Study regarding the return of retirement pension plans and programs in Romania

Daniela Nicoleta Sahlian

Bucharest University of Economic Studies, Bucharest, Romania
daniela.sahlian@cig.ase.ro

Daniela Livia Trasca

Bucharest University of Economic Studies, Bucharest, Romania
daniela.trasca@economie.ase.ro

Irina Denisa Munteanu

Bucharest University of Economic Studies, Bucharest, Romania
irinadmunteanu@gmail.com

Liviu Matac

Bucharest University of Economic Studies, Bucharest, Romania
liviu.matac@cig.ase.ro

Daniela Codruta Pavel

Bucharest University of Economic Studies, Bucharest, Romania
codruta.negrut@e-uvr.ro

Abstract. *Quite often, people ask questions about the size of their retirement funds, nevertheless, demographic changes are fueling an existing insecurity. Thereby, in the actual context, it is necessary to analyze the current retirement system in order to be able to provide reliable solutions in the future. The objective of the research is to elaborate an econometric analysis based on the information available for Pillar II of retirement pensions for each fund apart, but also at the market level. The mandatory private funds of Pillar II are managed by companies existing on the Romanian market. The study aims to analyze the causal relationship between the size of the fund, analyzed through the size of the total net assets, and its profitability. The research method consists in testing the connection between the two variables through a linear regression at the market and individual level, in terms of each fund. The results of the research will complete the already existing researches and, moreover, it will provide an updated base in order to evaluate the provisions regarding the investments made from these funds and act accordingly to increase the benefits that employees receive during their retirement age.*

Keywords: retirement pension fund; return on retirement pension fund; size of total net assets; econometric analysis.

Introduction

The research is based on the current subject, in the context of a permanent interest, both regarding the employees as well as the employers, in terms of the retirement fund system and the possibilities of presenting the information related to the benefits received and respectively, offered, during the retirement age. Retirement funds are an important topic for companies and for the whole society. These post-employment benefit plans impact millions of employees who expect these contributions to bring them sufficient income during their retirement.

Since there will always be a lack of harmony between the interests of the employees for a decent income after their retirement from work, and those of the companies regarding the costs with benefits for the post-employment plans, there arises the need for a legislative framework to regulate the system that adapts to the economic changes and needs of economic agents. Completing within this framework, there are accounting policies, treatments and models regarding the retirement fund plans and programs developed in order to compensate the interests of the parts involved.

In the context of harmonizing with the European directives, the retirement pension fund system in Romania has undergone modifications and is structured, since 2008, on the basis of three pillars of contributions (see Figure 1).

Figure 1. Structure of the retirement pension fund system in Romania

Source: Authors' prelucration

Pillar I (Public Retirement Fund System) represents the retirement fund received from the state, each year, after retiring from the workplace, based on seniority and contributions paid in due time.

Pillar II of retirement funds has become mandatory for employees under 35 and optional for those between 35 and 45, but who are already contributing to the public retirement funds system. Consequently, from the contribution for social insurance, a part is transferred to the privately administered fund. By 2017, the monthly contribution was 5.1% of gross wage income, and in 2018, it was reduced to 3.75%. Exceptions are employees who work in the field of construction; they do not participate in the privately administrated retirement pension funds. The transferred contribution is carried out in the individual account of each participant, being invested in prudent options in order to generate an increase of the assets held. The collection of the funds obtained from the investments will be possible when reaching the age of the retirement or in the case of disability or the death of the taxpayer. In this sense, the essential role of this additional income is to ensure future security from a financial perspective.

On the market of companies that administer the second pillar of retirement funds are seven active contribution funds, being classified according to the degree of risk, as high or average. With a high level of risk, only the "Wings" retirement pension fund is registered, all the others are classified as those with an average level of risk: "AZT Your Future", "BCR", "BRD", "Metropolitan Life", "NN", "Vital". Over time, the number of taxpayers of these funds has increased for each fund, but the differences from one month to another are not significant. However, for the period analyzed, the "NN" fund registered the highest number of taxpayers, 1.9 million people on average. At the other end of the axis, there is the "BRD" fund with only 384 thousand participants (see Figure 2).

Figure 2. Share of participants in each fund in December 2018

Source: Authors' prelucration based on FSA data

At the same time, based on the data analyzed regarding the number of participants in the funds and their grouping by gender, it can be stated that men have maintained, on average, 52.5% of the total share of taxpayers. This can also be explained by the fact that the share of men in the active population has maintained its dominant position over the years.

