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The performance of pension funds: the case of Italy

Abstract

The paper investigates the performance of pension funds with reference to recent innovation in Italian regulation. The aim is to evaluate the choice of Italian workers in terms of risk-return trade off. The reform of complementary pension system forces Italian workers to decide whether to invest these outflows in pension funds or retain a special provision which can be assimilated to a risk-free investment. In the first case they bear the risk of stochastic returns, while in the second case they earn a certain rate linked to inflation rate defined by regulation. As an investor in CAPM, the choice of the workers can be regarded in terms of risk-premium where the traditional risk-free rate is substituted by special provision rate. Under this assumption, the traditional measures of risk-adjusted performance, Sharpe and Treynor, are applied to a sample of Italian pension funds. The analysis is also extended to evaluate the ability of Italian fund managers (Jensen's alpha) and to measure the active risk due to their investment strategy (tracking error volatility). The results suggest the absence of a risk-premium with respect to other kind of investment and strategy.

Keywords: pension fund, performance measures.
JEL Classification: G23, G11.

Introduction

In several countries, demographic aging and early retirement, together with poor administration and unaffordable benefits have strained pension balances and overall public finances, prompting important changes and proposals in the structure of pension systems and in regulatory and accounting frameworks (BIS, 1998). For these reasons, pension funds are supposed to going to play an important role in Continental Europe, while they are already well established in the Anglo-Saxon countries. Many European countries have developed pension fund markets to fund public pension system by financial rent, since during the last two decades the annual growth rate of the stock market (10%) has largely exceeded the growth rate of the European Economy (2%) (Boldrini et al., 1999).

Italy has introduced pension funds since 1993 after several reforms involving the public pension system[1], but the market has not reached the international standard yet. In 2001 Assogestioni[2] estimates that in UK and US the investments in pension funds were respectively 60% and 50% of labor force and the assets managed were 70% of the Gross Domestic Product (GDP); in Italy, in the same year, these statistics accounted for only 13% of the labor force and the assets for 3% of the GDP (ABI-Assogestioni, 2001). In 2005, according to the statistics of the Commissione di Vigilanza sui Fondi Pensione (COVIP, 2005), the Italian pension fund supervisory authority, the total assets of Italian pension funds accounted for the 2,1% of the GDP and for nearly a null percentage of the financial market capitalization (Banca d'Italia, 2006).
Despite these "bad" numbers, pension funds represent nowadays a relevant and unique opportunity to try to cover the expected high gap between actual substitution ratio (retirement pension/salary in the last 5 years of working life) and the estimated one for the next years, as shown by Table 1. In 2040 the public pension system will be able to offer only a ratio of 48,1% for a worker of the private sector.

Table 1. Estimated substitution ratio of pension retirement on salary in the future for a representative worker of the private sector, 60 years old and with 35 years of working life

2000	2010	2020	2030	2040
67,3%	67,1%	56,0%	49,6%	48,1%

Source: Ministero del Lavoro, 2002.

Because of the pressure of the situation, a recent innovation in the Italian pension system regulation forces private sector workers to decide about the investment of a compulsory fee, monthly deducted from the salary and ascribed, called "Trattamento di Fine Rapporto" (TFR), kept by the employer until the end of the working agreement. The new regulation imposes to decide whether to invest these resources in a pension fund (permanent decision) or retain the TFR as the preceding regulation (amendable decision). This option entails 11 millions workers of the private sector, giving rise to a potentially dramatic increase in the resources managed by pension funds. It has been estimated that 19 billion euros could be diverted to pension funds (see Table 2).

Table 2. Annual amount of TFR flows for the private sector

	Firms >50 workers	Firms <50 workers	Total
Number of firms	25.000	4.181.000	4.206.000
Number of workers	4.800.000	5.700.000	10.500.000
Annual flow of TFR	€ 8.700.000.000	€ 10.300.000.000	€ 19.000.000.000

Source: COVIP, 2007.

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[1] The private pension system was introduced in 1993 (L. 124/93).
[2] Assogestioni is the Italian Association of the market participants in the mutual funds sector.

