The Impact of the Pension Scheme on the Economic Growth of the Country

DRITA LUZO, ZAMIRA VEIZI
Department of Accounting and Finance,
"Eqrem Çabej" University,
Rruga "Studenti", Lagjia "18 Shtatori", Gjirokastra,
ALBANIA

Abstract: - Albania's pension system faces many challenges and many problems to be addressed. In 2014 the next reform was undertaken in order to facilitate the pension scheme. The literature of the field is not consolidated in the case of Albania, which is mainly due to the short history of poor management and statistics of interest. Foreign literature is a great source of consultation, mainly for reforming the pension system as well as the various schools for social protection.

The study aims to shed light on the assumption that the pension system is affected by economic growth. The linear multifactor model is used for the study hypothesis, where it was shown that the pension system affects the country's economic growth. The main components of the scheme are the income from the scheme, the expenses, and funding from outside the pension scheme. Statistical analysis showed that only the expenditures from the pension scheme indicate the economic growth of the country. Considering the lack of data and time series after these 10 years of study, due to pension scheme problems and the pandemic period, the findings of our study constitute a valuable contribution to the other interested people and researchers in this field, who want to make further investigations and study analysis, financial institutions and governors.

Key-Words: - pension system, sustainability, income from the scheme, expenses of the scheme, funding from the state budget, linear multifactor regression model, EViews9.

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1 Introduction

The process of Albania's transition from the centralized system to the free market system and the adoption of the new system has had and continues to have great difficulties. Many of these difficulties consist of decision-making and the application of various reforms in the economic, social, and political fields. Although many reforms have been successful, reforms in the pension system have left much to be desired. One of the challenges that this system must face is undoubtedly the aging of the population, which causes a pronounced disorder in the dependency ratio. The demographic change brings into question the type of reform that this system should follow, the parametric reforms, i.e. the continuation of the PAYG system or the transition to a fully funded system, [1], according to the proposals of the World Bank.

Although the pension system in Albania has undergone three important reforms, in 1993, 2002, and 2005, according to [2], these reforms are not sufficient to avoid a crisis in the following years considering the demographic trend of the population.

The variant proposed by the World Bank, [3], the introduction of the multi-column system, also applied in many European countries that have managed to avoid the problem of an aging population, seems suitable for many decades to come.

In our country, the pension system can be considered to suffer from some acute problems, which require appropriate addressing.

Social security and especially pensions have been a hot topic for a long time in academic, political, and social circles. The issues under discussion are so diverse and important that despite all the great attention paid to pensions, a new paper always finds a place and is welcome.

Despite the fact that there are numerous foreign works on the effects of the pension scheme on various factors of the economy, Albania has its uniqueness in this scheme.

The aim of this study is the use of a linear multifactor regression model to see the impact of the pension scheme on the economic growth of the country through three main factors: income, expenses of the scheme, and the way it is financed.

Considering the lack of data and time series, due to pension scheme problems and the pandemic period, the findings of our 10 years study constitute a valuable contribution to the other interested people and researchers in this field, who want to make further investigations and study analysis, financial institutions and governors.

The rest of the paper is structured as follows;
-Section 2 presents the literature review of many researchers that have contributed to the field of pensions, providing evidence on their studies and conclusions and comparing them with the problems our system faces.
-Section 3 contains the purpose and study objective of the paper.
-Section 4 presents the methodology, the main hypothesis in a research question form, and three sub-hypotheses in help of the main raised hypothesis.
-Section 5 presents data analysis and findings using the linear multifactor model with the help of the statistical software EViews9.
-Section 6 presents the conclusions of this study for the period taken into consideration and serves as a good opportunity for future researchers interested in this field and decision-making institutions.
-Section 7 is for the limitations of the study.

The many problems that the pension scheme has had over the years, encouraged us to study this topic and look at the effects that this scheme brings to the economic growth of the country and its sustainability.

I emphasize that pensions are a very acute issue in the economy of our country.

2 Literature Review

Many authors and researchers have contributed to pensions as a means of providing for and supporting elderly people. In order to summarize these contributions, it is appropriate to elaborate this treatment according to its origin: social security, a brief history of the evolution of social security, and pensions in particular. So a review of the theoretical and empirical literature related to the issue of pensions also brings an exposition of the most significant contributions in the field of pensions from both foreign authors and Albanian researchers. We begin this literature review with a brief history of pensions.

