Correlation Analysis between Performances of the Privately Managed Pension Funds and their Asset Investment Allocation in Romania

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Abstract: The main objective of this paper is to determine in what extent the performances of the privately managed pension funds in Romania, second pillar, are influenced by the investment allocation of their total net assets, in order to improve that performances. The research methodology consists in testing seven variables - as dependent variables, in relation with the average weighted rate of profit of all privately managed pension funds, second pillar – as independent variable, considering their investment allocation: bank deposits, government securities, municipal bonds, corporate bonds, supranational bonds, shares and undertakings for Collective Investment in Transferable Securities – UCITS, by means of the multiple linear regression method. The conclusion is that, for privately managed funds, the second pillar, there is a strong correlation between their average weighted rate of profit and the investment allocations of their assets. On a short-term time horizon, the performances of the privately managed pension funds are influenced negatively by the bank deposits, government securities, and supranational bonds and in a positive way by the municipal bonds, corporate bonds, shares and undertakings for Collective Investment in Transferable Securities – UCITS.

1. INTRODUCTION

Economic and financial crisis which is manifested at the international level has considerable reduced the value of private pension assets in most countries "…by around 20-25% on average according to the latest OECD figures" (Antolin and Stewart, 2009).

Besides this major problems of global crisis, pension systems around the world face with specific difficulties which will increase for the coming years, namely, demographic trends of aging population while reducing birth rate, increase of the average lifespan, inflation, rising cost for the post-active period, early retirement, increase of life quality, and, not least, reducing dependency rate (respectively fewer contributors and an increased number of retired persons). In Romania, about 19.2% of the total population is over 60 years and in 2030, studies show that its share will climb at 22% (CSSPP, 2007).

Based on these difficulties, "private pensions need to diversify the sources of income at retirement and, as such, they complement public pensions" (Antolin and Stewart, 2009).

As organization, besides the public pension component (first pillar), the Romanian pension system also includes the ***private pension system***, with its two pillars: the ***second pillar, pilonul II***, which represents the *privately managed mandatory component*, known as *privately managed pension funds,* a pillar launched in May 2008; and the ***third pillar,*** which *represents the privately managed facultative component,* known as *facultative pension funds,* a pillar launched in May 2007.

Having into consideration the structure of all privately managed pension funds in Romania, in this study we will test in which extent their performances are affected or not by every form of investment and what is the causality relationship.

We are taking into consideration that „Once a set of asset classes has been defined, it is important to determine the exposures of each component of an investor's overall portfolio to movements in their returns. Such information can be aggregated to determine the investor's overall effective asset mix. If it does not conform to the desired mix, appropriate alterations can then be made" (Sharpe, 1992).

2. CHARACTERISTICS OF PRIVATE PENSION SYSTEM IN ROMANIA

The system of privately managed pensions becomes a ***compulsory*** system for the individuals newly entered on the work market who are aged up to 35 years and remains ***optional*** for those who are aged between 35 and 45 years, who are already insured and contribute to the public pension system.

The system of privately managed pensions indicates a ***pension scheme*** implemented by the law which involves a system of terms, conditions and rules according to which, the manager invests the pension fund assets in order to provide private pensions to the contributors.

The compulsory component of private pensions, the second pillar, stirs up a series of discussions on international level, as, against the economic crisis background, certain States have no longer complied with the initial pension reform pattern, and we mention here countries from the Central and Eastern Europe adopting certain adjustments of contributions to the pension second pillar.

In Romania, the legal provision on contributions to the privately managed pension funds indicates an amount of 2% of the individual contribution to the public system of pensions for the first year of collecting the contributions, starting from May 2008, following an annual increase of 0.5 percent points, till reaching 6% within the following eight years (till 2016). Unfortunately, Romania did not succeed in complying with this legal provision, the increase being achieved only for the year 2009. During 2010, the contribution registered the same level, that of 2.5%, following an increase of 3% in 2011.

The contributor has the right to a private pension if all the retirement requirements are met for the limit of age specific to the public system of pensions. The pension rights cannot be lower than the value of paid contributions, adjusted with the price consumption index, to which liquid asset transfers are added and transfer penalties and commission payments are deducted.

Overall, the assessment of privately managed pension fund performance may be undertaken by means of an index defined as the ***weighted average rate of profitability of all privately managed pension funds*** which, according to the laws currently in force (General Rule no 7/2010), represents the sum of the products between the annualized rate

of profitability of each pension fund and the average size of the pension fund for the total amount of privately managed pension funds, on a given period of time.

