

EVOLUTION OF NET ASSETS OF PRIVATE PENSION FUNDS IN ROMANIA UNDER THE INFLUENCE OF CERTAIN FACTORS

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Abstract: Considering the assets of pension funds around the world, their value has been significantly reduced in the current economic and financial crisis, which caused a reallocation of their investments towards investments with low risk, mainly oriented towards domestic investments. Consequence of the decline of the private pension fund assets on behalf of their influence factors has strong implications over the declining of the contributors' confidence in these types of investments, with effect over their contributions reduction. In this study, we measured the variation of the net assets of private pension funds in Romania under the influence of five variables: the exchange rate, interest rate of loans, the interest rate on deposits, interest rate of monetary policy and the stock market value index (BET-C index). We used multiple linear regression and we analyzed both the correlation between the dependent variable and independent variables, and the obtaining of the coefficients for the regression equation. The results obtained through analysis were compared with those obtained at the end of the year 2010. The conclusion is that, the influences of the factors over the assets of private pension funds are always in changing from one period to another, and the way that they affect the net assets of pension funds is declining. To counteract these effects, it shall be developed for a short time horizon, a mix of their investments, dynamic and adaptable to the variation of the influence factors.

JEL classification: G23, O50.

Key words: private pension, net assets, influence factors, statistical correlations

1. INTRODUCTION

The pension systems around the world are facing many difficulties, especially for the public pension component, related to the reduction of the dependency ratio (i.e. a decrease of taxpayers and an increase of pensioners), due to the aging population phenomena manifested worldwide, coupled with the birth rates decline.

Thus, regardless of the organization of the pension system on its two core components, public pensions and private pensions, numerous studies and analyzes were prepared in order to find solutions to tackle these problems, monitoring the evolution of private pensions assets value under the influence of certain factors and their efficient allocation towards investments that lead to high yields, by applying uniform guarantee and regulatory schemes.

The pension system in Romania, organized on three pillars, the public pension first pillar and the private pension 2nd and 3rd pillars, are facing similar problems related to the insufficiency of the budgetary resources allocated to public pensions, but also that of the demographic trends.

2. THEORETICAL FOUNDATIONS

To prevent "market failure" and the diversification of assets fund investments to reduce their risks, in most international pension systems are established various types of Pension Benefit Guarantee Schemes, as "a pension guarantee fund can not function properly without adequate investment rules" (Stewart, 2007).

Regarding the assets of pension funds around the world, their value has been significantly reduced in the current economic and financial crisis, which caused a reallocation of pension fund assets investments towards low risk investments, mainly oriented to domestic investments, especially in the OECD countries (Antolin and Stewart, 2009). In other countries, it has been shown that exchange rate appreciation led to an increase in the value of private pension fund assets (Watson, 2010).

As such, it is important to know the value of pension fund assets as reducing their value influences, on the one hand, their solvency, and the accumulated amounts in the insured persons' accounts, on the other hand.

Considering the various factors which influence the private pension fund assets, in terms of investments made, in the present study we have selected some of them and we determined the extent to which they influence or not the net assets of private pension funds, separately for each of the two components, privately-administered pension funds (2nd Pillar) and voluntary pension funds (3rd Pillar).

3. DATA DESCRIPTION USED FOR METHODOLOGY

Since July 2012, depending on the degree of total risk, a private pension fund can be classified in the following categories¹: a) conservative private pension fund, with a risk degree below 10% inclusively, a fund that until the emergence of the new rules was classified as low risk funds; b) balanced private pension fund, with a risk degree between 10% exclusively and 25% inclusively, prior to July 2012, being employed as a balanced risk fund; c) dynamic private pension fund, with a risk degree between 25% exclusively and 50% inclusively, being classified as a high risk funds.

In Romania, in late July 2012, for the private pension funds, the 2nd and the 3rd pillar, records were listing the following indicators (Newsletter, CSSPP, July 2012, year V, no. 7/2012):

- the existence of 9 pension funds in the 2nd pillar, divided into two risk categories according to the investments undertaken: balanced pension funds (8 funds) and dynamic pension funds (one single fund) and 11 pension funds in the 3rd pillar, divided into two risk categories: balanced pension funds (9 funds) and dynamic pension funds (2 funds);

- a total of 5.67 million participants in private pension funds, the 2nd pillar, up by 0.22% compared to June 2012 and by 6.22% compared to July 2011, and 278,838 participants in funds voluntary pension, the 3rd pillar, with 0.77% more than in June 2012 and 14.39% over the level recorded in the same month in 2011;

- net assets of private pension funds, the 2nd pillar, were worth 1,796.92 million (8,210.83 million lei), an increase of 3.66% compared to June 2012 and 47.93% higher than in July 2011 (up by 37.28% compared to the euro currency), and 115.47 million Euros (527.63 million lei), up by 3.01% compared to June 2012 and by 33.88% compared with July 2011 (24.24% compared to the euro currency);

¹ Norm no. 11/2011 on investment and valuation of private pension funds assets, published in the Official Gazette, Part I no. 8 of 05/01/2012

- of the total net assets of private pension funds, 93.17% were placed in the country, and the remaining 6.83% abroad, and of those of voluntary pension funds, 92.54% were placed in the country and the remaining 7.46% abroad.