The leadership position of the NN company has been maintained over time, with slight fluctuations from one month to the another, as can be seen in the graphic below. It is followed, at a considerable difference (almost 5 percentage points) by AZT Your Future and, later, by Metropolitan Life. However, the companies do not register major fluctuations during the analyzed period, NN being, since 2012, the fund with the most participants (see Figure 3).

Figure 3. Evolution of participants in retirement pension funds

Source: Authors' prelucration based on FSA data

Consequently, it can be observed that there is an upward trend in terms of the number of participants in this fund, which has led to an increase in size of the total funds being managed. At the same time, the retirement funds privately administered by "NN" registered the highest number of people who have transferred here from other funds. In 2018 alone, the monthly average is 70 participants. However, it should be mentioned that "NN" registers in December 2018 a number of 34,950 participants for which there are no contributions. This is in contradiction with the fact that NN does not register the highest rate of profitability of the fund, the advantage being returned to the "Metropolitan Life" administrator. At the same time, as the size of the fund increased, its profitability decreased. This observation is the basis of the econometric analysis.

This return of the retirement pension funds can be expressed through the average rate of returns, calculated as the sum of the profitability rates of each fund weighted with the average size of the fund compared to the time period being analyzed. The Romanian Financial

Supervisory Authority (ASF) publishes these data on a monthly basis, also providing information on the minimum rate of returns. If the registered rate of the fund is below the minimum level of profitability, the respective fund will be under special supervision. The purpose is to protect the taxpayers and to withdraw the authorization of the respective fund if required (see Figure 4).

Figure 4. Evolution of fund performance on the mid-market level

Source: Authors' prelucration based on FSA data

Pillar III voluntary and available to anyone, it represents a defined contribution plan with an investment within 15% of the gross monthly income. Also, the insured person can contribute to several private funds, but in order to receive this retirement fund, that person should have invested for a period of more than 90 months and should be over 60 years old. At the end of May 2018, pillar III included 457,143 taxpayers. The performance of these investments was analyzed by the OECD in 2017, and based on the data collected, it turned out that the investments made brought an average profit of 4.7%, the best performing being the BCR, with a total fund of 525 million euros and 5.5% efficiency. However, the largest fund was NN's, worth 2.9 billion euros and a yield of 5%. The funds were oriented on several investment options, as can be seen in the graphic below. Investments in stocks and funds that can bring higher returns is low because the mass of the obtained profit is not pursued as much as the security of the investment. Thus, the highest weight is given by the bonds issued by the state (60% -69%). However, there is also a reversal of this investment. This has led to a major decrease in their returns since 2008 and so far, from 15% to 5% in 2018.

Materials and Methods

The objective of the research is to carry out an econometric analysis based on the information available for the second pillar of retirement funds for each fund, but also at the market level. The compulsory private funds of Pillar II are in the administration of the companies existing on the Romanian market. At the base of the research methodology are the following methods, which are so important in order to interpret the data within the current economic context, and will be explained where they appear: the analysis of statistical data by synthesis, analogies for processing, induction, and deduction.

The main purpose is to find the determining factors that can affect the size of the fund, as well as its profitability.

The study aims to analyze the causal relationship between the size of the fund, analyzed by the size of the total net assets, and its returns, analyzed by the rate of profitability. The research method consists in testing the connection between the two variables through a linear regression at the market level and at the individual level, on each fund (see Figure 5).

Figure 5. Design of the study

Source: Authors prelucration

Working hypotheses:

H0: The fund's performance does not influence its total size (the model is not valid).

H1: The fund's performance influences its total size (the model is valid).

Thus, the endogenous (dependent) variable is represented by the total value of the net asset, and the exogenous (independent) variable is identified by the profitability rate.

On the market of the companies that administer the second pillar of retirement funds there are nine contribution funds classified according to the degree of risk. In this study, considering the homogeneity of the sample, were chosen the funds with a medium risk level. Consequently, six observations were chosen: the "AZT Your Future" fund, "BCR", "BRD", "Metropolitan Life", "NN", "Vital".

The results of this study complete the existing researches and provide an updated basis to evaluate the previsions regarding the investments made from these funds in order to increase the employees' benefits collected during their retirement age.