Pensions are a product of social security. Social security is the "food" of pensions, since social security funds pensions. Based on this connection, it is natural to consider social security as a proxy for pensions themselves. The book "Theory and Practice of Insurance", [4], has played a special and irreplaceable role in terms of condensing literature materials for consultation. On the other hand, [5], [6], are among the rare Albanian authors who have approached this topic and their work is very valuable in terms of summarizing the movements that have been made by different states in terms of reforming the social security systems, as well as in the plan of the analysis of pensions and their connection with other factors and dimensions of the economy. The study, [7], provides a valuable comparative analysis of the pension systems in three countries of South-Eastern Europe, including Albania. These are the most prominent Albanian authors dedicated to our field of study.

A very interesting discussion is brought by, [8], in "Social Security Systems and the Neo-Liberal Challenge". He tries to present the challenge that social security schemes have to meet the standards approved by the World Labor Organization.

According to the German researcher, [9], in his full discussion in "The Privatization and Marketization of Pensions in Europe: A Double Transformation Facing the Crisis", the adjustments that have been made in the field of pensions in European countries, have taken into account the side of privatization and that of orientation towards the market (marketization). Moreover, the study, [10], has also contributed to the creation of an exposition on the history of the insurance system in Russia. Russia currently implements the pay-as-you-go model supported by the World Bank. Similarly, the study, [11], presents the problems of the Russian social insurance system by grouping them into two dimensions: the problem of the aging population as well as the problem of financing the scheme.

The study, [12], estimated an aggregate savings function for Sweden, including as regressors the time lag of savings, income, and inflation. The study, [13], began their theoretical discussion by assuming that total wealth (including social security wealth) is proportional to last year's net labor income and, [14], in his studies emphasizes the fact that there are differences in social security and people savings.

In contrast to the analyses discussed so far, [15], applies a consumption function approach to test the effects of the social security rate.

3 The purpose and Study Objectives

The purpose of this paper is to analyze especially the impact of the pension scheme on the economic growth of the country. In view of the above purpose, the paper has its main objective.

The general **objective** of this paper is to verify whether the pension scheme in Albania affects or not the economic growth of the country.

4 Methodology and Study Hypotheses

The study, [16], approached the hypothesis of whether pensions convey impacts on productivity, savings, and economic growth.

The empirical model that has been taken into account in this paper intends to capture the impact of the pension system on the structural factors of the economy. According to, [16], the pension system affects the improvement of the factor of productivity, savings, and growth of the economy. Even for the latter, the author states that about a quarter of the growth of the economy can be dedicated to the contribution of pension reform.

The method for the investigation and analysis of the raised objective is according to the empirical approach. The model used in this study to test the hypothesis is a multifactor linear econometric model, which means that to explain a dependent variable many independent variables are taken into consideration.

Let the linear multifactor model be given,

$$Y = \beta_0 + \sum_{i=1}^{p} \beta_i X_i + \varepsilon \quad (1)$$

Or otherwise written

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_p X_p + \varepsilon \quad (2)$$

where:

- **Y** is the dependent, endogenous, internal, explained variable on the left side of the equation.
- $\mathbf{X_i}$ are independent, exogenous, external, and explanatory variables, on the right side of the equation, in total there are p variables.
- $\boldsymbol{\beta_i}$ are the parameters or coefficients, which show and interpret the relationship that the dependent variable has with the independent one. In other words, β is the measure of the increase in the dependent variable (Y) when i^t variable increases by one unit (X_i). Further, if X_1 increases by one unit, then Y is also expected to increase by β_1 units, and so on for all variables. The sign of the beta coefficient indicates the direction of the relationship between the dependent and independent variable. When the sign is positive, then the relationship between the two variables is correct (so as one increases, we expect the other to increase as well). Meanwhile, when the sign is negative, it means that the relationship between the variables is in the opposite direction (so when the independent variable increases, we expect the dependent variable to decrease). Since there are several independent or determining variables, then we have several parameters/coefficients. Each represents the respective variable and is not interpreted for the other variables.
- $\boldsymbol{\beta_0}$ is the free constant and in most cases has no economic interpretation while the other **β** are the coefficients next to the independent factors and can also be known as partial regressors;
- **ε** represents all other factors whose effects have not been taken into consideration. E as explained above represents all other factors not considered in the relevant model and is otherwise known as the residual term or the error term. When we study economic phenomena through empirical approaches, special attention should be paid to the attributes of this component of the model. Initially, the residual term must be normally distributed.