PPSSC monthly publishes data concerning the profitability of privately managed pension funds, distinctively reflecting: the weighted average rate of profitability of all optional pension funds for the last 24 months; the rate of profitability of each optional pension funds for the last 24 months; the rate of minimum profitability of all funds.

If the rate of profitability of a privately managed pension fund is inferior to the rate of minimum profit of all pension funds from Romania considered for two sequential quarters, the manager dealing with that pension fund will be submitted to the measure consisting in special supervision, and if this situation persists for 4 sequential quarters, PPSSC is entitled to withdraw the manager's authorization and to enforce the procedure relying on special management

At the initiation of the system, there were 18 privately managed pension funds, then, there were 14 when having completed the contributor selection and, presently, there 9 funds, namely (according to the Private Pension System Supervisory Commission, Statisitcal Data, June 30th, 2011):

- Alico pension fund belonging to Alico;
- Aripi pension fund belonging to Generali;
- AZT Viitorul Tău pension fund, managed by Allianz-Ţiriac Private Pensions;
- BCR pension fund which belongs to BCR PENSIONS;
- BRD pension funds, BRD as manager;
- EUREKO pension fund, managed by EUREKO;
- ING pension fund, ING PENSIONS as manager;
- Pensia Viva pension fund belonging to Aviva;
- Vital pension fund which belongs to Aegon manager.

Concerning the *investments* deriving from the assets of private pension funds, as it is recommended on international level, they are completed considering certain prudential rules enforced by the law, according to the risk range specific to each fund. Except for one single pension fund administered by Generali, registering a high level of risk, the other 8 pension funds indicate an average level of risk.

Private pension fund assets are invested inconformity with certain **prudential rules** imposed by the PPSSC. For the optional pension funds, the investment of their assets is performed according to the following prudential rules (art. 23 of Law 411/2004 concerning privately managed pension funds, republished in December, 2010):

a) it should be undertaken to the contributors' and beneficiaries' interest, in a way meant to provide funds security, quality, liquidity and profitability using instruments transacted on a regulated and monitored market;

b) investments using derived financial instruments are allowed only if they contribute to the risk diminution or facilitate the efficient asset management;

c) assets are diversified in an appropriate way meant to avoid the excessive reliance on a certain asset, issuer or group of entities and to prevent risk intensification on the amount of assets.

Each private pension fund manager establishes his/her own policy regarding the investment of fund assets according to the law and complying with its maximum constrains (art. 24 and 25 of Law 411/2004 concerning privately managed pension funds, republished in December, 2010), as they are synthesized in Table no 1.

Constrains concerning the way of investing privately managed pension fund assets - pillar II

Table no 1.

Potential ways of investong the assets	Maximum limit of the total value of pension fund assets %
Instruments of the monetary market, here including accounts and ROL deposits opened to a bank	20
State bonds issued by the Romanian Ministry of Public Finances, issued by European Union Member States or belonging to the European Economic Area - SEE	70
Bonds and other transferable securities issued by the authorities of the local public service in Romania or in European Union Member States or belonging to the European Economic Area SEE	30
Securities transacted on regulated and monitored markets from Romania, European Union Member States or belonging to the European Economic Area SEE	50
State bonds and other transferable securities issued by third States	15
Bonds and other transferable securities transacted on regulated and monitored markets, issued by the authorities of the local public service from third States	10
Bonds and other transferable securities issued by non-governmental foreign bodies, provided that these instruments are rated on authorized stock markets and fulfill rating requirements	5
Participation bonds issued by bodies charged with the collective investment in transferable securities, from Romania or from other countries	5

Source: adaptation from Law no 411/2004 concerning privately managed pension funds, republished in December 2010, art. 24, Official Journal no. 482 from 18th of July 2007, version completed and amended on December 10th, 2010, http://www.csspp.ro/uploads/files/legea-411-2004-vs-10-12-2010_iuw5.pdf

The main indices assessing privately managed pension funds, the second pillar, crucial for this study, according to the last statements of PPSSC (Private Pension System Supervisory Commission, Statistical data regarding Pillar II market, http://www.csspp.ro/evolutie-indicatori/) are, as it follows:

- the presence of 9 active pension funds, divided into two risk categories according to the investments performed: average risk funds (8 funds) and high risk funds (a single fund);

- the net assets estimated to 1,200 million euros (5,373.84 million lei) registered an increase of almost 24% as compared to December 2010 and of 3.6% compared to the previous month; during the analyzed period, July 2010 – June 2011, the net assets increased with 59%;

- the weighted rate of profitability for all privately managed pension funds was of 13.1776%, running lower as compared to the end of July 2010 (the first month considered for the calculation of the rate of profit), while it was almost 16% higher or almost double than the rate of minimum profit of 6.5048%, calculated for the funds registering an average level of risk and of 5.2039, for the high risk fund;

-the annualized rate of profit of each privately managed pension fund varies between 9.6954 and 13.9718%, for the funds with an average level of risk and indicates a value of 14.2143%, for the only high risk fund existing on the market for this component, designated as Wings.