Results

The connection between these two variables, the rate of the fund's profitability and the total size of the net assets, has been the object of the research of several studies by the specialists in this field. For example, in 2011, V. Robu and M. Sandu conducted a study entitled "Analysis of the Correlation between Size and Performance of Private Retirement Fund", which showed that the performance of retirement funds increases concurrently with the size of the fund with a total value of net assets under 25 million Euros and decreases with the size of funds over 25 million Euros. At the same time, a study by M. Cristea, et al., Entitled "Does the Dimension of Privately Managed Retirement Funds Influence their Performances? Statistical Study in Romania", indicated that there is a strong and reverse link between the return rate and the size of the private fund. This case study completes the existing ones, updating them through an analysis of the situation from recent years. Also, the present study takes into account a considerably larger sample of observations (84 observations, compared to 12 observations in the case of the mentioned study).

Mid-level market analysis

In order to test the causal relationship between the profitability rate and the total size of the retirement funds, a first market analysis is performed taking into account the monthly average values provided by the FSA.

The hypothesis of this analysis are in the following form:

- H0: There is no connection between the two variables.
- H1: There is a connection between the two variables.

The regression model is of the form: $Y_i = b_0 + b_1X_i + \varepsilon$

- Y_i represents the average value of the total net assets, with i considering values from 1 to 84.
- X_i represents the average profitability rate, with i considering values from 1 to 84.
- b_0 represents the free term, that part of y that is influenced by variables other than x
- b_1 represents the slope of the regression line and indicates the number of units with which y is modified when variable X is changed with one unit
- ε represents the error that appears due to the lack of perfect collinearity between the variables. The number of observations is 84, which corresponds to the period analyzed: January 2012-December 2018.

The correlation between the two variables is explained by the correlation coefficient r (Pearson) which indicates the meaning, but also the intensity of the connection.

Following the regression analysis, the results are as follows:

The regression model is: $Y = 7.18 - 0.98X$.

In order to validate this model, it is necessary to test both the model and the significance of the parameters within the model, but the linear correlation coefficient.

The value of F greater than the value of tabled F (3.92), indicates that we are in the critical region and we must accept $H1$ and refuse $H0$. Thus, we can say, with a probability of 95%, that there is a connection between the size of the retirement pension fund expressed by the value of the total net assets and the rate of profitability of the fund. At the same time, based on this test, the regression model is valid for a probability of 95%. In terms of the parameters of the regression model, the validation of their significance is done by carrying out the Student test:

- H0: b_1 , respectively b_0 , are not statistically significant
- H1: b_1 , respectively b_0 , are not statistically significant

Following the Excel results, the value considered in the module, within the Student test for the two parameters are greater than the tabled value set for t (1.99). Also, another condition for their verification is achieved through p -value (the lowest level of significance for which the null hypothesis can be rejected). The output of the analysis resulted in values that are below the accepted limit of 0.05. Thus, it can be stated, with a probability of 95%, that the parameters of the regression model are statistically significant and can be explained as follows.

Regression Statistics	Column1
Multiple R	0.619370342
R Square	0.38361962
Adjusted R Square	0.376102786
Standard Error	0.455683632
Observations	84

ANOVA					
Column1	df	SS	MS	F	Significance F
Regression	1	10.59723865	10.59723865	51.03473422	3.36983E-10
Residual	82	17.02710091	0.207647572		
Total	83	27.62433957			

Column1	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	7.181884551	0.388330564	18.4942552	5.39433E-31	6.409371354	7.954397749
X Variable 1	-0.983431865	0.137661136	-7.143859896	3.36983E-10	-1.257283717	-0.70958001

Table 1 – Regression summary

Source: Authors' calculation based on ASF data

The model obtained, in congruence with the results of the previous studies, can be explained, in the first phase, by changing the economic context. In 2011, the average rate of return on funds was 14%, reaching 4% in 2018. At the same time, the total of net assets increased from 4 billion lei in 2011 to 40 billion lei in 2018, which confirms the growth of total net assets as the profitability rate decreases. This means that since the beginning of the administration of the private pension funds (Pillar II), the number of participants and contributions transferred to this fund have increased and there has been a diversification of investment portfolios. Thereby, the total net asset has increased, but the profitability of the funds expressed through the average rate of profitability has decreased, so between the two being an inverse causal relationship. Therefore, the short-term previsions that can be made based on this regression model will show that as the size of the assets will increase, the rate of profitability of the fund will decrease. This result may be the starting point for further research into the causes of this decline by analyzing investments and their results.