A regression model is not appropriate if its residual term is not normally distributed. The autocorrelation of the error term for economic growth is also taken into consideration. A regression model to be considered appropriate must be supported by Fisher's F test and pass these error term tests.

The method for evaluating the parameters or coefficients of such a model is that of the smallest squares (**least square method**).

It works on the principle of finding the relationship that gives the least squared distance between the actual observed values and the model line. The parameters of the multifactor regression model are those that are interpreted in this analysis. The model parameters are otherwise known as regression coefficients, βi.

For the case of this study, the linear multifactor model is of the form:

$$G = f(E, I, F) + \varepsilon \Rightarrow \quad (3)$$

$$G = \beta_0 + \beta_1 \times E + \beta_2 \times I + \beta_3 \times F + \varepsilon \Rightarrow \quad (4)$$

where economic **growth** is marked with: **G**
pension **expenses** with: **E**
income from the pension scheme with: **I**
and **funding from outside the pension scheme** or funding from the state budget with: **F**

In our study, **economic growth** (G) is the dependent variable; while the pension **expenses (E)**, **income** from the pension scheme **(I),** and **funding** from outside the pension scheme **(F**) are independent variables.
Epsilon (ε) expresses the error term of the model.
The linear multifactor model is a sufficient tool to answer the main hypothesis and its sub-hypotheses.

From hypothesis to variables

Based on the treatment of the literature of the field and the researchers' considerations about the phenomenon, the following hypothesis is deduced:

Hypothesis: The pension system in Albania helps and supports economic growth.
This hypothesis can be formulated in the form of the question:
Does the pension system support the economic growth of the country?
This formulation brings together four different components: pension scheme income, pension expenditure, non-scheme funding, and economic growth. The fact that there are several components within the same hypothesis makes it necessary to design several other sub-hypotheses, the control of which provides answers to the raised hypothesis. Thus the sub-hypotheses are segmented as follows:
Sub-hypotheses:

1. Income from the pension scheme affects economic growth in Albania. (I)
2. Pension expenses affect economic growth in Albania. (E)
3. Funding from outside the pension scheme affects economic growth in Albania. (F)

These three sub-hypotheses will help us to answer the main hypothesis.

The investigation and observation of these sub-hypotheses will make it possible to derive a final answer to the main hypothesis of the paper. The study and control of the hypothesis by examining the sub-hypotheses allow us to formulate the answer to the hypothesis according to the specifics resulting from the sub-hypotheses. In other words, if the economic growth turns out to be affected only by pension expenditures, then the answer to the main hypothesis will be the version: the pension system affects economic growth through the expenditure component, but not through the income component and financing from outside the scheme.

It is important to emphasize that with this hypothesis we try to look at the impact that the pension system has on economic growth and not to determine which are the factors affecting the economic growth of the country.

5 Data Analysis and Findings

Economic growth is the dependent factor for the factors or components of the insurance system. Real economic growth on an annual basis is obtained from, [17], [18], and it is expressed as a percentage. Income from the pension scheme is measured in billions of ALL on an annual basis and it is provided by the, [19], Social Insurance Institute. (S.S.I). Annual expenses for pensions are in billions of ALL and are received by S.S.I., [19], Funding from outside the pension scheme means funding that originates from the state budget in response to the deficit or gap of the pension scheme.