The *influence factors* selected for analysis consider the destinations of the investments of pension fund assets (Moț, 2010) and are tested for each of the two components of the private pension system. These factors are: the *interest levels*: the interest rate on loans, the interest rate on deposits and the interest rate monetary policy; the *exchange rate*, which influences the value of foreign currency assets to the moment of their evaluation; the *stock market*; the value of equity investments, for the 2nd pillar, was representing at the end of July 2012, 10.55% of total fund assets, and for the 3rd pillar, approximately 13.56% of the total fund assets.

The data used for analysis is provided by the Commission of the Private Pension System Supervision, the National Bank of Romania and the Bucharest Stock Exchange for the period May 2008 - July 2012, for private pension funds, the 2nd pillar, and June 2007 - July 2012, for voluntary pension funds, the 3rd pillar.

Based on these influence factors, the variables used to test the statistical correlations are:

- the net assets of private pension funds, the 2nd pillar, and the voluntary pension funds, the 3rd pillar, as dependent variables;

- the lei/euro exchange rate, the interest rate on loans, the interest rate on deposits, the monetary policy interest rate, and the BET-C index value, as independent variables tested for each of the two dependent variables.

To identify the best combination of independent variables that explain the variation in each dependent variable, we analyzed the statistical correlation between these variables, using the multiple linear regression equation in the statistical program SPSS (Statistical Package for the Social Sciences) by which the independent variables are entered into the model one by one, in order of their importance, at every step testing whether the corresponding regression coefficient is zero.

4. RESULTS AND DISCUSSION

The analysis of the correlation between the dependent variable, the net asset value and the independent variables is presented in Table no. 1 for private pension funds, 2nd pillar, and Table no. 2 for pension funds, 3rd pillar. Hence, for each regression model is given the correlation coefficient (R), the determination ratio (R Square) and the standard error.

Model Summary for private pension funds, 2nd pillar

Table no. 1

Model	R Correlation coefficient	R Square Report of determination	Adjusted R Square	Std. Error of the Estimate Standard error	Durbin-Watson Coefficient
1	0,979 ^a	0,958	0,953	514,31104	0,320

a. Predictors: (Constant), BET-C index, leu/euro exchange rate, monetary policy interest rate, interest rate on loans, interest rate on deposits

Dependent variable: Net assets of private pension funds, 2nd pillar

As can be seen from Table no. 1, all independent variables were entered into the model, for which the correlation coefficient, R, is very high (0.979) and a determination

ratio, *R Square*, of 0.958. The correlation coefficient means that there is a strong correlation at the model level, and the determination ratio shows that 95.8% of the variation in "net assets of private pension funds" is explained by the variation of the five independent variables entered into the model.

Model Summary for voluntary pension funds, 3rd pillar

Table no. 2

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0,979 ^a	0,958	0,955	35423,14595	
2	0,979 ^b	0,958	0,955	35113,32738	
3	0,979 ^c	0,958	0,956	35063,42272	0,837

a. Predictors: (Constant), exchange rate, BET-C index, monetary policy interest rate, interest rate on loans, interest rate on deposits

b. Predictors: (Constant), exchange rate, BET-C index, monetary policy interest rate, interest rate on loans

c. Predictors: (Constant) BET-C index, monetary policy interest rate, interest rate on loans

Dependent variable: Net assets of voluntary pension funds, 3rd pillar

It is noted that the interpretation of the three models of correlation resulted is as follows:

- model 1 shows the dependence between the *net assets of the voluntary pension funds and all five independent variables, the exchange rate, the BET-C index, the monetary policy interest rate, the interest rate on loans, the interest rate on deposits*, for which is obtained a correlation coefficient of 0.979 and a determination ratio of 0.958. These values show that there is a direct correlation between variables, strong enough, because 95.8% of the variation in total net assets is explained due to the change of the five variables;

- in model 2, an independent variable is eliminated, that is the *interest rate on deposits*, for which the same coefficient of correlation is obtained, and the same determination ratio as in the previous model, but the standard error of the estimate decreases from 35,423.1 to 35,113.3;

- model 3 removes from the equation of the model 2 the second independent variable, namely the exchange rate, leading to the same value of the correlation coefficient of 0.979, and a determination ratio of 0.958, for which the standard error of the estimate decreases from 35,113.3 to 35,063.4. As such, through this model is explained 95.8% of the change in total net assets of voluntary pension funds on behalf of three independent variables, namely, *the BET-C index, the monetary policy interest rate and the interest rates on loans* for which the standard error of the estimate is the lowest.