Up to now little research has been made on the financial performance of Italian pension funds for several reasons. Firstly, the postponed implementation of the 1993 reform prevented from a complete analysis because dataset was too small and too short for a thorough breakdown. Secondly, the assets managed were not really relevant, since the TFR provision was not involved. The majority of studies focused on the countries with the most active pension fund markets such as United States, showing mixed results. Beebower and Bergstrom (1977) are among the first to study the US pension fund performance in a CAPM framework. In their studies, the average portfolio outperforms the S&P 500 by 144 basis points per year. Ippolito and Turner (1987) investigate a sample of US pension funds in the period of 1977-1983 and find out that the average plans underperform the S&P 500 in a CAPM framework by 44 basis points per year. The famous study by Lakonishok, Shleifer and Vishny (1993) investigates a sample of 769 defined-benefit pension funds and finds that they underperform the S&P 500 by 260 basis points per year during 1983-1989. These studies applied usual mutual fund measures of performance such as the Sharpe ratio (Sharpe, 1966 and 1994); the Treynor ratio (Treynor, 1966); the Jensen's measure (Jensen, 1968). The majority of empirical investigations presents the widely debated shortcoming to evaluate the pension fund performance against broad market indices, regardless of the investment style.

This paper originally revises and applies these measures to evaluate the financial performance of a sample of Italian pension funds during the period from 2002 to 2006. The mentioned measures are modified, by an innovative definition of the risk free rate and of the benchmark (fund category-specific), to be fully applicable to the alternative between the retention of the TFR provision and investment into pension funds. The main contribution of the paper is related to these innovative measures of performance, able to convey a full evaluation of the risk-return profile of the pension fund with specific reference to the option offered to the Italian (investors) workers.

Formally three sub-topics are explored. First, the paper examines which pension fund of the sample has achieved greater risk-premium with respect to the TFR rate considering different measures of risk (total and systematic). Second, the paper studies whether the ability of pension funds managers could explain their performance. Finally, an attempt is made to investigate whether the use of active or passive strategy has affected fund performance.

There are a number of reasons why such an analysis is worth undertaking. First, it is important for the sustainability of the society to determine whether pension funds represent a good alternative investment for Italian workers. Moreover, as workers can now choose between investment in pension funds or TFR, it is important to adopt a new methodological approach to better evaluate the Italian pension funds performance with respect to TFR.

The choice assumes particular relevance for young people with a short previous working life since it represents the unique opportunity to cover the gap (20-30%) between today's public pension retirement and the estimated pension of the future. The financial sustainability of entire public pension system will depend on the success of the reform.

Moreover, even if mutual funds and pension funds are similar from several points of view as the investment opportunity set they face and the portfolio management services offered, they differ substantially for the longer horizon of investment of pension funds and the financial need they are supposed to satisfy. This difference should be also evident in the criteria adopted to evaluate their strategies. In our analysis we will only focus on the second aspect from an Italian worker perspective.

The remainder of this paper is organized as follows. Section 1 recalls the regulation of the TFR Provision. Section 2 reviews the traditional literature on the performance of mutual fund and introduces the innovative revision for Italian pension funds. Section 3 presents the empirical analysis related to a sample of contribution-defined (CD) equity pension funds, while main results are in section 4. The last section concludes.

1. Financing pension funds by TFR

TFR provision is based on a quote of monthly salary retained by the employer within the firm and monthly revaluated according to a formula linked to inflation rate and defined by regulation. So far, TFR represented a sort of social guarantee for Italian workers in the event of anticipated loss of the job. At the same time it has a second function as fund available at the end of working life. From this point of view, it can be regarded as a risk-free investment in workers portfolio, starting at the beginning of working life, with a maturity coincident with the end of working life and a monthly return rate defined by law (TFR rate).

TFR corresponds to 7,4% of gross year's salary and every year it is added to the quote of the previous years. Every month the quote is separated from salary and is revaluated according to the following formula:

$$r_{TFR} = 1{,}50\% + 0{,}75 \cdot inflation \quad rate\,, \qquad (1)$$

where *inflation rate* is year's inflation rate, and 1,5% is a fixed base to add on.

After the choice introduced by the reform of private pension scheme, TFR rate represents also the monthly return offered to the worker in the case of the choice to retain the TFR. This return is free of risk thanks to a public guarantee and its volatility is basically linked to inflation.

In the case of choice for pension fund, the worker renounces to this certain return on TFR and chooses to invest these monthly flows in various kinds of pension funds offering a stochastic return. The major typologies are open pension funds and close pension funds, where the difference is substantially due to the restrictions in the participation requirement based on the categories the workers belong to. In both cases they offer a stochastic return.