Table 1. Data description and their source

Factors	Abbreviation	Description	Nature	Source
Economic Growth	*G*	Real growth on an annual basis of GDP expressed in (%)	**%**	INSTAT, Bank of Albania
Income from the scheme	*I*	Annual income from the pension scheme	Billion ALL	S.S.I*
Expenditures for pensions	*E*	Annual expenditures for the pension scheme	Billion ALL	S.S.I*
Financing from outside the scheme	*F*	Financing level outside the scheme origination from the state budget	Billion ALL	S.S.I*

** The data on the pension system has been obtained from S.S.I.*

Table 2. Descriptive statistics of variables

Indicators	G	I	E	F
Average	0.042	42.35	67.36	25.57
Median	0.046	43.30	66.72	24.28
Maximum	0.075	61.22	96.79	40.07
Minimum	0.004	28.51	40.30	11.16
St. Dev.	0.021	9.25	18.72	9.56
Skewness	-0.270	0.35	0.08	0.00
Kurtosis	1.973	2.59	1.73	1.70
Jarque-Bera	0.673	0.327	0.817	0.843
Probability	0.714	0.849	0.665	0.656
Sum	0.502	508.14	808.31	306.87
Sum of squares	0.005	941.70	3855.46	1005.68
Observations	12	12	12	12

Source: author's calculations

This issue is written about the descriptive analysis of the data of the paper, to familiarize the reader with the reality of the research problem. Descriptive statistics are considered to be one of the most useful elements that fulfill this requirement. Descriptive statistics summarize a range of information about a given variable. Thus, part of descriptive statistics is the mean, median, minimum and maximum, standard deviation, coefficient of asymmetry and Kurtosis, coefficient of normal distribution, and a number of data for the variable. Let's take a look at each of these statistics in turn.

The mean is one of the most commonly used indicators when talking about the generalization of the sample in its population. It is calculated through the formula,

$$\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n} = \frac{x_1 + x_2 + \ldots + x_n}{n} \quad (5)$$

In this paper, the data are all distributed over time, otherwise known as time series, therefore, the average calculated for the time series is the simple one and not the weighted average.

The median is a type of average that only requires the data to be ordered from smallest to largest. The median of a time series is exactly the midpoint of the data when it is ordered from smallest to largest.

The **minimum** is the smallest value of a variable or time series, while the maximum is its largest value.

The standard deviation is another type of mean, which is calculated similarly to the mean formula. Specifically,

$$\sigma_x = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n}} = \sqrt{\frac{(x_1 - \bar{x})^2 + (x_2 - \bar{x})^2 + \ldots + (x_n - \bar{x})^2}{n}} \quad (6)$$

The coefficient of asymmetry is a statistic that informs on the asymmetry of the distribution of the variable compared to the normal distribution. It is calculated in this way,

$$A_x = \frac{1}{n}\sum_{i=1}^{n}\left(\frac{x_i - \bar{x}}{\sigma\sqrt{\frac{n-1}{n}}}\right)^3 \quad (7)$$

The calculation of the asymmetry coefficient includes the third moment and does not stop only at the first or second moment. The first moment is related to the mean, the second moment is related to the variance and standard deviation, and the third moment is related to the skewness of the series.

Following the coefficient of asymmetry, the coefficient of **Kurtosis** provides information on the distribution of extreme values of a variable, compared to the normal distribution.

$$K_x = \frac{1}{n}\sum_{i=1}^{n}\left(\frac{x_i - \bar{x}}{\sigma\sqrt{\frac{n-1}{n}}}\right)^4 \quad (8)$$

The Jarque-Bera coefficient is a statistical test of whether the series is normally distributed or not. This statistic measures the difference between the Skewness and Kurtosis of the series with the normal distribution. It is calculated,

$$Jarque - Bera_x = \frac{n}{6}\left(A_x^2 + \frac{(K_x - 3)^2}{4}\right) \quad (9)$$

If we take each of the variables we will see that for the case of economic growth (G), the average is about 4% with a maximum value of 7.5% and a standard deviation of about 2.1%. The Jarque-Bera criterion indicates that economic growth is normally distributed. On the other hand, the income variable (I) for pensions has an average of 42.35 billion ALL, with a maximum of 61.22 billion ALL and with a normal distribution, since the Jarque-Bera criterion results in 0.33 with a probability of 0.85. Expenditures for pensions, (E) have an average of 67.4 billion ALL with a maximum of 96.79 billion

ALL, with a minimum of 40.3 billion ALL. Likewise, pension expenses have a normal distribution. This variable reflects a much higher volatility compared to the other variables and this is reported by the standard deviation, which is 18.72, where the same statistical indicator for the other variables is lower. Meanwhile, financing from outside the scheme (F) is presented in the last column of the following table. Its average value is 25.57 billion ALL, and the maximum value is 40.07 billion ALL and this coincides with the year 2013. This variable is also normally distributed.

