolito and Turner (1987) point out that poor results obtained by pension fund managers are not related to the setting of high fees. We apply model (3) to analyse the impact of fees on the performance achieved by pension plans in the Spanish market, using the gross returns of monthly fees, and considering that fees remain constant over the period analysed. At the same time, to allow comparison of results before and after fees, we apply model (3) to the

**Table 6.** Performance-fees relationship.

Panel A (net returns)									
Class	Number of plans			>0	p-value $\leq 0.05$	Min.	Max.	Mean	Median
	Total	<0	p-value $\leq 0.05$						
STFI	77	49	8	28	4	-3.83	10.35	0.08	-0.22
LTFI	32	5	1	27	7	-3.68	3.47	0.85	0.97
MFI	181	83	3	98	4	-6.37	5.16	0.09	0.06
ME	123	72	0	51	1	-10.76	7.78	-0.36	-0.51
EQ	108	59	0	49	7	-7.18	22.82	0.53	-0.22
Panel B (gross returns)									
STFI	77	7	0	70	48	-2.53	12.05	1.39	1.12
LTFI	32	1	0	31	21	-2.08	4.71	2.46	2.58
MFI	181	15	0	166	54	-4.08	6.26	1.83	1.87
ME	123	20	0	103	6	-8.48	9.42	1.50	1.36
EQ	108	25	0	83	9	-5.08	24.52	2.49	1.90

plans for which data on fees is available using monthly returns.

Table 6 shows the results obtained on using net and gross monthly returns. The heteroskedasticity and autocorrelation consistent covariance estimator is by Newey and West (1987). The performance is presented as an annualised percentage. As in the previous tables, the Spanish Association of Collective Investment Institutions and Pension Plans (INVERCO) classification criteria are followed to group the pension plans according to management styles. B, performance improves slightly when gross returns are used. On using only net returns, only 23 pension plan beats the market, whereas when gross returns are used, 26.49% of the sample plans obtain better results than those of the benchmarks. By contrast, when net returns are used, 2.30% of the plans obtain a negative and significant alpha, while with gross returns the sample plans do not show negative performance.

In general, the mean risk-adjusted returns are positive in the case of short-term fixed income, long-term fixed income, mixed fixed income, equity and mixed equity plans. However, in the mixed equity plan category, we observe that the mean risk-adjusted net return is negative. Therefore, the management companies of pension funds are able to beat the benchmark. Nonetheless, these benefits do not compensate for the costs incurred by active management. In this case, negative performance would be caused by the high fees to which, according to Martí et al. (2009), pension plans in the Spanish market are subject.

The legal status of the financial group to which the management company belongs can also influence pension plan performance. Hence, banks and saving banks may specialise in the workings of certain financial markets and show greater skills and abilities in stock selection, depending on the market in which they are

trading. We apply model (3) to analyse this hypothesis to pension plans classified according to the legal status of the financial group to which they belong. Plans administered by a management company that forms part of a bank group are included in the sub-group Bank; those managed by a company belonging to a saving bank are classified in the Saving Bank sub-group; and plans managed by independent companies make up the Independent sub-group.

Table 7 shows the results of the estimation of performance by means of model (3) from monthly net returns during the period January 31 2006 to December 31 2010 for plans managed by companies belonging to banks, saving banks or independent companies. The heteroskedasticity and autocorrelation consistent covariance estimator is by Newey and West (1987). The performance is presented as an annualised percentage. The Spanish Association of Collective Investment Institutions and Pension Plans (INVERCO) classification criteria are followed to group the pension plans.

The results, presented in Table 7, show that the mean risk-adjusted return of plans managed by companies belonging to banks is higher than that achieved by independent management companies or those belonging to saving banks, for all categories analysed with the exception of mixed equity and equity pension plans. In this case, independent management companies reveal greater skills and knowledge of the stock market. To examine whether management companies belonging to bank groups are more efficient in pension plan asset management, we carry out a one-way analysis of variance (ANOVA). The ANOVA shows that the performance impact of legal status of the financial group to which the management company belongs is not statistically significant ( $F = 0.955$ ;  $p\text{-value} = 0.385$ ).

In summary, Spanish pension plans in general obtain a positive performance, and only 23 of the pension plans in



**Table 7.** Performance-Management company legal status relationship.

Panel A (Bank)									
Class	Number of plans			>0	p-value ≤0.05	Min.	Max.	Mean	Median
	Total	<0	p-value ≤0.05						
STFI	16	10	2	6	1	-0,78	10,35	0,88	-0,16
LTFI	4	0	0	4	3	0,52	3,47	2,49	3,00
MFI	45	17	0	28	0	-2,22	2,50	0,46	0,72
ME	16	8	0	8	1	-3,29	2,87	-0,38	-0,02
EQ	16	9	0	7	1	-4,76	8,46	0,03	-0,19
Panel B (Saving Bank)									
STFI	26	18	4	8	2	-3.03	1.90	-0.44	-0.55
LTFI	20	3	0	17	2	-3.68	2.57	0.53	0.37
MFI	50	18	3	32	4	-6.37	3.11	0.14	0.16
ME	33	19	0	14	0	-10.76	2.40	-0.89	-0.10
EQ	44	22	0	22	4	-6.87	17.72	0.34	-0.07
Panel C (Independent)									
STFI	35	21	2	14	1	-3.83	10.18	0.09	-0.19
LTFI	8	2	1	6	2	-1.32	1.80	0.83	1.38
MFI	86	48	0	38	0	-5.34	5.16	-0.13	-0.23
ME	74	45	0	29	0	-4.26	7.78	-0.12	-0.59
EQ	48	28	0	20	2	-7.18	22.82	0.88	-0.24

our sample generate a significantly higher risk-adjusted return than that of the market. The results therefore, seem to suggest that once management costs have been deducted, active management by the management company does not improve on the results obtained by passive management. Furthermore, the fees borne by the plans influence the risk-adjusted return. However, the size, the legal status of the management company group and the age of a plan do not affect its performance.

## Conclusions

Efficient management performance by management companies will have a major impact on the payments received by pension plan beneficiaries. This hypothesis led us to evaluate pension plan performance in the Spanish market. To this end, the monthly net returns of 521 individualised pension plans were analysed for the period 31 January, 2006 to 31 December, 2010. A traditional model proposed by Jensen (1968) and an extended model of Jensen's alpha (1968) were applied to these data in an attempt to minimise bias deriving from the omission of portfolios in measuring the results.

The results provided by these two models are similar. This may suggest that the bias deriving from omitted portfolios is not very relevant in our case. Results show that, on average, performance is positive or close to zero, with poorer performance in the case mixed equity pension plans. This suggests that in the Spanish pension

plan market, the value added by active management does not compensate for its associated costs.

Our analysis of whether the size and age of the plan might explain performance indicates that both factors are not related to risk-adjusted return of pension plans. The age and size relationship with performance is not significant, a result that may be due to the lack of maturity in the Spanish market. In addition, pension plan performance improves slightly when fees are not deducted, and positive risk-adjusted returns are obtained in some cases.

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