Figure 1 presents the conditions of risk-return offered by the choice. From the perspective of the risk faced, the two alternatives are similar for some aspects. We can identify in both choices a sort of political risk (as a specific form of the regulatory risk) due to the changes in the regulatory framework for private and more likely for public pension scheme and in the definition of TFR rate and conditions. Moreover, the choices are also exposed to corporate risks affecting the firm to whom the workers are bounded and affecting the firms that manage the portfolio financed by TFR. In various ways, these risks are hedging or guaranteed by public system. For pension funds there is an institutional supervision of COVIP and TFR is guaranteed by the national institute for welfare through a specific fund which aim is to give TFR in case of corporate crisis.

	TFR provision (employers)	Pension funds (markets)
Return	TFR rate $r_{TFR} = 1{,}50\% + 75\% \cdot inflation\ \ rate$	Stochastic return • Asset allocation policy • Market movements • Management style
Risk	Political risk Corporate risk (hedged by public guarantee)	Political risk Corporate risk (hedged by COVIP authority) Market risk

Fig. 1. The choice of reform of the private pension system in terms of risk-return

Substantially, the two choices differ for one aspect: in the case the worker's choice is to finance pension funds by TFR, it implies the assumption of market risks on pension funds portfolio, similar to those assumed by mutual fund investors. Instead, in the case of choice to hold the TFR in the firm, the risk can be assumed to be zero and the TFR considered as a risk-free asset in workers portfolio.

As a consequence, to adequately evaluate the performance of these funds it is necessary to take into account the comparison with the TFR rate and the presence of market risks. Our methodological approach starts with comparing Italian workers to a conventional investor in CAPM world. We consider the evaluation of the choice forced by the reform through the traditional measures of performance. Our analysis will be focused on equity pension funds, since this segment is the one referring to younger generations of workers. In this perspective, the long-term investment should be able to offer the higher extra-returns.

2. An innovative approach for Italian pension funds

Mutual fund and pension fund are similar from several points of view. For this reason we can extend to pension funds the same conventional measures of performance developed in CAPM for the mutual funds (Beebower and Bergstrom, 1977).

Despite its credit, this approach requires some specification as far as the application to the Italian market is concerned. Given its peculiar nature, the TFR provision is very similar to a risk free asset (see previous section), while the pension funds are a proper "risky asset".

Therefore, as in the CAPM, the risk-free rate, as price for time, is the evaluation parameter setting the benchmark for the market price of risk, so in the Italian worker-investor context the corresponding evaluation parameter for Italian pension funds is the TFR rate. This replacement approach is very easy to implement since the TFR rate is defined by law (see equation 1) and does not need any computational

estimation. This changeover will define risk premiums able to assess simultaneously the performance of pension funds and their excess return with respect to the TFR provision.

The literature offers several measures of performance combining in different ways the two fundamental parameters of risk and returns. On this basis, we would like to evaluate whether the pension fund managers have been able to add value according to benchmark declared. In the present investigation the risk-adjusted Sharpe (1966), Treynor (1966) and Jensen (1968) measures are employed.

2.1. Revised Sharpe and Treynor ratio. The Sharpe ratio (Sharpe, 1966) measures the excess-return with respect to the risk free rate and betters as the ratio increases. With the aim to evaluate the Italian pension funds performance with respect to the TFR alternative allocation, we replace the risk-free rate with TFR rate as follows:

$$S_{pension\ \ fund} = \frac{R_{pension\ \ fund} - r_{TFR}}{\sigma_{pension\ \ fund}}, \qquad (2)$$

where $\sigma_{\text{pension fund}}$ is the standard deviation of the return of the pension funds, and r_{TFR} is the return earned by TFR. This Revised Sharpe Ratio (RSR) provides for an immediate ranking of pension funds in terms of risk-return, with reference to both systematic and unsystematic risks. A positive value implies that the fund is able to achieve an excess-return over the TFR rate; therefore, the funds that exhibit a positive value are performing better than the TFR and are objectively a preferable investment with respect to the TFR.

Finally, we have to compare the performance of the funds with that of the "financial market", in order to evaluate the competitive advantage of the fund in the market. A possibility is to appraise the performance with reference to the declared benchmark, that is the parameter the fund managers announce to replicate (passive strategy) or to outperform (active strategy). Nevertheless, this methodology does not provide for a homogeneous comparison, since each result is evaluated with respect to a peculiar benchmark. An alternative methodology is to calculate the RSR for a general proxy of the market as follows:

$$S_{benchmark} = \frac{R_{benchmark} - r_{TFR}}{\sigma_{benchmark}}. \qquad (3)$$

The higher the ratio is, the better is the performance of the fund with respect to the financial market as set by the selected benchmark, since equation (3) replaces the angular coefficient of the Capital Market Line in the CAPM model.