In addition to the analysis of the description, it is also interesting to look at the progress of the variables over the years. For this thing, the presentation by means of the following figures helps us. What stands out the most is that the variables of the pension system have an increasing tendency from year to year. The exception here is variable F, which has reflected a decrease for the last year. Next to each figure, information is provided in the form of boxes for quartiles, mean, and median. Expenditure on pensions reflects a clear and stable upward trend from year to year, addressing the alarm regarding the difficulties of managing the pension scheme. The continuous increase in expenses means an increase in the obligation of the scheme to the beneficiaries of the pension scheme. This is due to the increase in the number of beneficiaries from year to year and the fact that beneficiaries receive pension increases from time to time. On the other side of the balance lies the income from the pension scheme. Thus, the increase in expenses has been accompanied by an increase in income. Especially during the last year presented, an out-of-trend increase in income has been noticed, defining a narrowing in the gap between expenses and income within the pension scheme.

Economic growth has a different trend than the indicators of the pension system. Until 2008, economic growth experienced a steady and continuous rise, but after this year, economic growth experienced a decline with a return in 2014. In the time span from 2003 to 2014, the economic growth values for 2013 and 2014 are considered by box plot as outliers. The multifactor regression model does nothing but attempt to formulate a relationship that may exist between economic growth and other indicators of the pension system. In other words, the model tends to show that the figures of these variables have a common behavior and that they are related to each other. In this paper, the data are distributed over time, otherwise known as time series.

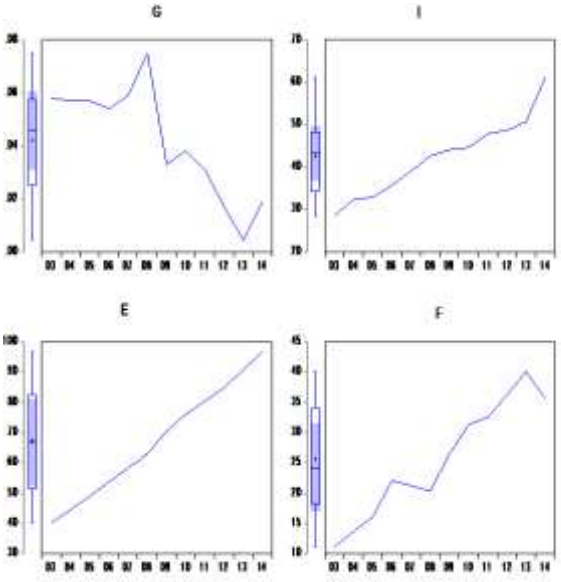

Fig. 1: Time series trend

Table 3. Time series of the variables in focus of this study

Year	Economic growth	Income	Expenses	Funding outside the scheme
	G	*I*	*E*	*F*
2003	0.0580	28.50800	40.30369	11.16307
2004	0.0570	32.30410	44.50286	13.64157
2005	0.0570	32.89208	49.00474	16.12006
2006	0.0540	35.64271	53.78254	22.06770
2007	0.0590	39.10185	58.34577	21.20785
2008	0.0750	42.56100	62.90900	20.34800
2009	0.0330	44.03800	70.54000	26.50200
2010	0.0380	44.65800	76.01000	31.35200
2011	0.0310	47.87900	80.42800	32.54900
2012	0.0170	48.60400	84.88100	36.27700
2013	0.0044	50.73800	90.80700	40.06900
2014	0.0190	61.21600	96.79100	35.57500

* *The data on the pension system has been obtained from S.S.I*

The model that was built and passed all statistical inference (statistical diagnosis) tests is as follows. From the point of view of the mathematical formulation, the model would be written:

$$G = f(E, I, F) + \varepsilon \Rightarrow \quad (10)$$

$$G = \beta_0 + \beta_1 \times E + \beta_2 \times I + \beta_3 \times F + \varepsilon \Rightarrow \quad (11)$$

$$G = \underset{\substack{0.017\\2.146}}{0.038} - \underset{\substack{0.0039\\-1.99}}{0.008} \times E + \underset{\substack{0.0023\\0.457}}{0.001} \times I - \underset{\substack{0.002\\-1.05}}{0.02} \times F \quad (12)$$

The part in parentheses shows the standard error of the corresponding coefficient as well as the actual value of the student's criterion. The first figure is the standard error and the second figure indicates the Student's criterion. This is a more complete way of reading the model as we are provided with a lot of details and information on it.