The rate of profitability of privately managed pension funds is assessed for the last 24 months previous to the calculation date. As all the 9 privately managed pension funds currently existing on the market were introduced on May 2008, then, the first reports concerning the rate of profit appeared only in July 2010. Therefore, for the analysis, we dispose of a set of 12 remarks corresponding to the period July 2010 - June 2011 (Private Pension System Supervisory Commission, Statistical data regarding Pillar II market).

The following variables have been used for testing statistical correlations:

-        *average weighted rate of profit of all privately managed pension funds*, as dependent variable (its values for the analyzed period, July 2010 – June 2011, are indicated in Annex no 1);

-        *investments of privately managed pension fund assets*, for the same given period, on different investment categories, namely: bank deposits, government securities, municipal bonds, corporate bonds, supranational bonds, shares, undertakings of collective investment in transferable securities – UCITS – titles of participation, as independent variables (values indicated in Annex no 2).

Therefore, according to Annex no 2, the structure of portfolios corresponding to privately managed pension funds, at the end of June 2011, is the following:

- Government securities: 66.28% from the total value of fund assets;
- Supranational bonds: 1.30% from the total value of fund assets;
- Municipal bonds: 1.04% from the total value of fund assets;
- Corporate bonds: 8.37% from the total value of fund assets;
- Bank deposits: 8.68% from the total value of fund assets;
- Shares: 13.31% from the total value of fund assets;
- UCITS - titles of participation: 0.92% from the total value of fund assets.

In order to identify the best combination between the independent variables, meant to explain the variation of the dependent variable, we have analyzed the statistical correlation between these variables applying the equation of multiple linear regression within the statistical software SPSS (Statistical Package for the Social Sciences), by means of which the independent variables are introduced in the model, all together at the same time, following to be removed those registering no statistical significance.

3. RESULTS AND DISCUSSION

According to the analysis of the correlation between the dependent variable, the average weighted rate of profit of all privately managed pension funds, and the independent variables: bank deposits, government securities, municipal bonds, corporate bonds, supranational bonds, shares, UCITS – titles of participation, processing the data by means of the SPSS software, we achieve the indices, as revealed in Table no 2.

Considering Table no 2, it results one signle pattern (no independent variable being removed) which has determined the multiple linear regression model, the value of the correlation coefficient (R), the value of the determination report (R Square) and the standard error.

Table no 2.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.977[a]	0.955	0.876	0.3397118

a. Predictors: (Constant), UCITS - titles of participation, Shares, Municipal bonds, Supranational bonds, Government securities, Bank deposits, Corporate bonds
b. Dependent Variable: average weighted rate of profit

The model presents the reliance between the *average weighted rate of profit of all privately managed pension funds* and the independent variables considered for the analysis, namely, *UCITS – titles of participation, bank deposits, corporate bonds, supranational bonds, municipal bonds, government securities and shares,* for which the correlation coefficient is 0.977 and the determination report is 0.955. These values confirms the existence of a direct correlation between the analyzed variables which is very strong due to the fact that 95.5% of the fluctuation of the average weighted rate of profit of privately managed pension funds is determined by the modifications of all independent variables.

The regression coefficients calculated for each of the three models are illustrated in table no 3.

Table no 3
Regression coefficients for the dependent variable, net assets of privately administered pension funds

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 (Constant)	40.865	30.678		1.332	0.254		
Bank deposits	-0.262	0.348	-0.360	-0.753	0.493	0.049	20.218
Government securities	-0.443	0.336	-0.538	-1.318	0.258	0.068	14.780
Municipal bonds	0.781	1.161	0.121	0.672	0.538	0.347	2.885
Corporate bonds	0.479	0.268	0.913	1.784	0.149	0.043	23.206
Supranational bonds	-0.793	1.719	-0.132	-0.462	0.668	0.138	7.252
Shares	0.121	0.435	0.200	0.279	0.794	0.022	45.333
UCITS - titles of participation	-1.574	1.461	-0.185	-1.077	0.342	0.383	2.608

a. Dependent Variable: average weighted rate of profit

Considering the coefficients expressed in the column B of the table no 3, the equation no 1 presents the linear model of multiple regression identified for the studied variables.

$$Y = -0.443 \cdot X_1 + 0.781 \cdot X_2 + 0.479 \cdot X_3 - 0.793 \cdot X_4 - 1.574 X_5 - 0.262 X_6 + 0.121 X_7 + 40.865$$
(1)

Where: Y – average weighted rate of profit of privately managed pension funds;
X_1 – investments in government securities;
X_2 – investments in municipal bonds;
X_3 – investments in corporate bonds;
X_4 – investments in supranational bonds;
X_5 – investments in UCITS – titles of participation;
X_6 – investments in bank deposits;

X_7 – investments in shares.