One known shortcoming of the Sharpe ratio is that it focuses on total risk rather than its systematic component, measured by means of the beta coefficient. According to modern portfolio theory, the specific risk should be diversified away in a large fund and only the remaining systematic risk should be considered and priced by the market. Therefore, according to the replacement for the Sharpe ratio, we reformulate also the Treynor ratio (Treynor, 1966), as the ratio of the average return in excess from TFR rate to the beta of the pension fund ($\beta_{\text{pension fund}}$) as follows:

$$T_{pension\ \ fund} = \frac{R_{pension\ \ fund} - r_{TFR}}{\beta_{pension\ \ fund}}. \qquad (4)$$

As in the previous case, a positive value of the Revised Treynor Ratio (RTR) points out the outperformance with respect to the TFR rate and higher values denote more efficient funds. As far as the comparison with the market is concerned, being the beta of the "market" equal to 1 by definition, the evaluation is set according to:

$$T_{benchmark} = R_{benchmark} - r_{TFR}. \qquad (5)$$

2.2. The Revised Jensen Alpha. From CAPM the Jensen's *alpha* (Jensen, 1968) is obtained, measuring the fund manager ability with respect to the performance of a "buy and hold strategy" portfolio with the same beta. For the reformulation of this measure, Once again as proxy of the market is considered a unique benchmark to obtain a homogeneous comparison. As in the case of RSR and RTR, for the Jensen alpha we also can reformulate the regression equation, using as setting standard the TRF rate as follows:

$$R_{pension\ \ fund_t} - r_{TFR_t} = \alpha_{pension\ \ fund} + \\ + \beta_{pension\ \ fund}\left(R_{benchmark_t} - r_{TFR_t}\right) + \varepsilon_{pension\ \ fund_t}. \qquad (6)$$

Therefore, the Revised Jensen Alpha (RJA) is the constant of a regression equation of the excess return of the fund over the TRF rate and the explanatory variable is the excess return of the selected market. The last term $\varepsilon_{pension\ fund}$ is the error term.

A positive and significantly different from zero (t-statistic test) alpha indicates that, during the period under analysis, excess-returns of the pension fund can be attributed to the ability of fund manager. In other words, the manager outperformed the market doing better than buy and hold strategy. Vice-versa a significantly negative alpha implies that the fund manager underperformed the market doing worse than a random selection strategy.

3. Data and primary results

The empirical analysis is focused on open Italian pension funds. The time series has been set on monthly data and refers to the period of 2001-2006. We will evaluate the performance for 11 CD pension funds presented in Table 3 where we assign a code to each pension fund.

Table 3. The sample of pension funds

Fund manager	Pension fund denomination	Code
ALETTI GESTIELLE SGR SpA	Gestielle Pensione e Previdenza linea Azionario Internazionale	GEST
ARCA SGR	Arca Previdenza Aziende linea Alta crescita	ARC
ARCA SGR	Arca Previdenza FPA linea Alta Crescita	APFP
BIPITALIA GESTIONI SGR	Fondicri Multiprev - FPA linea Linea Azionaria Internazionale	BIPI
CREDEMVITA SpA	Azurprevidenza Fondo Pensione Aperto linea Azionaria	AZUR
INTESA PREVIDENZA SIM SpA	Carime Previdenza linea Linea Azionaria	CARM
INTESA PREVIDENZA SIM SpA	Giustiniano linea Azionaria	GIUS
INTESA PREVIDENZA SIM SpA	Previd-System linea Rivalutazione Azionaria	PRSY
INTESA PREVIDENZA SIM SpA	Previmaster linea Linea Valore Azionario	PRMS
INTESA PREVIDENZA SIM SpA	Intesa Mia Previdenza. Linea Piano Previdenza Dinamico	GEDS
SELLA GESTIONI SGR SpA	Eurorisparmio Fondo Pensione linea Azionario Internazionale	SELL

The selected funds belong to the category investing in the international equity markets, according to the definition provided by Assogestioni. They invest at least 70% of their assets in the international equity markets and refer to international indexes as benchmarks. The risk profile of this category is the highest and the horizon of investment the longest. Given these features, the perspective of our analysis can be referred to private workers with shortest age of retirement and corresponding longest working like ahead.

