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## **The efficiency of Italian pension funds: costs, membership, assets**

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# The efficiency of Italian pension funds: costs, membership, assets

Luca Di Gialleonardo\*<sup>a</sup> and Mauro Marè\*\*

## Abstract

The scope of the supplementary pension funds is to provide workers with a satisfactory standard of living at retirement. An efficient and affordable system of pension funds is therefore an important factor to realize the workers' aims of maximizing the value of their pension wealth. A rationalization of the industry structure, leading to the creation of bigger pension funds, that should be better able to take advantage of economies of scale, might contain the costs sustained by participants.

In this paper, and for the first time (to the best of our knowledge), we attempt to carry out an econometric study of the principal factors which determine the costs level and the efficiency of Italian pension funds.

Based on an original dataset of Italian closed pension funds in the 2007-2013 period, this work runs a panel estimate of the impact of dimension (the number of participants) on administrative costs. Our results highlight the existence of important overall economies of scale and that in those funds characterized by the outsourcing of some activities, the administrative costs result smaller.

We adopt the same dataset also for the open pension funds, in order to evaluate the link between financial costs and the sum of resources under management. The estimates do not confirm the existence of particular economies of scale, probably due to the distinctive traits of the complementary pension funds industry in Italy. The commission fees of the financial management of pension funds, in particular of closed type, are much lower than those relative to other financial services and also to other types of foreign pension funds. This situation, fuelled by competition among financial managers, has gone on for some time, thus further limiting the ways in which savings can be made through an increase in the volume of the assets managed.

*JEL classification codes:* H55, G23, G14

*Keywords:* social security, pension funds, efficiency

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## 1. Introduction

In most developed countries, social security saving is an important source of funds for the financial market. An efficient and affordable system of pension funds is therefore crucial to achieve a satisfactory workers' rate of substitution. Covip, the Italian pension funds' supervisory authority, has introduced, in the last years, several measures leading pension funds to invest more in their internal structures and in other monitoring mechanisms and has repeatedly stressed the necessity of containing pension funds' costs<sup>1</sup>. The usual argument is that a process of merger and supply rationalization would result in an increase of the average size of pension funds, therefore making possible to better exploit economies of scale and significantly contribute to costs reduction.

In section 2, we briefly provide a review of the literature on pension funds' efficiency.

In section 3, we supply some general data regarding the costs of Italian pension funds and we explain the reasons of this study.

In section 4, we illustrate the methodology adopted in the construction of our dataset.

In section 5, we investigate the administrative costs. After an initial descriptive analysis of their dimension for the different types of pension funds, with an econometric analysis we evaluate the variables with the strongest impact on the costs level, in order to verify the presence of the economies of scale and whether there is a threshold effect in the level of membership.

In section 6, we analyze the financial costs of the different lines of investment of pension funds. Also in this case, we verify the possible presence of economies of scale with an econometric analysis.

## 2. The literature on pension funds efficiency

In the international context, the literature on the efficiency of pension funds and the impact of costs on pension performance is rather scant. The development of this line of research is limited by the scarce availability of data and the difficulty in modeling a

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<sup>1</sup> See, for example, the 2010 Report – President's Considerations – Covip (2011): *“To sustain the profitability of the complementary pension, it is absolutely necessary to further reduce costs, in particular those of PIPs, and to conduct direct analyses in greater depth in order to pinpoint the best risk/return combinations. For negotiated funds, the renewal of the management mandate represents a good opportunity for examining the results obtained and evaluating the investment policies of the Board of Directors in greater depth.”*

production function, which adequately may represent the pension funds operating principles.

Bateman and Mitchell (2004) estimated that the growth of one percentage point in the annual management commission fees implies, after forty years of contribution, a 27% reduction in the final value of pension wealth.

Some authors have focused on the effect that pension funds characteristics have on administrative costs, both in defined benefit and defined contribution plans, with reference in particular to two countries, the US (Caswell, 1976, Mitchell and Andrews, 1981) and Australia (Bateman and Mitchell, 2004). Other works have examined for various countries the costs and commissions of defined contribution funds (see Whitehouse, 2000, Dobronogov and Murthi, 2005, James *et al.*, 2005).

On the whole, the literature has demonstrated the existence of significant economies of scale in the administrative costs of pension funds. At the same time, cross-country studies have highlighted important differences at the national level with respect to size and fees of the different pension funds (see, among others, Mitchell, 1998).

Empirical studies on the economies of scale of pension funds have up to now failed to confirm the impact of costs reduction on the quality of service. In a study of the Dutch market, PriceWaterhouseCoopers (2007) reports a more personalized service in smaller pension funds, even if this implies higher costs. The differences with regard to administrative costs therefore appears to be due not only to economies of scale, but also to the quality of service and the complex business model on which the smaller funds are based.

A recent study by Bikker and de Drew (2009) focused on the Dutch market, shows the existence of strong economies of scale, both in administrative and financial costs. Greater efficiency is found in pension funds which gather the population of an entire industrial sector, rather than in those at the company level. Furthermore, the operating costs of defined contribution funds appear inferior to those of defined benefit schemes. Similarly, funds with a greater percentage of pensioners show higher costs. To our knowledge, there are no attempts to estimate the role of economies of scale in Italian pension funds industry.