Individual analysis on private funds

From the results of the linear regression, it is observed that, taking into account the database during the period January 2012 - December 2018, the rate of return has a significant influence on the value of the net assets. The regression model assumes that if the rate of return increases by 1 unit, the total size of the net assets decreases by approximately 0.98 units. At the same time, if the fund's return is 0, theoretically, the total net asset value is 7.18 units. The term units is used, and not lei or percentage points, due to the fact that the data has been standardized by applying the natural logarithm.

Regarding the correlation ratio, the value of F shows that it can be affirmed, for a probability of 95%, that the indicator is statistically significant and the change in the size of the total net assets is explained in a proportion of 38%. In addition, the linear correlation coefficient has a value of over 0.5, which indicates a moderate intensity link between the analyzed variables.

For a better understanding of this causal relationship that results from the econometric model at the average market level, the variables were also analyzed at the level of each fund. The period analyzed is the same (January 2012 - December 2018), and the variables are averaged for each fund separately. For each analysis, the assumptions established above remain valid.

As a result of the regression analysis performed, for the "AZT Your Future" fund belonging to Allianz-Tiriac-Private Pensions, a moderate-strong link, with a correlation coefficient r of 0.76, was found. The model verification indicators indicate its validation (Sig. F is smaller than α (5%). The model can be validated by the linear regression equation in the form: $Y = 5.49 - 1X$.

We can say with a probability of 95% that the profitability of the private fund influences the size of the total net assets, and the increase with one unit in the rate of profitability decreases the size of the fund with one unit.

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	5.490255553	0.280676672	19.56078	1.25882E-32
X Variable 1	-1.007786609	0.095154148	-10.5911	5.12791E-17

Table 2 - Regression coefficients AZT Your Future

Source: Authors' calculation based on ASF data

As a result of the regression analysis carried out, for the “BCR” fund, a moderate link was found, with a correlation coefficient r of 0.61. The model verification indicators indicate its validation (Sig. F is lower than α (5%), and the coefficients are statistically significant (p-value < 0.05). The model can be validated by the linear regression equation of the form: $Y = 3.99 - 1.16X$. We can say with a probability of 95% that the profitability of the private fund influences the size of the total net assets, and the growth with one unit of profitability rate decreases the size of the fund with 1.16 units.

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	3.996824915	0.444024305	9.001365	7.15E-14
X Variable 1	-1.167492391	0.164464633	-7.09874	4.12E-10

Table 3 - Regression coefficients BCR

Source: Authors' calculation based on ASF data

As a result of the regression analysis performed, for the “BRD” fund, a moderate link was found, with a correlation coefficient r of 0.51. The model verification indicators indicate its validation (Sig. F is lower than α (5%), and the coefficients are statistically significant (p-value < 0.05). The model can be validated by the linear regression equation of the form: $Y = 4.34 - 0.72X$. Thus, we can say with a probability of 95% that the profitability of the private fund influences the size of the total net assets, and the increase with one unit of the rate of profitability decreases the size of the fund by 0.72 units.

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	4.347645221	0.390790959	11.12525	4.66E-18
X Variable 1	-0.726022699	0.133505553	-5.43815	5.43E-07

Table 4 – Regression coefficients BRD

Source: Authors' calculation based on ASF data

Following the regression analysis carried out, for the “Metropolitan Life” fund, a moderate-low link was found, with a correlation coefficient r of 0.4. The model verification indicators indicate its validation (Sig. F is lower than α (5%), and the coefficients are statistically significant (p-value < 0.05). The model can be validated by the linear regression equation of the form: $Y = 5.51 - 0.87X$. Thereby, we can say with a probability of 95% that the profitability of the private fund influences the size of the total net assets, and the increase with a unit of the rate of profitability decreases the size of the fund by 0.87 units.

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	5.515415783	0.591042388	9.331676	1.58E-14
X Variable 1	-0.872296044	0.216995258	-4.01989	0.000129

Table 5 – Regression coefficients Metropolitan Life

Source: Authors' calculation based on ASF data

As a result of the regression analysis performed, for the “NN” fund, a moderate connection was found, with a correlation coefficient r of 0.48. The model verification indicators indicate its validation (Sig. F is lower than α (5%), and the coefficients are statistically significant (p-value < 0.05). The model can be validated by the linear regression equation of the form: $Y = 6.79 - 0.76X$. Thereby, we can say with a probability of 95% that the profitability of the private fund influences the size of the total net assets, and the increase with one unit of the rate of profitability decreases the size of the fund by 0.76 units.