The restriction of the number of the pension funds included in the sample is due to the only recent actual implementation of the normative and to the lack of information about their performance. The sample is mainly composed by pension funds managed by financial companies and divisions of banks (SGR and SIM). However, the sample can be considered representative of the market in terms of the managed asset value. It covers the 37% of the total asset value managed by the open pension funds for this category. The data are only available from websites and can have some reporting biases.

As far as the single observations are concerned, the monthly quotes correspond to the last working day of each month. The returns are continuously compounded and we apply them a decay factor of 20% to the first three years to moderate their contribution to the results, in order to avoid a too heavy influence of outdated information.

As proxy of the market portfolio we use a weighted benchmark composed by 70% of MSCIWI (*Morgan Stanley Capital International World Index*) and 30% of MTS *Italy Index Long Term* (*duration* of 9,8 years). This choice has been made on the basis of the definition of both the category by Assogestioni and the benchmark declared by the funds to avoid an underestimation of our sample performance.

Table 4 gives for a complete breakdown of the main features of the sample.

Table 4. The main features of the sample

Code	Total assets 29/12/06	Declared benchmark	Starting date
GEST	€ 5.128.084,79	65%MSCI, 20%MSCI Europe15 Index,15%M.L. EMU Dir 1-3y	Dec-99
ARC	€ 32.000.000,00	5% M.L. EMU Direct Gov. Index TR, 65% MSCI Daily TR Net World Local, 30% MSCI Daily TR Net World USD converted in Euro	Sep-99
APFP	€ 291.300.000,00	5% M.L. EMU Direct Gov. Index TR, 65% MSCI Daily TR Net World Local, 30% MSCI Daily TR Net World USD converted in Euro	Dec-98
BIPI	€ 6.530.000,00	95%MSCI World Index, 5% MTS Spa short-term in Euro	Sep-00
AZUR	€ 10.903.615,00	15%J.P Morgan Gov. Bond Traded in Euro, 40%M.T.S.Capitalizzazione Generale Lordo, 35%MSCI International World in Euro, 10%Comit Globale	Dec-98
CARM	€ 7.473.604,57	5%JPMorganEMU Cash 3-months, 5%JPMorgan EMU Gov. Bond Traded, 5%JPMorgan GBI Traded, 20%MSCI AC Europe, 65% MSCI AC World Free	Mar-00

Table 4 (cont.). The main features of the sample

Code	Total assets 29/12/06	Declared benchmark	Starting date
GIUS	€ 7.970.921,56	15%JPMorgan EMU Gov. Bond Traded, 85%MSCI AC World Free	May-00
PRSY	€ 59.546.113,18	5%JP Morgan EMU Cash 3-months, 5%JPMorgan EMU Gov. Bond Traded, 5%JPMorganGBI Traded, 20%MSCI AC Europe, 65% MSCI AC World Free	May-00
PRMS	€ 6.242.827,71	5%JPMorgan EMU Cash 3-months, 5%JPMorgan EMU Gov. Bond Traded,5%JPMorganGBI Traded, 20%MSCI AC Europe, 65% MSCI AC World Free	Mar-00
GEDS	€ 67.783.350,46	15%ComitGlobale, 50%MSCI AC World Free, 10% MTS-BOT, 15%MTS-BTP, 10%J.P.Morgan Gov. Bond Global Traded	Mar-99
SELL	€ 12.979.202,00	90%MSCI World Index, 10%MTS Monetario	Mar-99

With reference to the total asset value, the sample is mainly composed of pension funds of small size, even if it includes one of the larger in Italy (APFP). Starting dates are between 1998 and 2000. We will assume the TFR rate as risk-free rate as defined by the law. In our analysis, we use gross returns, since taxation is neutral because according to the Italian regulation, pension funds returns and TFR returns are both imposed at 11%.