### 3. The reasons of the study

Figure 1 shows the reduction in the final value of total assets of a generic pension fund in the presence of a 1, 2 or 3% cost level, expressed in terms of a synthetic cost indicator (SCI)<sup>2</sup>. After 40 years of contributions, even a higher cost of only 1%, might imply a considerably significant reduction in the final performance and the accumulated stock value.

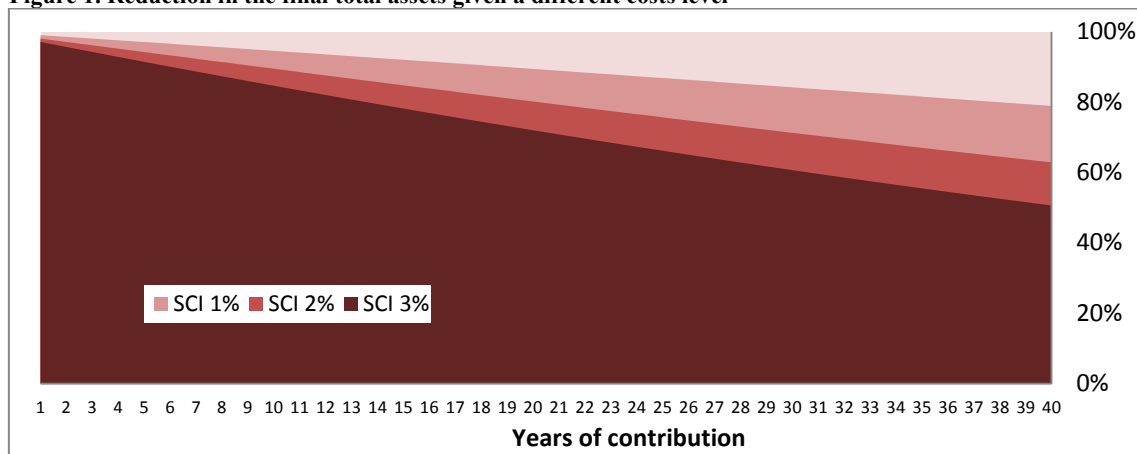
Figure 2, on the other hand, shows that, in the Italian pension funds market, the declared SCI of various pension funds varies from the 0.2% of closed pension funds to the 1.6% of PIPs (individual plans) after a thirty-five year period.

The aim of our study is to verify the factors which have the greatest impact on the total administrative costs and financial management expenses of Italian pension funds and, on the basis of current market structure, to provide an estimate of the optimal dimension of pension funds, a dimension beyond which the growth in terms of participants or assets no longer generates an improvement in unit cost.

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<sup>2</sup> The SCI is calculated in the same way for all forms of supplementary pension industry and is the result of the difference between the internal rate of return of a funded scheme without costs and one in which costs are included. Current laws require pension funds to declare in a specific document (Nota informativa) the index calculated for four different periods of contribution to the pension scheme (2, 5, 10 and 35 years), given a hypothetical regular payment of € 2,500 per annum and a nominal 4% gross interest rate. In calculating the SCI, taxes on annual yields, adhesion costs such as enrollment fees, annual and transfer costs (fixed or as a percentage of the contribution) and fees as a percentage of assets are taken into consideration. Over performance fees are not included in this index.

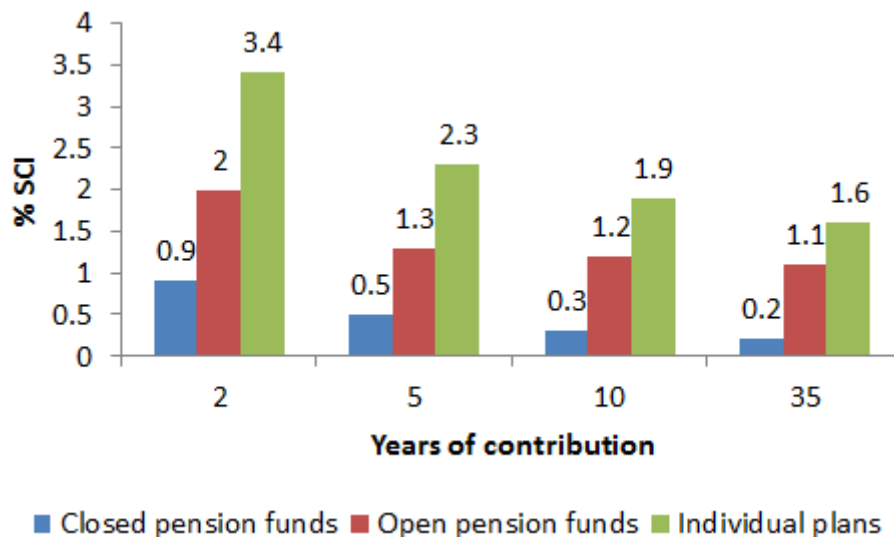
**Figure 1. Reduction in the final total assets given a different costs level**



Source: Mefop

Note: hypothetical regular payment of € 2,500 per annum at a nominal 4% gross interest rate.

