The Impact of Investment Strategies on the Mandatory Private Pension
Founds in Romania

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Abstract. The goal of this paper is to establish the factors that determine the existing gaps among the yields of the mandatory private pension funds. It begins by presenting the basic characteristics of the mandatory private pension system in Romania, supported by the legal framework. The second part explains the influence of the assets invested in by the currently active private pension funds over a period of 15 months. The analysis, which implies estimating the coefficients of a multivariable regression, was conducted using STATA.

Keywords: private pension, pension funds, investment, yield

INTRODUCTION

Since 2007, Romania operates a multi-pillar pension system. Besides the mandatory component (Pillar I) of “pay as you go” type, based on solidarity intra-and inter-generational, there are two other functional components, namely Pillar II (mandatory privately managed pension funds) and Pillar III (voluntary privately managed pension funds). In addition to increasing the average life expectancy at retirement, which has put increased pressure on public pension system resources during the past 20 years, two other complementary phenomena have developed, that have led to the need for alternatives to the public pension system: changing age structure of population (increase in elderly population segment) and simultaneously, declining birth rates. All those, but also other factors have determined the alteration of the ratio of active / inactive population. To tackle these problems, it was decided in 2007 to implement reforms aimed at extending the public pension system with two new components, i.e. Pillar II and Pillar III (Şeulean, 2003).

Without going into details regarding the performance of private pension funds, because things are somewhat known, we only say that, unlike the public component, where the contributions mobilized from active persons are redistributed to be spent by the inactive persons (retired), essential for the II and III pillars is that the resources mobilized through contributions paid by the insured are not redistributed. They are recorded in individual accounts opened on behalf of the assured and based on those contributions, pension fund managers make certain types of legislated financial investments. At the end of the accumulation period, which generally equals the contribution period, the assured receive, in addition to the contributions mobilized over the period of contribution a surplus obtained from the fructification of the contributions.

As in other countries in Central and Eastern Europe, where the construction of the multi-pillar pension systems began at mid 90s, in our country, private pension funds are of ”

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1 Pillar II was launched on the market in May 2008 and the third pillar in May 2007.
defined contribution” type. Compared to the systems of ”defined benefit” type, in the case of ”defined contribution” pension funds, the assured pay a contribution level which is defined by law, without knowing the exact size of the pension they will get. But its amount is closely related to the size of the contributions, the period of accumulation and, equally important, the yield obtained by the resources deployed throughout the period of accumulation.

Private pension funds of “defined contribution” type are gaining ever more ground in the Europa, being considered by experts as extremely important for the future in terms of saving for retirement. The main problem of these types of funds is that in order to produce substantial benefits to supplement the public pension, the contribution should be 10%. Considering this, at a rate of 2.5% on gross earnings, which will increase annually by 0.5 percentage points to reach the 8%, Romania does not meet this requirement (Law number 23/2007). Currently it is the lowest rate practiced among countries which have adopted this system (http://w4.csspp.ro/ro/).

There is a variety of instruments offered by financial markets, in which the pension fund assets may be invested with good results. The decision to determine the structure of an investment portfolio that provide the best returns, belongs to the fund managers, but the regulatory and supervisory authority of the private pension system set the higher boundaries, measured as a percentage of total fund assets, for each financial instruments in which to invest. That legislation is intended to limit risky investments which, by some wrong strategy of the pension fund managers can jeopardize the resources of their assured and the future expectations (Law number 23/2007). Comparing the legal options available to pension fund managers to invest their assets in, it appears that in Western European countries, the degree of freedom of this choice is high, participants being given several investment options. One such option is the multifund model which, in essence, assumes choosing a customized and complex investment portfolio, depending on the age and risk appetite of each assured. There are generally three types of investment plans: (a) a plan for the young assured associated with increased risk appetite, (b) a conservative plan for assured who are near retirement age, and exercise caution against turmoil in the financial markets in order to protect the acquired asset and (c) a moderate plan for assured that are between the two age levels.

Another regulation aimed at protecting the resources of the assured, as it is explicitly mentioned in the text of the law, the pension fund can not be declared bankrupt. Under well defined circumstances and in order to avoid bankruptcy situation, the Commission for Monitoring Private Pension System may decide to withdraw the operating license of a fund, in which case the assets of that fund are distributed to other funds.

In comparison to pension systems in Central and Eastern Europe, the private pension system in Romanian has more restrictive legislation and is more clearly outlined. Thus, when guarantees are concerned, the private pension system in Romania is the only one in the region that offers customers both an absolute guarantee of performance (at least 0% return over the period of accumulation) and a relative one (minimum yield calculated periodically based on the average market performance). The provision, challenged by some, liked by most, has the effect of providing competitive investment returns both short and long periods of time.