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	6.797580341	0.428164507	15.87609	9.85E-27
X Variable 1	-0.764807005	0.151671938	-5.04251	2.7E-06

Table 6 – Regression coefficients NN

Source: Authors’ calculation based on ASF data

As a result of the regression analysis performed, for the “Vital” fund, a moderate link was obtained, with a correlation coefficient r of 0.45. The indicators for model verification show its validation (Sig. F is lower than α (5%), and the coefficients are statistically significant (p-value < 0.05). The model can be validated by the linear regression equation of the form: $Y = 3.33 - 1.35X$. Thereby, we can say with a probability of 95% that the profitability of the private fund influences the size of the total net assets, and the increase with one unit of the rate of profitability decreases the size of the fund by 1.35 units.

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	3.330833922	0.821717662	4.053502	0.000114
X Variable 1	-1.358961338	0.293271916	-4.63379	1.34E-05

Table 7 – Regression coefficients Vital

Source: Authors’ calculation based on ASF data

Following the regression analysis on each fund, the results are in line with the average market level. The regression models are valid for all the analyzed funds, and thereby it can be stated that, over a short prevision period, the increase of one unit of the total size of the assets held will lead to a decrease of the fund's performance with a value between 0.72 and 1.36 units. Again, it is necessary for a better understanding of this phenomenon, an investigation regarding the causes of this decrease by analyzing the investment portfolios within each fund and the results obtained. In addition, trading costs and fund management fees must be taken into account.

These regression models show that the effects of the dynamics of the total value of assets held within a fund have an impact on its performance. Therefore, both the managers of the private pension funds and the participants in this pension plan must show an interest in the structure of the investments in the portfolio held. It is necessary that these investments constitute a dynamic and adaptable mix, both in the short term and in the long term, within the fluctuations of the market in order to prevent the decrease of the income that will benefit the taxpayers during their retirement age.

Discussion

This research completes the already existing studies through a national econometric analysis of the second pillar of retirement pensions that are privately administered. Unlike the other existing researches, this study brings forward a different approach regarding the analyzed set of data, taking into account a longer period of time, but also the attainment of a multiple regression

model with a small number of variables that are stable from the point of view of evolution, but also statistically significant. The results obtained from the econometric analysis check the affirmed hypotheses (there is a connection between the variables analyzed, the analysis model is valid). Thereby, it highlights the change in the size of the total net assets held in Pillar II is influenced by the rate of return of this fund, with an inverse causal relationship. The reverse dependency relationship is explained by some specialists in the field through the trading costs incurred by the funds, but in order to analyze this in depth, it requires additional data from the ASF regarding these costs.

Although the case study carried out in this paper brings relevant results and confirms the previous studies, there are some limitations regarding the analysis of the investments that are made in Pillar II. Thereby, future research can follow up these aspects and compare the reverse dimension – fund performance relationship with the dimension - fund behavior relationship, the research being able to be carried out at both, national and comparable levels, in other external private pension markets.

Overall, this research represents both a continuation of the previous researches and a starting point for future research. It may be of interest to both Pillar II participants when selecting a fund, but also to administrators when doing investments, ensuring a balanced mix that will have the highest performance.

References

- Chan, H.F. Fund, Size, Transaction Costs and Performance: Size Matters. *Australian Journal of Management* 2008, 73-96. DOI: 10.2139/ssrn.697581
- Cristea, M; Thalassinou, E. Private Pension Plans: An Important Component of the Financial Market. *International Journal in Economics and Business Administration* 2016, 110-115.
- European Commission. Country Fiche on public pensions for Ageing Report 2018 – Romania. The 2018 Ageing Report 2018.
- Emerging Europe. Available online: <https://emerging-europe.com/voices/romania-pension-system-explained/> (accessed on May 2019).
- Intelligence on European Pensions and Institutional Investment. Available online: <https://www.ipe.com/pensions/country-%20reports/cee/romania-analysis-of-a-miscalculation/www.ipe.com/pensions/country-%20reports/cee/romania-analysis-of-a-miscalculation/10022466.fullarticle> (accessed on May 2019).
- Preda, M. The public pension system in Romania: Myths and facts. *Transylvanian Review of Administrative Sciences* 2011. Volume 32E, 234-251.
- Virjan, D. Analysis of the Romanian Pension System from an European Prospective. *Annals of Faculty of Economics* 2009, 616-621.