Meanwhile, from the point of view of the EViews9 program language, the model would be reported as in Table 4 (APPENDIX).

This representation obtained by the computer program also provides information for other basic tests of the model. From these tests, the level of R-squared (R-squared), which results in a level of 0.67, should be highlighted. R-square is known as the coefficient of determination and means the measure of the variation of economic growth (G) from the other variables included in the model, which in our case are expenses (E), income (I), and financing outside the scheme (F). The level of 0.67 is a significant measure when we consider all the submissions we have made about the complexity of the relationship of economic growth with other factors in an economy. The 0.67 level is interpreted: about 67% of the variation in economic growth is explained by the variation of the independent factors we are considering.

Next to the coefficient of determination, is Fisher's statistic (F-statistic) and the probability of this statistic (F-statistic). In simple words, the Fisher statistic provides information about whether the R-squared level is significant or not. Since the probability of this statistic results in the level of 0.039, then we can state that the model is significant, which means that the considered factors are important in determining the variation of economic growth. The level of 0.039 reads: the coefficient of determination is significant with a confidence level of 96.1%. This level of confidence is very satisfying. If this test was greater than 0.05 (or 95% confidence level), then discussion of the model would be stopped and another model would be tried.

The Durbin-Watson statistic reflects information on the model's error term. For our model, this statistic results above the 2.9 level, and for this level, we do not have enough information and this forces us to do further in-depth investigations later by means of the autocorrelation test of the error term (APPENDIX, Table 5 and Table 6).

Series control deals with the fact that the built model must reflect the appropriate and necessary characteristics to represent a suitable model from a mathematical-statistical point of view.

In light of these rigorous rules, each of the series used in our study was checked for:

• The normal distribution of the series – I touched on this elsewhere above, where we identified whether or not the series used in modeling are normally distributed. For this, the Jarque-Bera test as well as the Skewness and Kurtosis indicators comes to our aid. The Skewness and Kurtosis indicators provide information on how skewed the series under consideration are compared to a normally distributed series.

• Autocorrelation of the series. The use of time-distributed variables (time series) in econometric modeling must meet some preliminary conditions. This stage becomes even more difficult when the time series has the behavior of a continuous cycle. Specifically, the series of economic growth (G) manifests a trend as noted in the description of the series. Such an analysis contributes to finding the horizon of the time series cycle according to, [20]. Autocorrelation analysis, as shown in the accompanying table, reports that economic growth suffers from first-order autocorrelation. The partial correlation column informs this by illustrating it with asterisks (*) that have crossed the dotted line. The other orders of autocorrelation are within the range marked by the dots, implying that we must operate with the first-order autoregressive. Table 5 and Table 6 (APPENDIX), presents the summary of the autocorrelation test for economic growth considering autocorrelation at the level, i.e. no difference.

This test or control was done for all the series taken into consideration and the same result was obtained for expenses (E), together with income (I) and financing outside the scheme (F).

Now we have to look at the importance of each variable in relation to economic growth. Besides the importance of the variables, the direction of the relationship between economic growth (G) and other variables is of special interest. That is read from the sign of the beta coefficient. Let's deal with them one by one.

The free constant results at the level of 0.038 and as explained, we do not interpret it.

- **Expenditures for pensions (E)** reported a negative coefficient of -0.008. This means: with an increase of one unit in pension expenses, economic growth is expected to decrease by 0.008 units (or increase by -0.008 units). The importance of the variable is reported by the corresponding probability, which in this case is calculated at the level of 0.0869 or 8.69%. However, it is acceptable to consider as important that variable whose probability is calculated to a smaller extent than 0.1 or 10%. Thus, pension spending is a variable that determines the negative impact on economic growth and it is important in explaining its variation.