Another aspect to which we refer is related to the management fees of directors. Although launching the private pension system involved significant effort from managers, pension funds in Romania work with the lowest commissions i.e. from 2.5% of the contributions and 0.6% per year of the assets. For comparison, in Austria the commission is up 3.5% of contributions and 0.8% of assets, in Bulgaria 5% of contributions and 1% of assets, in Hungary 4.5% of contributions and 0.8% of assets, in Ireland 5% of contributions and 1% of assets, in Poland 3.5% of contributions and 0.6% of assets, in Spain 2% of assets
and 0.5 percentage points of return (http://w4.csspp.ro/ro/). The low level of fees charged by pension fund managers are, in this regard, an incentive to develop local private pension system.

Regarding portfolio investments of private pension funds, the entire period analyzed is characterized mainly by investments made in assets with low risk as government securities, corporate bonds, the foreign non-governmental organizations or bank deposits. 2009 was undoubtedly the year of bonds, which have provided the best returns, due to the liquidity need of the state budget, a trend that continued even in 2010.

MATERIALS AND METHODS

In order to determine the factors that have an influence on the annualized yield of the private pension funds we need to show the explicit way in which this yield is calculated. The formula that provides the annualized yield is (current fund unit value – initial fund unit value)*360 days/(initial fund unit value *days of existence). From this formula we observe that the fund unit value has an important role in the evolution of the yield, and therefore our analysis will focus on the effect of investment strategies on it.

If in the beginning a total of 18 administrators of pension funds were authorized to operate in Romania, after more than two years, in our country operate ten pension fund managers. For our study we have considered a period of 15 months from December 2008 until February 2010 and monthly data for the 10 currently active mandatory private pension funds: ING (ING), Allianz Tiriac (AZT Your Future), Generali (Wings), AIG (AIG), Aviva (Pension Viva), Eureko (Eureko), BCR (BCR), Aegon (Vital), BRD (BRD), KD (KD). The evolution of the investments made by these ten mandatory private pension funds can be seen in the figure below (http://www.apapr.ro).

![Fig. 1. Investments evolution](http://www.apapr.ro)

2 February 2010, and nine in April 2010
To better grasp the evolution of these investments and also the evolution of the fund unit value the following table presents the basic descriptive statistics.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Observations</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fund Unit Value</td>
<td>150</td>
<td>11.45234</td>
<td>0.778942</td>
<td>10.063</td>
<td>13.8826</td>
</tr>
<tr>
<td>Government bonds</td>
<td>150</td>
<td>0.6359173</td>
<td>0.0904665</td>
<td>0.4194</td>
<td>0.8495</td>
</tr>
<tr>
<td>Municipal bonds</td>
<td>150</td>
<td>0.0286073</td>
<td>0.0319215</td>
<td>0 0.1405</td>
<td></td>
</tr>
<tr>
<td>Supranational bonds</td>
<td>150</td>
<td>0.043482</td>
<td>0.0256999</td>
<td>0 0.1082</td>
<td></td>
</tr>
<tr>
<td>Corporate bonds</td>
<td>150</td>
<td>0.1607613</td>
<td>0.085609</td>
<td>0 0.3279</td>
<td></td>
</tr>
<tr>
<td>Cash and deposits</td>
<td>150</td>
<td>0.0868247</td>
<td>0.0608235</td>
<td>-0.0674</td>
<td>0.2586</td>
</tr>
<tr>
<td>Listed equity</td>
<td>150</td>
<td>0.0330453</td>
<td>0.0349605</td>
<td>0 0.1479</td>
<td></td>
</tr>
<tr>
<td>Mutual funds</td>
<td>150</td>
<td>0.0093073</td>
<td>0.0067886</td>
<td>0 0.0491</td>
<td></td>
</tr>
<tr>
<td>Derivates</td>
<td>150</td>
<td>0.000046</td>
<td>0.0006786</td>
<td>-0.0039</td>
<td>0.0049</td>
</tr>
</tbody>
</table>

From this table it can be concluded that across the 150 existing observations the assets with the highest mean are the Government bonds followed by the corporate bonds. The minimum value of assets such as municipal or supranational bonds expresses the fact that there have been periods in which the private pension funds have decided not to invest in such assets. The negative values of corresponding to the deposits and the derivatives suggest a disinvestment strategy adopted by the funds. Another issue arising from this table is the degree of homogeneity. This degree is obtained by comparing the mean with the standard deviation. So it can be concluded that the series of the fund unit value has a high degree of homogeneity.