**Figure 2. SCI average for Italian pension funds (December 2012).**



Source: Previ|DATA (Mefop database)

We use a dataset of closed pension funds, with annual data for the 2007-2013 seven-year period. The breakdown of total costs was taken from the Total Expenses Ratio (TER), which expresses the annual administrative and financial costs actually incurred as a percentage of the average asset of pension funds at the end of the year.

In this study both administrative and investment costs are considered. These are categories of costs which are influenced by diverse factors: administrative costs are in general paid off by the fund itself, while financial costs vary on the basis of the single investment lines and of financial managers ability and management complexity.

Administrative costs are normally linked to the total number of fund participants, while financial costs are influenced by the volume of managed assets.

#### **4. The costs dataset**

Our costs database was elaborated by using a breakdown of the TER for closed pension funds relative to the 2007-2013 period. The TER is an indicator which expresses annual costs as a percentage of total assets at the end-of-year. When calculating the TER, all the costs actually sustained for both financial and administrative management, with the exception of tax obligations<sup>3</sup>, are taken into account.

For closed pension funds, the TER may be broke down into the following items:

- 1) investment costs:
  - a) management commissions;
  - b) guarantee commissions;
  - c) over performance commissions;
  - d) bank deposit payments;
- 2) administrative costs:
  - a) general administrative expenses;
  - b) costs for administrative services purchased from third parties;
  - c) other administrative costs.

We calculated the absolute values of costs by multiplying the previous values by the total assets of each investment line at the end of the year.

For administrative costs we choose to focus only on closed pension funds since the open funds usually do not explicitly report administrative expenses, given that they are accounted in the balance sheet of the sponsoring organization (banks or insurance companies).

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<sup>3</sup> See the framework for the document *Nota informativa* to the regulation set by Covip on 31 October, 2006.

## **5. Administrative costs, dimension and outsourcing**

We start by investigating the dynamic of administrative costs. The variable that most successfully can be associated to administrative costs of pension funds is the number of participants: an increase in the fund dimension produces efficiency gains if the level of administrative costs increases less than proportionately to the number of participants.

Administrative costs include those relative to the staff, administrative services (all closed pension funds rely on an external organization which provide the management of administrative activities) and a range of expenses relative to the fund's operation, among which there are promotion costs and those linked to business premises, consultants, auditors and other suppliers. Usually they do not include costs sustained by the financial manager and bank deposit fees, which are included in the financial costs.

A strong correlation between unit costs and fund size appears evident in an analysis of pension fund data. Table 1 shows the average administrative costs per participant in 2013, or expressed as a percentage of assets according to the size of the fund, both in terms of number of participants and of managed asset. In general, there is a significant decreasing level of unit costs.

A participant of a small fund sustained administrative costs for a total of approximately € 34 in 2013, more than those sustained by a participant of a larger fund (€ 19.63)<sup>4</sup>.

Also the level of costs on total assets (0.34%) is the double in smaller funds than that of larger ones (0.14%).

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<sup>4</sup> Generally a closed pension fund covers administrative costs by sums directly paid participants (enrollment fee, annual fees, expenses for individual prerogatives such as prepayment or redemption of benefits). However, such costs are partially borne by the employer.



**Table 1. Administrative costs based on size (2013)**

Size classes based on	Number of funds	Average values				
		Administrative costs per participant (€)	Administrative costs / assets (%)	Assets per member (€)	Total assets (€m)	Participants
<b>number of participants (thousand)</b>						
0-10	9	34.12	0.30	16,608	119.49	7,108
10-50	15	31.43	0.16	21,191	685.76	34,206
over 50	11	19.63	0.14	15,947	2,095.12	124,051
<b>Total assets (million)</b>						
0-150	7	29.10	0.33	13,063	88.78	6,866
150-450	6	40.11	0.17	25,486	320.96	15,887
over 450	22	25.00	0.15	18,109	1,448.23	81,738
<b>Total</b>	<b>35</b>	<b>28.41</b>	<b>0.19</b>	<b>18,365</b>	<b>983.09</b>	<b>55,475</b>

Source: Mefop, Previ|DATA

## 5.1. Definition of the econometric model

The initial descriptive analysis confirms the existence of economies of scale in pension funds industry. An increase of the participants' number gives to the fund a greater negotiating strength when dealing with suppliers, and at the same time allows the fund to allocate the amount of fixed costs over a larger number of members. It is therefore useful to investigate the existence of economies of scale in relation to administrative costs.

In order to decide what structural variables has to be included in the estimation model, we break down the administrative costs into diverse components:

$$\text{Administrative costs} = ASC + SC + PC + OAC$$

where

- ASC = administrative service costs;
- SC = staff costs;
- PC = promotion costs;
- OAC = other administrative costs.

**Administrative service costs** derive mainly from the cost of the service as the funds outsource most of the administrative activities. Such costs are in general expressed in terms of each administrated participant, plus other expenses linked to specific single activities (request of benefit or transfers). Part of the cost of administrative services is linked to the way in which participants interact with the fund. For example, members who have been in the fund for longer than eight years are more likely to request an

advance payment<sup>5</sup>, with some additional costs for managing the procedure. A proxy of the number of years spent in a pension funds is given by the total assets per participant (it is in general higher for workers who have a long profile of membership). In addition, members with a high level of resources tend more likely to change profile of investment or take advantage of the possibility of spreading his/her holdings over more than one line of investment. This possibility, which is not allowed by all pension funds, might increase the individual member's management costs. At the same time, the more the investment lines supplied, the more the complexity of administrative management.