The regression coefficients calculated for each of the two private pension funds are presented in Table no. 3 and Table no. 4.

Regression coefficients for the net assets of private pension funds, 2nd pillar

Table no. 3

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1	(Constant)	20516,891	888,875		23,082	0,000
	lei/euro Exchange rate	0,024	0,012	0,065	2,067	0,045

Interest rate on loans	-755,252	97,214	-0,742	-7,769	0,000
Interest rate on deposits	287,732	144,566	0,334	1,990	0,053
Monetary policy interest rate	-811,441	171,163	-0,618	-4,741	0,000
BET-C index	-0,868	0,177	-0,272	-4,918	0,000

a. Dependent variable: Net assets of private pension funds, 2nd pillar

The *t* test and the *Sig.* value (significance threshold) serve to test the regression coefficients, i.e. the hypothesis that between the dependent variable and the independent variables there is a significant relationship. It is noted that the only model obtained, the significance threshold, *Sig.*, takes values below those allowed, of 0.05, only four of the five independent variables entered into the model, namely the *lei/euro exchange rate*, the *interest rate on loans*, the *monetary policy interest rate* and the *BET-C index* value, while for the variable *interest rate on deposits*, its value exceeds the maximum allowed of 0.05, which allows us to reject the hypothesis that between the interest rate on loans and the net assets of private pension funds there is a significant relationship, this one being rejected from the model.

Based on the calculated coefficients, which are found in column B of Table no. 2, the linear multiple regression model, identified for the variables studied, is presented in equation no. 1.

$$Y = 20516,891 + 0,024 \cdot X_1 - 755,252 \cdot X_2 - 811,441 \cdot X_3 - 0,868 \cdot X_4 \quad (1)$$

where:

Y – net assets of private pension funds, 2nd pillar;

X₁ – lei/euro exchange;

X₂ – interest rate on loans;

X₃ – monetary policy interest rate;

X₄ – BET-C index.

Regression coefficients for the net assets of voluntary pension funds, 3rd pillar

Table no. 4

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1344883,869	54436,468		24,706	0,000
Exchange rate	0,733	0,807	0,025	0,908	0,368
Interest rate on loans	-37330,421	6679,962	-0,483	-5,588	0,000
Interest rate on deposits	-644,961	7553,164	-0,010	-0,085	0,932
Monetary policy interest rate	-39967,975	7804,029	-0,404	-5,121	0,000
BET-C index	-84,391	4,334	-0,738	-19,473	0,000
2 (Constant)	1347584,046	43922,569		30,681	0,000

	Exchange rate	0,731	0,800	0,025	0,914	0,365
	Interest rate on loans	-37715,800	4881,664	-0,488	-7,726	0,000
	Monetary policy interest rate	-40403,007	5859,907	-0,409	-6,895	0,000
	BET-C index	-84,186	3,575	-0,736	-23,550	0,000
3	(Constant)	1356401,139	42789,037		31,700	0,000
	Interest rate on loans	-38223,442	4843,067	-0,495	-7,892	0,000
	Monetary policy interest rate	-40334,093	5851,094	-0,408	-6,893	0,000
	BET-C index	-84,661	3,532	-0,740	-23,972	0,000

a. Dependent Variable: net_assets_3rd pillar

In the study undertaken, t-test takes high values for each variable, and Sig takes null values, allowing us to reject the hypothesis that between the variables analyzed there is no significant relationship, meaning small errors that could arise from random measurements.

We note that the influence of the three selected variables on the net asset value of the voluntary pension fund is very good (Sig.=0), for each dependent variable, which eliminates the *risk of non-colinearity*.

Based on the calculated coefficients, which are found in column B of Table no. 4 the linear multiple regression model identified for the variables studied is presented in the equation no. 2.

$$Y = 1.356.401,139 - 38.223,44 \cdot X_1 - 40.334,093 \cdot X_2 - 84,661 \cdot X_3 \quad (2)$$

where:

Y – total net assets of voluntary pension funds;

X₁ – interest rate on loans;

X₂ – monetary policy interest rate;

X₃ – BET-C index.