- **Income (I)** results with a positive coefficient at the level of 0.001. A positive coefficient (beta>0) means a positive relationship between pension scheme income and economic growth. This supports the logic that an increase in income from the pension scheme comes as a result of two factors: **a)** an increase in the amount of contribution per contributor and **b)** an increase in the number of contributors to the scheme. On the other hand, the importance of this variable in explaining economic growth was calculated at the level of 0.6616, which means that it is not significant. So the income from the pension scheme turns out to be not important in explaining the variation of economic growth, they do not play a role in determining the progress or fluctuations of economic growth.

- **Financing outside the scheme (F)** results in a negative coefficient of -0.002. Here we need to make a small prefix. Financing outside the scheme is calculated as the difference between expenses and income, otherwise, it expresses the gap between these two indicators. Taking these results into consideration, we can say that this variable determines in itself an impact composed of expenses and income from the pension scheme together.

The closer the values predicted by the model are to the actual values of the dependent variable (G), the more accurate and appropriate the model is. The chart nr.2 below will help us to illustrate this fact. The line with the name (g) represents the economic growth according to its true values, while the line with the name (GF) represents the economic growth according to the forecast or according to the estimation of the model. What we notice is that the values provided by the model deviate very little from the true value of economic growth. There are some points where the value of the model (GF) matches that of the economy's growth (g), and the deviation of the points that do not match perfectly is very small. The largest value of the deviation or inaccuracy of the model is recorded for the year 2010. For this year, the model calculates a smaller value for economic growth by comparing it with the real one. This shows that the multifactor model conceived and built to estimate economic growth through the components of the pension system is suitable as it is supported by economic logic, presents good qualities in relation to mathematical rigor, and reflects high accuracy in relation to the forecast. So the components of the pension system (expenditures for pension beneficiaries as an important factor) can be used to predict the values of economic growth as they are important for the latter.

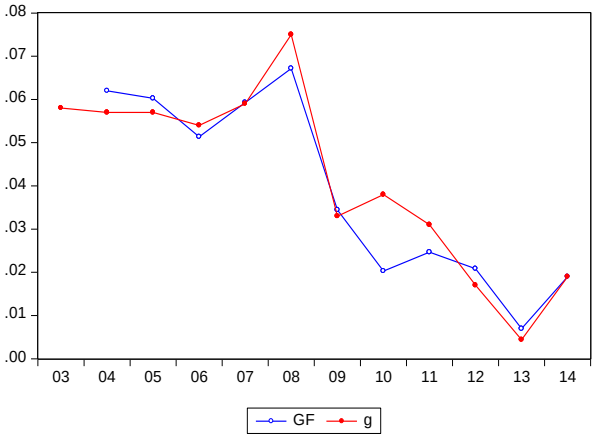

Fig. 2: Graphic presentation of the forecast compared to the current values of economic growth

6 Conclusions

- **In conclusion,** we can say that the pension system participates in the determination of economic growth by means of the expenditure factor for pension beneficiaries.
- Other factors such as income from the pension scheme as well as financing from outside the scheme do not play a role in determining economic growth. In this way, we have answered the main hypothesis of this paper.
- The hypothesis that income from the pension scheme affects economic growth in Albania is rejected. The model did not support this formulation.
- The same conclusion results for the case of the hypothesis regarding the impact of funding from outside the pension scheme on economic growth in Albania.
- On the other hand, the built empirical model accepts the hypothesis that pension expenses affect economic growth in Albania.

- As a result of accepting even one of the sub-hypotheses, the main hypothesis is accepted. So, based on the detailed analysis and rigorously following the empirical procedures**, we conclude that the pension system in Albania helps in determining and supporting the country's economic growth.**
- Decision-makers and policy-makers should take into consideration and pay special attention to the fact that the continuous increase in pension expenses harms the country's economic growth.
- Therefore, belonging to, [12], the alternative of orienting the pension market towards the private sector (second and third columns) is of great importance, because it not only relieves the impasse of the pension scheme but also "facilitates" economic growth. In light of this argument, it is claimed that in the future, the pension system should be oriented toward the private sector. This system will have a great influence on the economic growth of the country.
- In the prism of income and financing from the state budget, according to, [21], [22], it is important to carefully observe the issue of the number of contributors as well as the issue of the number of contributions.
- The multifactor model conceived and built to evaluate economic growth through the components of the pension system is suitable as it is supported by economic logic, presents good qualities in relation to mathematical rigor, and reflects high accuracy in relation to the forecast. So the components of the pension system (expenditures for pension beneficiaries as an important factor) can be used to predict the values of economic growth as they are important for the latter.
- This study constitutes a valuable database and it is important for further studies and all researchers interested in the field of pensions.