We can therefore suggest the following form for the administrative service costs:

$$ASC = f \left( \underbrace{APP}_{(+)} , \underbrace{PSH}_{(+)} , \underbrace{\#L}_{(+)} \right)$$

where

- APP = assets per participant;
- PSH = possibility of spreading the holdings on more than one line;
- #L = number of available lines.

**Staff costs** tend to be fixed in relation to the number of participants and to increase only when membership exceeds certain levels that might require the hiring of new employees. The fund's outsourcing choices have an impact on staff costs. Some administrative activities may in fact be carried out by internal staff and not delegated to external services. In the start-up years, pension funds tended to outsource most of administrative activities. As the market and participants' number have grown, many funds have begun to reallocate some administrative activities to the internal structure, but in smaller funds the common practice is still the outsourcing. For this reason, we can expect to find lower staff costs in pension funds which outsource most of their administrative activities.

$$SC = f \left( \underbrace{\%O}_{(-)} \right)$$

where %O = weight of outsourcing: administrative service costs over total administrative costs.

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<sup>5</sup> In Italy participants may ask for an advance payment only after eight years of membership, except when they have to face medical expenses.

**Promotion costs** tend not to vary according to the number of participants, while they might be influenced by the structure of their target group: the greater the number of potential members, the higher the difficulties in reaching them through a promotion campaign. In the same way, a fund aimed at a specific company (or group) or territory (e.g., a region), would pay less communication expenses than those targeted at a wider number of companies.

$$PC = f\left(\underbrace{PM}_{(+)}, \underbrace{CRF}_{(-)}, \underbrace{\#C}_{(+)}\right)$$

where:

- PM = number of potential members;
- CRF = company or regional fund;
- #C = number of member companies.

As far as **other administrative obligations** are concerned, in general these costs will be fixed or semi-fixed according to the number of members (e.g. expenses for the fund's headquarters), while others will be linked to the number of participants (e.g. mailing expenses for periodical communication).

Summing up, these are the structural variables that can influence the administrative costs of pension funds.

$$Administrative\ costs = f\left(\underbrace{\%O}_{(-)}, \underbrace{PM}_{(+)}, \underbrace{CRF}_{(-)}, \underbrace{\#C}_{(+)}, \underbrace{APP}_{(+)}, \underbrace{PSH}_{(+)}, \underbrace{\#L}_{(+)}\right)$$

We therefore decide to estimate the following regression model:

$$AC_{it} = \theta + \sum_{j=1,2} \alpha_j P_{it}^j + \beta W_{it} + \varepsilon_{it}$$

where:

$AC_{it}$  = logarithm of administrative costs of pension fund  $i$  at time  $t$ ;

$P_{it}$  = logarithm of the number of participants in pension fund  $i$  at time  $t$ ;

$W_{it}$  = matrix of the structural variables

(values in logarithms)

- a) impact of costs for outsourced services over total administrative costs
- b) base of potential participants
- c) average assets per member (in €k)  
(absolute values)
- d) number of lines
- e) dummy for type of pension fund (company, regional)
- f) dummy for possibility of spreading the holdings on more than one line

$\varepsilon_{it}$  = error term, i.i.d.

The number of participants, expressed in logarithm form, represents the dimensional variable. The model is first estimated with a linear model by considering only  $j = 1$ . Given that, as we have already seen, some cost items might decrease with an increase in the number of members (due, for example, to the fund bargaining power with reference to administrative service operators), while others should remain constant, we expect a value of  $\alpha_1 < 1$ . This value would indicate the presence of economies of scale, since an increase in the number of participants leads to a less than proportional increase in administrative costs, while  $\alpha_1 > 1$  values would indicate the presence of diseconomies of scale.

If 1 is equivalent to the threshold of constant economies of scale, the total of unexploited, and therefore potentially achievable, economies of scale can be expressed as  $1 - \alpha_1$ .

A second model is estimated by adding the quadratic term  $P_{it}^2$ , in order to test the presence of non-linear functional form. Also in the presence of  $\alpha_1 < 1$ , a value of the coefficient  $\alpha_2 > 0$  indicates that economies of scale are not constant, but tend to lose strength with an increase of the number of participants.

The cost burden of outsourced services represents an indicator of the level of outsourcing chosen by the fund (it measures how much of the total administrative costs can be attributed to the outsourcer). A negative coefficient indicates that the outsourcing has produced an efficiency increase. As stated before, the outsourcing of administrative activities is very common among the Italian closed pension funds.

The dummy variables on the type of pension fund (company, regional) aim at verifying whether a company pension fund have lower promotion costs with respect to industrial pensions fund, which would have to contact a larger number of administrative people. Furthermore, a company fund should in general face less difficulty in collecting pension contributions.

We can also expect higher promotion costs for those pension funds which have a highly elevated number of potential members, due to the difficulty of reaching all of them.