A more in depth analysis of the relationship between the fund unit value and the assets in which the mandatory private pensions have invested is based on the multiple regression model. This type of analysis is currently the most widely used for empirical analysis in economics. Likewise, the method of ordinary least squares is popularly used for estimating the parameters of the multiple regression model (Woolridge, 2000). Before estimating the parameters of the model some basic assumptions have to be considered. The assumptions provided by the specialized literature are: Linear parameters, random sampling, zero conditional mean, no perfect collinearity and homoskedasticity. The first assumption implies that the model can be written as $Y = \beta_0 + \beta_1 \cdot x_1 + \beta_2 \cdot x_2 + \ldots + \beta_n \cdot x_n + u$ where $\beta_0, \beta_1, \ldots, \beta_n$ are the unknown parameters (constants) of interest, and $u$ is an unobservable random error or random disturbance term. The random sampling assumption implies that the sampling from the population has been done in a random manner. The third assumption implies that the error $u$ has an expected value of zero, given any values of the independent variables; in other words, $E(u|x_1, x_2, \ldots, x_n) = 0$. The forth assumption states that in the sample (and therefore in the population) none of the independent variables is constant and there are no exact linear relationships among the independent variables. The no perfect collinearity assumption concerns only the independent variables but says nothing about the relationship between the $u$ and the explanatory variables. It is important to note that this assumption allows the independent variables to be correlated, as long as they are not perfectly correlated. If we did not allow for any correlation among the independent variables, then the multiple regressions would not be very useful for economic analysis. The last assumption means that the variance in the error term $u$ conditional on the explanatory variables is the same for all combinations of outcomes of the explanatory variables. If this assumption fails, then the model exhibits heteroskedasticity. The homoskedasticity assumption is needed to justify the t
tests, the F tests and the confidence intervals for the OLS estimation of the linear regression model. Many tests for heteroskedasticity have been developed over the years and we have chosen for our analysis the Breusch-Pagan test. The steps of this test are: estimating the original regression model by OLS and obtaining the squared OLS residuals for each observation, running a new linear regression of the squared OLS residuals on all the explanatory variable and calculating the F-statistic based on the R squared determined on the previous step.

Considering all the above assumptions our analysis starts with a multiple regression model of the following form:

\[ FUV = \beta_0 + \beta_1 \cdot GB + \beta_2 \cdot MB + \beta_3 \cdot SB + \beta_4 \cdot CB + \beta_5 \cdot CD + \beta_6 \cdot LE + \beta_7 \cdot MF + u \]

where GB=Government bonds,
MB=Municipal bonds,
SB=Supranational bonds,
CB=Corporate bonds,
CD=Cash and deposits,
LE=Listed equity,
MF=Mutual funds.

RESULTS AND DISCUSSION

The derivatives have not been included in the estimation to avoid a multicollinearity problem, due to the fact that the funds have invested all the contributions they received in the eight assets mentioned above. In other words, the proportions of the investments made in the whole eight assets add up to 100%.

The homoskedasticity test, that has been performed using STATA, has the null of a constant variance. After performing the test, the values obtained suggest that, a significance level of 5% the null hypothesis can be rejected and therefore there is heteroskedasticity present. To correct for that, when estimating the regression we used the robust standard error estimates in stead of the normal standard errors. The results can be seen in the figure below.

Fig. 2. STATA output

A test value of 2.93 and a p-value of 0.0871.
Thus our estimated model has the following form:

\[ FUV = 11.267 \cdot GB + 10.765 \cdot MB + 9.602 \cdot SB + 10.238 \cdot CB + 9.092 \cdot CD + 28.535 \cdot LE + 13.627 \cdot MF, \]

with the above mentioned abbreviations.

When considering every coefficient individually, we can conclude that all have a high statistical importance\(^4\). The overall significance of the model is given by the F-value of 27964.41 and the according p value of zero, both very solid proofs of the statistical importance of the model. The goodness-of-fit of the model is given by the R squared: the value of 0.9988 means that 99.88% of the variance of the fund unit value is explained by the model. The coefficient of the government bonds means that an increase of 1% in the fraction of investments in government bonds will determine an increase of 11.267% in the fund unit value. The other coefficients can be interpreted in the same manner.

This analysis of the influence of investment strategies on the fund unit value and therefore on the yield obtained by the ten currently active mandatory private pension funds, can provide one explanation for the registered yield. In the last trimester the mandatory private pension funds have obtained an annualized yield of 9.5% and in the last year a 24.2% yield, which is much higher than the inflation rate or the interest rate offered by the banks for the population deposits.

Yields of pension funds in Romania, superior to all pension funds obtained by the developed countries but also compared with those obtained by countries of Central and Eastern Europe can be explained by several factors which have acted on the domestic market, including, managers’ prudence throughout this period and consistent investment strategy.

What should be understand is that the success of private pension funds, over a long period of time depends both on creating appropriate legal and institutional framework and an efficient management of fund and also the effective control exercised by the Supervisory Authority. To enhance the private pension system in our country the IMF provided recommendations regarding the rapid increase in the contributions, the improvement of the legal framework and the rejection of the inflation guarantee. If these recommendations are to be applied, the success of the private pension system in Romania can be sustainable in the future, making private pensions the most profitable investment.

REFERENCES

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\(^4\) The t values of each of the coefficients are larger that the critical t value of 1.97 and all the p values are zero.