Table 5. Descriptive statistics of the sample

Code	Mean %	St. deviation %	Beta
GEST	0,11	1,81	0,84
ARC	0,09	2,59	1,14
APFP	0,07	2,62	1,16
BIPI	0,24	2,27	0,99
AZUR	0,13	2,03	0,95
CARM	0,18	2,24	1,02
GIUS	0,12	2,43	1,03
PRSY	0,14	2,28	1,07
PRMS	0,18	2,29	1,03
GEDS	0,09	1,82	0,85
SELL	0,08	2,25	0,91
Benchmark	0,27	2,08	1
TFR rate	0,19	0,09	

ARC and APFP, which belong to the same fund manager, exhibit the highest volatility and lower expected return, resulting among the most inefficient funds. BIPI shows the highest expected return and represents the most efficient solution among the others. BIPI is also the fund which movements are closer to the market portfolio dynamics with a beta equal to 0,99. The remaining funds are equally split into "aggressive" with beta higher than 1 (6 funds) and "defensive" with beta lower than 1.

Figure 2 presents this statistics in the traditional risk-return space.

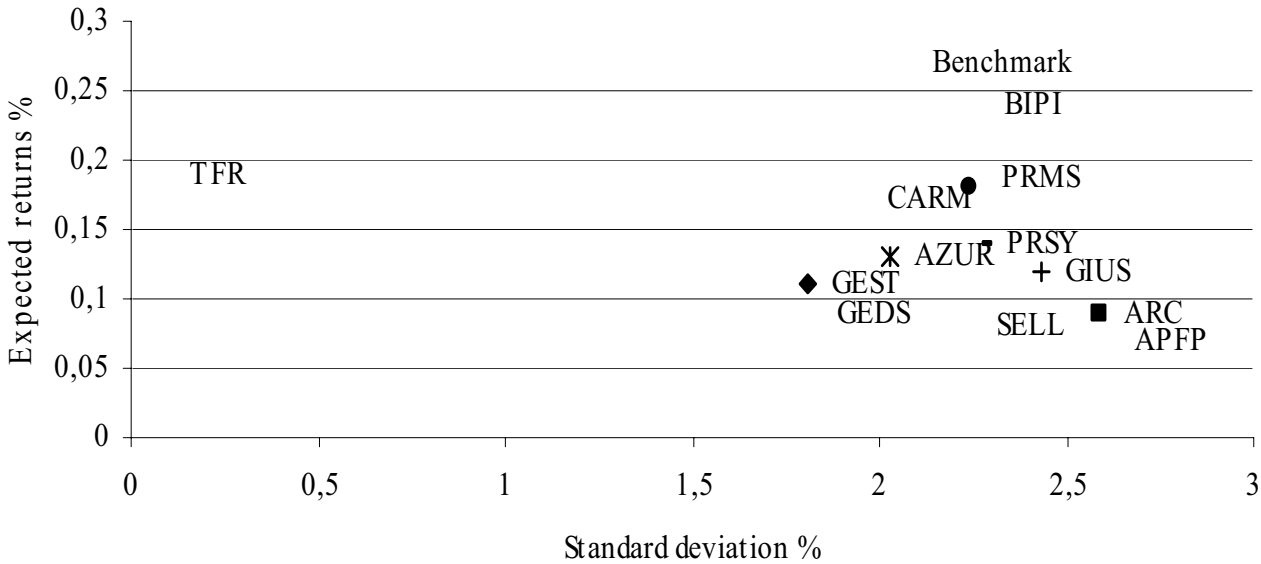

Fig. 2. The risk return plot

As expected, because of its variability – linked only to a fixed percentage of the inflation rate – the TFR rate plays a role very similar to the traditional risk-free rate. It emerges also that the most efficient pension funds are dominated by our proxy of market portfolio.

4. Results

Table 6 reports the results for Sharpe and Treynor ratios computed applying the methodology described in Section 2.

Table 6. Revised Sharpe Ratio (RSR) and Revised Treynor Ratio (RTR)

Code	RSR		Code	RTR
GEDS	-0,053		SELL	-0,0012
SELL	-0,050		GEDS	-0,0011
APFP	-0,048		APFP	-0,0011
GEST	-0,045		GEST	-0,0010
ARC	-0,041		ARC	-0,0009
GIUS	-0,032		GIUS	-0,0008
AZUR	-0,032		AZUR	-0,0007
PRSY	-0,021		PRSY	-0,0005
CARM	-0,008		CARM	-0,0002
PRMS	-0,005		PRMS	-0,0001
BIPI	0,019		BIPI	0,0004
Benchmark	0,039		Benchmark	0,0008

The rankings reveal that BIPI is the only fund with a positive excess return on the TFR rate and hence, the one with the highest value for the two revised ratios. All the remaining funds present negative value of the measures of performance. According to this analysis, BIPI is the only fund that a "rational" worker should prefer to the TFR provision investment. The table reports the two ratios also for the market portfolio referred to the category of pension funds investing in the International equity markets and approximated by our benchmark. From the comparison with the market portfolio it emerges that BIPI was not able to beat the market: both the Benchmark RSR and RTR have greater values.