Similarly, the larger the number of investment lines, the higher the level of administrative costs. This difficulty should be greater in those funds which allow members to spread their holdings over several lines. Another control variable is given by the average level of assets per participant.

## **5.2. Empirical results relative to administrative costs**

Table 2 reports the results of the estimates of the model illustrated above<sup>6</sup>. In the analysis of the linear model (estimates 1, 3 and 6), we find a coefficient inferior to 1 for the logarithm of the number of participants. Such a value confirms the existence of economies of scale in closed pension funds. Of all the other variables, only the impact of outsourcing and assets per participants appears significant in all the estimates with the expected sign.

Moving on to the quadratic model, the coefficients for the participants, taken individually, do not appear to be significant, although their joint significance is elevated. The coefficient  $\alpha_1$  remains inferior to 1, highlighting the existence of economies of scale, while a positive  $\alpha_2$  indicated that economies of scale decrease with the increase in the participants' number.

Also in the quadratic model, the sign and the significance of other variables are confirmed.

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<sup>6</sup> We carried out pooled OLS and panel, random and fixed effect. The random effect estimates were run according to the model proposed by Mundlak (1979), adding, as variables, average values at fund level of the time variant variables.

**Table 2. Estimate of administrative costs (2007-2011)**

<i>Dependent variable:</i>	Pooled OLS		Panel RE (Mundlak, 1979)			Panel FE		
<i>Administrative costs (logarithm)</i>	1	2	3	4	5	6	7	8
Participants (ln)	0.692*** (0.144)	-0.085 (1.022)	0.692*** (0.204)	-0.078 (0.930)	0.130 (1.164)	0.688*** (0.200)	-0.079 (0.919)	-0.052 (0.917)
Participants (ln) squared		0.041 (0.054)		0.041 (0.046)	0.038 (0.064)		0.041 (0.045)	0.040 (0.045)
Impact of services purchased from third parties on administrative costs (ln)	-0.652*** (0.072)	-0.650*** (0.072)	-0.653*** (0.120)	-0.652*** (0.119)	-0.530*** (0.150)	-0.646*** (0.118)	-0.644*** (0.117)	-0.647*** (0.114)
Average assets per participant in k (ln)	0.537*** (0.046)	0.537*** (0.046)	0.538*** (0.169)	0.538*** (0.170)		0.536*** (0.167)	0.536*** (0.168)	0.543*** (0.173)
Number of potential members (ln)	0.963 (0.658)	0.539 (0.858)	0.061 (0.044)	0.061 (0.044)				
Number of lines	0.021 (0.032)	0.021 (0.032)	0.021 (0.059)	0.021 (0.059)		0.025 (0.056)	0.026 (0.056)	
Possibility of spreading the holdings (dummy)	-0.327 (1.345)	0.089 (1.451)	0.081 (0.090)	0.081 (0.091)				
Company fund (dummy)	0.711 (1.416)	0.297 (1.516)	-0.117 (0.123)	-0.117 (0.123)				
Regional fund (dummy)	1.357* (0.802)	0.805 (1.077)	-0.263 (0.206)	-0.263 (0.206)				
Constant	-7.266 (6.317)	1.241 (12.755)	8.142*** (1.707)	8.153*** (1.708)	10.828*** (2.261)	4.616** (2.052)	8.119 (4.840)	7.981 (4.882)
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund dummy	Yes	Yes						
Observations	245	245	245	245	247	247	247	247
Number of funds			38	38	39	39	39	39
R-squared	0.98	0.98				0.64	0.64	0.64
Test $\alpha_1 = 1$	0.034	0.290	0.131	0.246	0.455	0.127	0.247	0.259
Test $\alpha_1, \alpha_2 = 0$		0.000		0.000	0.000		0.001	0.000
Hausman test (prob.)				0.894	0.797			

clustered standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

### 5.3. Efficient dimension for administrative costs

We can estimate an optimal dimension for the pension fund, beyond which economies of scale achieved through an increase in the number of participants ends. We compute the point of maximum efficiency starting from the estimate model and calculating the elasticity of the dependent variable with respect to  $P_{it}$ , i.e. the dimension in terms of participants.

Taking into consideration the quadratic model and deriving to  $P_{it}$ , cost elasticity can be obtained:

$$\text{Elasticity} = \frac{\partial AC}{\partial P} = \alpha_1 + 2\alpha_2 P$$

We derive the optimal point setting elasticity equal to 1. When elasticity is inferior to 1, the fund may take advantage of economies of scale; on the other hand, when greater than 1, this is not possible. Therefore, by making elasticity correspond to a

value of 1 and keeping in mind that  $P = \ln(\text{participants})$ , we can determine the level of membership which implies the maximum use of economies of scale:

$$\text{participants}^* = e^{\frac{1-\alpha_1}{2\alpha_2}}$$

The point  $\text{participants}^*$  represents the upper limit within which economies of scale can be found.

Adopting the results presented in Table 2 in the fixed effect panel estimation as a reference, we obtain a threshold number of  $\text{participants}^*$  of 90,000. At the end of 2013, only six closed funds had more than 90,000 participants.