5. CONCLUSION

The purpose of this paper is to provide an assessment of the impact of certain influence factors on the value of the assets of private pension funds in Romania, based on statistical methods and a range of data from the establishment of each private pension pillar until end of July 2012. This is done using the multiple linear regression equation that allows the estimation of the total net asset value of private pension funds in terms of the variables selected in the model for each component of private pensions.

The *interpretation of the coefficients in the obtained equation* (equation no. 1), reveals that, based on data analyzed for the period May 2008 - July 2012, for a short time horizon, *for the private pension funds, the 2nd pillar*, the following correlations take place:

- if the value of the lei/euro exchange rate increases by one point, the total net assets value increases by 24 thousand;
- if the interest rate on loans increases by one percent, the total net assets value decreases by 755,252 thousand lei;

- if the monetary policy interest rate increases by one percent, the total net assets value decreases by 811,441 thousand lei;
- if the BET-C index increases by one point, the total net assets value decreases by 868 thousand lei.

For the voluntary pension funds, the 3rd pillar, the interpretation of the coefficients of the equation obtained (equation no. 2) reveals that, based on data analyzed for the period June 2007 - July 2012, the following correlations take place:

- if the interest rate on loans increases by one percent, the total net assets value decreased by 38,223.44 thousand lei;
- if the monetary policy interest rate increases by one percent, the total net asset value decreases by 40,334.093 thousand lei.
- if the BET-C index increases by one point, the total net asset value decreases by 84.661 thousand lei.

Knowing the variation in net assets of private pension funds is especially important, primarily through their effects on the increase or decrease in value of investments invested in insured persons' accounts, while maintaining unchanged their contributions, and, therefore, the results obtained in these placements.

Comparing the analyzed factors influences on the value of private and voluntary pension fund assets, we can see that the evolution of the exchange rate, the interest rate on loans, the monetary policy interest rate and the BET-C index greatly affect the private pension fund assets, the 2nd pillar, while in the case of voluntary pension funds, the 3rd pillar, only the influence of the interest rates on loans, the monetary policy interest rate and the BET-C occurs, also in the sense of reduction of the value of their assets, but in a slower pace than in private pension funds. The exchange rate, which affects the private pension fund assets, in an upwards trend, has no influence on the voluntary pension funds, and the interest rate on deposits does not influence the development of private pension fund assets, or those voluntary.

Furthermore, ***the analysis undertaken for the same influence factors, during the establishments of funds and by the end of 2010***, has revealed the following results²:

- *for private pension funds, the 2nd pillar*, only the evolution of the exchange rate and the monetary policy interest rate influences the assets of these pension funds, in an upward trend, under the influence of one point increase in the lei/euro exchange rate, and in a downward trend, under the influence of one percent growth in the monetary policy interest rate. The evolution of the interest rate on loans, the interest rate on deposits and the stock market index, BET-C, did not affect the private pension fund assets, although shares had a significant percentage, of over 14%, in the total investment of private pension fund assets. Compared to the current time of analysis, we see that these variables affect in the same way the pension fund assets, and to them were added the influence of the interest rate on loans and the BET-C index, in terms of reduction of the pension fund assets;

- *for the voluntary pension funds, the 3rd pillar*, the evolution of the exchange rate, the interest rates on deposits, the monetary policy interest rates and the BET-C index variation greatly affect the voluntary pension fund assets, meaning that an increase in the interest rates on deposits, the monetary policy interest rate and the BET-C index

² A synthesis of these comparisons was presented at the International Conference "Sustainable Development and Economic and Social Welfare in the European Context", Bucharest, 07.10.2011, National Institute of Economic Research "Costin C. Kirițescu", with the paper "*The influence of certain factors on the value of net assets of private pension funds and voluntary pension funds in Romania*"

influenced, by the end of 2010, in a downwards trend, the net asset of the voluntary pension funds, while the exchange rate changes caused a slight increase in the voluntary pension fund assets. At that point in time, the evolution of the interest rate on loans was not affecting the voluntary pension fund assets. At the moment July 2012, the interest rate on deposits does not show any influence on the value of the voluntary pension fund assets, instead, there is an influence of the interest rate on loans. The variations of the monetary policy interest rate and the BET-C index affect in the same way, namely reducing the value of the voluntary pension fund assets, and changes in exchange rates do not directly affect the value of the voluntary pension fund assets.

Therefore, to offset the effect of the decrease in the net assets of the private pension funds, the 2nd pillar and the 3rd pillar, a mix of their investments should be developed, on a short time horizon, dynamic and adaptable to influence factors changes. Thus, new opportunities for obtaining better returns for pension funds and prevent the decrease of policyholders' contributions to these pension funds would be created.

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