7 Limitations of the Study

This work has its limitations in terms of data collection and time series.

The study is my unique and original Ph.D. work, never been published before. The time series are from the years 2003-2014, as I have emphasized during the paper.

After these years of study, the pension system in our country has faced many problems and great difficulty in collecting consecutive time series. The worldwide Covid-19 pandemic emphasized, even more, the gap in this scheme as well as the difficulty of data collection.

The study of the pension system in Albania faces many challenges and difficulties. Due to the implementation of a multifactor linear model, which was used in our study, there is a need to find and examine statistical data that are spread through the years. The biggest difficulty is related to the small database of the factors under study. This is a very big obstacle for both qualitative and quantitative studies, especially for the latter.

I emphasize that this study will serve as valuable literature for future researchers interested in the field of pensions.

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Contribution of Individual Authors to the Creation of a Scientific Article (Ghostwriting Policy)

- Drita Luzo was responsible for the literature review, methodology, and supervision.
- Zamira Veizi was responsible for gathering the data from different sources of information and processed them with the statistical software EViews9 and edited the paper.

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Conflict of Interest

The authors have no conflict of interest to declare.

APPENDIX

Table 4. Multifactorial regression model

Dependent Variable: D(G)
Method: Least Squares
Sample (adjusted): 2004 2014
Included observations: 11 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.037629	0.017535	2.146021	0.0690
D(E)	-0.007718	0.003879	-1.989820	0.0869
D(I)	0.001059	0.002317	0.456937	0.6616
D(F)	-0.002112	0.002014	-1.049064	0.3290
R-squared	**0.674569**	Mean dependent var		-0.003545
Adjusted R-squared	0.535099	S.D. dependent var		0.015996
S.E. of regression	0.010907	Akaike info criterion		-5.923628
Sum squared resid	0.000833	Schwarz criterion		-5.778938
Log likelihood	36.57995	Hannan-Quinn criter.		-6.014834
F-statistic	**4.836650**	**Durbin-Watson stat**		**2.935110**
Prob(F-statistic)	**0.039531**			

Table 5. Autocorrelation in the level for economic growth

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
. |***** |	. |***** |	1	0.653	0.653	6.5111	0.011
. |***. |	. | . |	2	0.394	-0.056	9.1242	0.010
. |* . |	. | . |	3	0.207	-0.050	9.9219	0.019
. | . |	. *| . |	4	0.001	-0.174	9.9220	0.042
. **| . |	. **| . |	5	-0.250	-0.289	11.425	0.044
.***| . |	. *| . |	6	-0.412	-0.174	16.186	0.013
. **| . |	. |** . |	7	-0.289	0.262	18.995	0.008
. **| . |	. *| . |	8	-0.278	-0.149	22.251	0.004
. **| . |	. *| . |	9	-0.262	-0.085	26.099	0.002
. *| . |	. *| . |	10	-0.190	-0.081	29.119	0.001
. *| . |	. | . |	11	-0.074	-0.037	30.028	0.002

Table 6. First-order autocorrelation for economic growth

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
.***| . |	.***| . |	1	-0.375	-0.375	2.0157	0.156
. *| . |	. **| . |	2	-0.092	-0.271	2.1487	0.342
. |* . |	. | . |	3	0.132	-0.017	2.4598	0.483
. | . |	. |* . |	4	0.073	0.132	2.5695	0.632
.***| . |	.***| . |	5	-0.404	-0.362	6.4585	0.264
. |* . |	. **| . |	6	0.110	-0.268	6.8036	0.339
. | . |	. *| . |	7	0.041	-0.196	6.8630	0.443
. | . |	. | . |	8	-0.019	-0.030	6.8804	0.550
. | . |	. | . |	9	0.016	0.066	6.8990	0.648
. | . |	. *| . |	10	0.018	-0.163	6.9456	0.731