Figure 3. Trend for administrative costs per participant

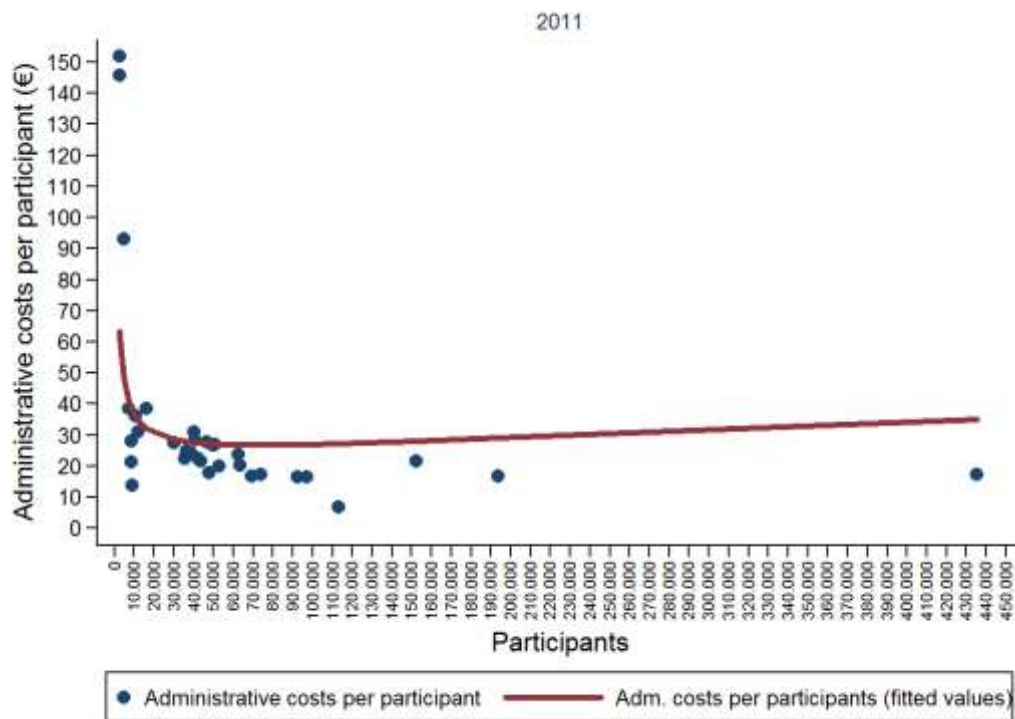


Figure 3 shows the values of administrative costs per participant in relation to number of participants in 2011, with the addition of a trend line based on coefficients derived from estimate 8<sup>7</sup> in Table 2. The graph shows that the economies of scale are very strong before the optimal point, while they become almost insignificant after that point. These results suggest that smaller funds have strong potential gain in reaching the optimal dimension, while bigger funds encounter no appreciable disincentives becoming larger.

<sup>7</sup> Our choice for estimate 8 was guided by the greater joint significance of parameters  $\alpha_1$  e  $\alpha_2$  among the panel and fixed effect estimates.

## 6. Investment costs, type of fund and supply

The investment costs include financial management commissions and possible guarantee commissions paid to managers, as well as payments made to the fiduciary bank. These costs are generally calculated as a percentage of the assets managed. The fund could acknowledge also an over performance commission to managers when they achieve a yield superior to certain limits which vary according to individual management agreements<sup>8</sup>.

Investment costs are also accounted by open pension funds, and our analysis can therefore be extended to them. Moreover, we can consider the single investment lines rather than the fund as a whole<sup>9</sup>.

We can presume that a larger amount of assets would allow a pension fund to take advantage of economies of scale and therefore achieve a reduction in investment costs over assets.

However, from an initial descriptive analysis of the data, this hypothesis is not immediately confirmed. Table 3 reports average investment costs (arithmetical average) for closed and open pension funds in the 2007-2013 seven-year period compared to the total assets trend. The data shows how the investment costs over assets ratio do not display the expected pattern: although the assets of pension funds have increased over time, investment costs did not always decrease.

**Table 3. Investment costs over assets over time (2007-2013)**

Year	Closed funds			Open funds		
	Average total assets (€m)	Number of lines	Investment costs over assets	Average total assets (€m)	Number of lines	Investment costs over assets
2007	121.36	94	0.153	12.34	329	0.894
2008	122.92	113	0.184	13.38	341	1.074
2009	157.42	119	0.202	18.21	310	1.004
2010	197.31	113	0.209	23.58	298	1.031
2011	223.65	113	0.183	30.15	271	1.052
2012	271.93	111	0.199	38.21	256	1.063
2013	321.57	107	0.201	45.63	240	1.080

Source: Mefop Data Processing using Previ|DATA data

<sup>8</sup> With regard to closed pension funds, 37% of the lines offered foresee commissions for over-performance. The lines which award a bonus to managers on achieving certain results are mainly mixed bonds (19%) and stocks (13%).

<sup>9</sup> In closed pension funds, the assets in an investment line are generally distributed over a number of agreements stipulated with several financial managers and with various cost conditions. Therefore, a more detailed evaluation at individual levels of management agreements should be carried out. However, at the moment, the data to perform this estimation are not available.