Finally, we want to investigate whether the negative performances can be due to funds managers (in)ability. We compute the RJA regressing the excess returns on TFR rate on the excess returns of the benchmark, as explained in Section 2. In this case the benchmark represents the performance of a manager following a strategy of buying-and-holding the market portfolio. The results of the estimated Alphas are reported in Table 7.

Table 7. Revised Jensen Alpha (RJA)

Code	RJA	T-value	R^2
GEST	-0,0015	-2,71	0,93
APFP	-0,0022	-1,74	0,84
ARC	-0,0011	-1,57	0,83
SELL	-0,0019	-1,28	0,71
GIUS	-0,0016	-1,17	0,77
GEDS	-0,0016	-3,07	0,93
AZUR	-0,0014	-2,43	0,94
PRSY	-0,0013	-2,05	0,94
CARM	-0,0010	-1,12	0,89
PRMS	-0,0009	-0,96	0,86
BIPI	-0,0004	-0,29	0,80

Note: Grey cells refer to significant values.

The regressions show on large scale an R^2 close to 70% with uncorrelated error terms. The alphas are all negative but only for GEST, GEDS, AZUR, PRSY these values are significant at 95% of confidence level. These results suggest that only for these four funds the negative performance can be due to insufficient manager ability.

Until now, the analysis suggests that the pension funds do not represent an efficient alternative to the TFR provision. At the same time, an interesting result is that a strategy of buying-and-holding on the market portfolio would have represented a more efficient alternative to the TFR.

To investigate this aspect, we measured the tracking error and its volatility. These measures identify the additional return (active return) obtained as a reward for the extra-risk (active risk) due to an active strategy with respect to the market. They can be considered as relative measure of risk, since they can only identify which are the funds with "aggressive strategy" and the funds with "conservative" strategy close to the buy-and-hold strategy. Table 8 reports the results of tracking error volatility of the selected sample: the results show that the adoption of an aggressive strategy has been penalizing for almost all the pension funds, since the assumed active risk did not result in any active return.

Table 8. Tracking error statistics

Code	Tracking error mean %	Tracking error volatility %
AZUR	-0,14	0,49
GEDS	-0,18	0,55
GEST	-0,16	0,57
PRSY	-0,13	0,57
CARM	-0,10	0,74
PRMS	-0,09	0,83
BIPI	-0,04	1,01
ARC	-0,19	1,10
ARFP	-0,20	1,10
GIUS	-0,16	1,15
SELL	-0,19	1,23

Conclusion and future research prospect

The main contribution of the paper is a new interpretation of the traditional measures of evaluating the performance of the mutual funds, which better represent the Italian pension funds performance. Given the new regulation of the private pension system, we suggest the adoption of the TFR rate as risk-free rate in a CAPM traditional setting.

The revised measures have been applied to a sample of Italian pension funds. These funds belong to the category investing al least 70% of their portfolio in the international equity market with a long investment horizon. Hence the perspective of our analysis is referred to younger workers with the highest urgency to cover the expected gap between today and future's substitution ratio.

The results show that the Italian pension funds do not represent at the very moment either an efficient or a real alternative to the choice to retain the TFR provision. Over the period under investigation only a buy-and-hold strategy applied to the market portfolio would have performed better in terms of risk-return trade off than TFR. The underperforming of the pension funds is investigated in terms of manager's ability with reference to the RJA. These values are negative, but only for four funds they are significant. Finally, the analysis has been extended to the tracking error analysis to quantify whether the bad performance could have been due to the implementation of an "aggressive strategy". The results demonstrate that the active risk, measured by means of the tracking error volatility, led pension funds to suffer from a negative active return.

In the interpretation of these results one must keep into account that the recent actual implementation of the regulation restricts the investigation horizon to 5 years and that the selected period coincides with the start-up phase for which the conditions of the regulation and the practice were not developed yet. Finally, the small number of the pension funds included in the sample prevent us from generalizing the results on a large scale.

Further research prospects are concerned with the possibility to expand the dataset and to replicate the analysis for other kind of pension funds in addition to the open ones, as well as to apply in a prospective analysis the decision model by means of a stochastic approach.

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