4. CONCLUSIONS

The achieved equation of multiple linear regression allows a clear image of the tendency of investing the total amount of net assets of privately managed pension funds according the influence of the five variables, selected in the model, on their performances.

The interpretation of the coefficients deriving from the equation (equation no 1) reveals the fact that, taking into account all data analyzed for the period July 2010 – June 2011, on a short-time horizon, the following correlations are manifested:

- If the investments in government securities determine an increase with one percent, the average weighted rate of profit of privately managed pension funds decreases with 0.443%;
- If the investments in municipal bonds increase with one percent, the average weighted rate of profit of privately managed pension funds increases with 0.781%;
- If the investments in corporate bonds increase with one percent, the average weighted rate of profit of privately managed pension funds increases with 0.479%;
- If the investments in supranational bonds increase with one percent, the average weighted rate of profit of privately managed pension funds decreases with 0.793%;
- If the investments in UCITS – titles of participation increase with one percent, the average weighted rate of profit of privately managed pension funds decreases with 1.574%;
- If the investments in bank deposits increase with one percent, the average weighted rate of profit of privately managed pension funds decreases with 0.262%;
- If the investments in shares increase with one percent, the average weighted rate of profit of privately managed pension funds increases with 0.121%.

According to this study, one should consider the fact that, on a short-time horizon, a markup of *investments in government securities, supranational bonds, UCITS – titles of participation and bank deposits* will determine a diminution of the average weighted rate of profit of privately managed pension funds, while an enhancement of the *investments in municipal bonds, corporate bonds and shares* generates an increase of the average weighted rate of profit of privately managed pension funds, an effect which should be neutralized through a potential reallocation of pension fund investment towards investments providing better benefits.

Acknowledgments

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ANNEX 1

Evolution of representative indices of privately managed pension funds in Romania, second pillar

Period	Net asset value (mil. lei)	Average weighted rate of profit of all private pension funds (%)*
Year 2010		
July	3379.40	15.9928
August	3379.40	15.637
September	3236.30	15.8687
October	4030.70	16.5206
November	4152.40	15.0509
December	4331.91	15.0991
Year 2011		
January	4.501.99	15.0473
February	4.682.88	14.831
March	4.884.65	14.7395
April	5.059.34	14.1045
May	5.184.74	13.7588
June	5.373.84	13.1776

Data are calculated after 2 years from the creation of privately managed pension funds
Source: Data processing based on those published on the site of PPSSC, http://www.csspp.ro/evolutie-indicatori/, statistical department – series of data

ANNEX 2

Evolution of investments of privately managed pension funds in Romania, second pillar
- % of total assets -

Period	Bank deposits	Government securities	Municipal bonds	Corporate bonds	Supranational bonds	Shares	OPCVM – participation titles
Year 2010							
July	8.11	64.52	0.91	13.52	1.86	10.3	0.62
August	8.26	65.10	0.86	13.06	1.79	10.41	0.71
Sept.	9.33	64.27	1.32	12.77	1.73	11.52	0.76
Oct.	8.35	63.57	1.30	12.45	1.80	11.7	0.83
Nov .	8.36	64.51	1.22	12.13	1.77	11.42	0.93
Dec.	7.18	66.35	1.27	11.00	1.70	12.2	0.52
Year 2011							
Jan.	7.10	65.99	1.25	10.49	1.49	13.7	0.74
Febr.	6.40	66.26	1.22	9.80	1.5	14.23	0.75
March	4.68	67.14	1.20	9.31	1.71	14.89	0.74
April	5.90	66.32	1.16	9.04	1.67	14.51	0.72
May	7.08	67.04	1.08	8.79	1.62	13.49	0.72
June	8.68	66.28	1.04	8.37	1.30	13.31	0.92

Undertakings of collective investment in transferable securities, hereinafter OPCVM
Source: Data processing based on those published on the site of PPSSC, http://www.csspp.ro/evolutie-indicatori/, statistical department – series of data