**Table 4. Investment costs over assets by dimension (2013)**

Total assets	Closed funds		Open funds	
	Number of lines	Investment costs over assets (%)	Number of lines	Investment costs over assets (%)
<b>0-5 mln</b>	5	0.208	49	1.135
<b>5-20 mln</b>	8	0.196	62	1.036
<b>20-50 mln</b>	23	0.223	67	1.022
<b>oltre 50 mln</b>	71	0.195	62	1.143

Source: Mefop Previ|DATA

Table 4 represents the 2013 trend in investment costs over assets of the lines classified by the amount of the total assets. While the ratio for open funds is higher in bigger lines, in closed funds the relation of investment cost and assets is not univocal.

These dynamics could be explained considering that the financial manager might have greater, more effective but also more costly investment opportunities with the growth of the fund's assets. Once beyond a certain threshold, economies of scale begin to reduce the impact of costs over assets.

### 6.1. Definition of an econometric model for analyzing investment costs

In order to assess which structural variables impact on investment costs, we can identify these main components:

$$Investment\ costs = MF + OPF + GF + FB$$

where:

- MF = management fees;
- OPF = over-performance fee;
- GF = guarantee fees;
- FB = fiduciary bank fee.

The **management fee** is paid to the managers who invest resources on behalf of the pension fund. This commission is generally expressed as a percentage of the assets managed. Closed funds (which select independent managers) with a large amount of resources could have a greater negotiating power. This impact might be less important for open funds, which generally choose managers within the same group of the sponsor company. Closed fund could add an element of competition allocating its assets to more than one manager. However, fragmentation of assets might reduce economies of scale. Furthermore, management costs could also be influenced by the type of management. A stock-based investment is generally more expensive. Managers can enabled by fund to

delegate their mandate to other managers. Delegation could increase costs of management.

**Over-performance fees** are not present in all investment lines. Even when present, an incentive commission represents a cost for the fund only when the financial manager achieve a yield superior to an agreed limit. The impact of these commissions on the total cost is undoubtedly positive, but their inclusion might also carry to a reduction in management commissions requested by the managers themselves.

The presence of a **yield guarantee**, particularly when investments are accounted with mark-to-market valorization, requires higher hedging costs for the pension fund.

Lastly, **fees for the fiduciary bank** are expressed as a percentage of the assets held. This cost too could be influenced by the negotiating power of grater pension fund.

The following relations can therefore be identified:

$$Investment\ costs = f\left(\underbrace{PFT}_{\substack{+ \text{ if open fund} \\ +}}, \underbrace{G}_+, \underbrace{\%S}_+, \underbrace{\#AM}_?\right)$$

where:

- PFT = type of pension fund (closed or open fund);
- G = presence of a guarantee;
- %S = weight of stocks;
- #AM = number of asset managers;

In order to determine the marginal contribution of the variables in increasing or decreasing investment costs, we estimate of the following regression model:

$$IC_{it} = \theta + \sum_{j=1,2} (\alpha_j + \beta_j OF_i) \cdot TA_{it}^j + \gamma OF_i + \delta W_{it} + \varepsilon_{it}$$

Where:

$IC_{it}$  = logarithm of investment costs of line  $i$  to time  $t$ ;

$TA_{it}$  = logarithm of total assets of line  $i$  to time  $t$ ;

$OF_i$  = dummy equivalent to 1 for open pension fund lines;

$W_{it}$  = matrix of the structural variables:

- a. dummy equivalent to 1 if line  $i$  offers a yield guarantee;
- b. maximum share of assets investible in stocks (based on line  $i$ 's classification);
- c. dummy equivalent to 1 if the line  $i$  has more than one manager;

$\varepsilon_{it}$  = term of error , hypothesis i.i.d.

As for administrative costs, a model with a squared dimensional variable is adopted to investigate the existence of economies of scale (or their absence) and how their intensity varies while the assets managed grow. Furthermore, the variables  $OF_i \cdot TA_{it}$  and  $OF_i \cdot TA_{it}^2$ , as well as the dummy  $OF_i$  have been added in order to capture the structural differences presented by open pension funds compared to closed ones. Open funds are product sold by financial institutions. In most cases, the resources are managed by the institute itself, and therefore the *element of competition* produced when closed funds select their managers is missing.

The results shown in Table 4 suggest the presence of initial diseconomies of scale, therefore we can expect a value superior to 1 of  $\alpha_1$ . At the same time, a negative value,  $\alpha_2$ , would indicate that such diseconomies tend to acquire minor importance as assets grow, even inverting the trend beyond certain levels of total assets<sup>10</sup>.

We presume that the presence of a yield guarantee implies higher costs – linked to complexity of management and security margins – for the line. We also expect a positive coefficient for stock investment. In closed pension funds (almost all open pension funds have a single manager, without mandates) we investigate whether the distribution of the assets among various managers may allow greater efficiency: a bigger number of financial managers stimulates competition, but at the same time fragments the assets, reducing the negotiating power of the fund.

## 6.2. The empirical results on financial costs

Table 5 illustrates the main results of the panel estimates<sup>11</sup>. The presence of diseconomies of scale is confirmed in the linear estimates (estimates 1, 3 and 7). The  $\alpha_1$  parameter is always greater than 1 and significant. For the open funds the  $\beta_1$  parameter is significant only in the OLS estimate. The hypothesis regarding the presence of constant economies of scale cannot be excluded.

Moving on to the quadratic model, the coefficients relative to assets, if taken singularly, lose significance. Significance tests show the validity of the quadratic model, but the parameters  $\alpha_2$  e  $\beta_2$  do not appear to be significant either singularly or jointly,

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<sup>10</sup> For open funds we expect a value greater than 1 of  $\alpha_1 + \beta_1$  and negative of  $\alpha_2 + \beta_2$ .

<sup>11</sup> See note 6.

thus rendering the estimate of the shape of the curve not robust. The hypothesis of the existence of constant economies of scale cannot be rejected – these results are particularly important for closed pension funds.

Such outcomes could be explained by the particular nature of the supplementary pension funds industry in Italy. In fact, since their onset, the asset management of closed pension funds has been characterized by a relatively low level of management fees. This situation, driven by competition between financial managers, has gone on through time, thus reducing further opportunities of cost reduction.

Our results may show that opportunities for taking advantage of economies of scale in terms of asset costs have already been taken up: greater efficiency might be found in improving the quality of service rather than in reducing costs.

Our estimate shows also that the presence of various asset managers is significant – this is true, however, only in the case of closed pension funds; the asset management in open funds is always runs by a single manager, who is generally a staff member of the company or group promoting the fund. The “greater competition” seems to produce a greater impact than that of “reduction of assets”, given its negative coefficient.

More investment in stocks implies higher costs, and the parameter is very significant. The financial cost level of open pension funds is significantly higher than closed pension funds.

**Table 5. Panel estimate of financial costs over assets (2007-2013)**

<i>Dependent variable:</i> <i>Financial costs</i> <i>(logarithm)</i>	OLS			Panel RE (Mundlak, 1979)				Panel FE	
	1	2	3	4	5	6	7	8	9
Total assets (ln)	1.096*** (0.012)	2.038*** (0.115)	1.285*** (0.069)	1.630** (0.763)	1.588** (0.694)	1.632** (0.762)	1.591** (0.695)	1.282*** (0.065)	1.582** (0.694)
Total assets (ln) squared		-0.028*** (0.003)		-0.011 (0.022)	-0.010 (0.020)	-0.011 (0.022)	-0.010 (0.020)		-0.010 (0.020)
Total assets (ln) x OF dummy	-0.071*** (0.013)	-0.646*** (0.133)	-0.109* (0.057)	-0.180 (0.762)	-0.292 (0.702)	-0.181 (0.762)	-0.292 (0.702)	-0.116** (0.054)	-0.292 (0.701)
Total assets (ln) squared x OF dummy		0.016*** (0.004)		0.001 (0.022)	0.005 (0.021)	0.001 (0.022)	0.005 (0.021)		0.005 (0.021)
Guaranteed line (dummy)	0.047** (0.024)	0.046** (0.023)	0.053 (0.046)	0.055 (0.046)			-0.081* (0.042)		
Max investment in stocks	0.003*** (0.000)	0.003*** (0.000)	0.003*** (0.000)	0.003*** (0.000)		0.003*** (0.000)			
Presence of various managers (dummy)	-0.385*** (0.045)	-0.298*** (0.045)	-0.295*** (0.059)	-0.238*** (0.060)					
Open fund (dummy)	2.862*** (0.218)	8.092*** (1.109)	2.234*** (0.507)	7.297** (3.073)	7.807** (3.203)	8.187*** (3.002)	7.747** (3.263)		
Constant	-8.279*** (0.199)	-16.24*** (0.986)	-7.652*** (0.458)	-14.99*** (2.700)	-14.62*** (2.850)	-15.78*** (2.613)	-14.52*** (2.901)	-8.476*** (0.608)	-9.656*** (1.920)
Observations	2712	2712	2712	2712	2810	2712	2810	2810	2810
Number of idcomparto			471	471	487	471	487	487	487
R-squared	0.944	0.946						0.880	0.880
Test $\alpha_1 = 1$	0.000	0.000	0.000	0.409	0.397	0.407	0.395	0.000	0.402
Test $\alpha_1, \beta_1 = 0$	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Test $\alpha_1, \alpha_2 = 0$		0.000		0.000	0.000	0.000	0.000		0.000
Test $\alpha_2, \beta_2 = 0$		0.000		0.193	0.644	0.189	0.636		0.671
Test $\beta_1, \beta_2 = 0$		0.000		0.010	0.015	0.010	0.015		0.016
Hausman test			0.000	0.000	0.000	0.000	0.000		

clustered standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

The coefficient associated with the presence of a guarantee is significant only in the estimates that do not foresee a percentage of investment in stocks and shows a negative value, contrary to our expectations. We should note, however, that the guaranteed lines of investment all show a very small stocks component. For this reason, when the variable relative to percentage of stocks is omitted, the coefficient associated with the presence of a guarantee becomes negative and increase its significance. On the other hand, being investments in stocks equal, the presence of a guarantee is associated to higher asset costs.

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