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MACROECONOMIC FACTORS THAT GENERATE FISCAL RISK IN ROMANIA[3]

Fiscal risk, under the form of unforeseen increases in public expenditures, can be quantified by the (increasing) government debt level. This study aims to identify the interdependencies between government debt, the number of people active on the labour market (labour force), the level of the average salary in the economy, the harmonized index of consumer prices and the RON-EURO exchange rate. The main objective is thus to assess which ones of the last four variables influence in the short and long run the government debt and constitute a fiscal risk. The analysis is focused on Romania, using quarterly data starting from the 1st quarter of the year 2000 and up to the 2nd quarter of 2021, the applied methodology being VECM. The most important conclusions show that changes in the level of the average salary and active population are significant and influence the government debt both in the short and long run and they can constitute in this regard fiscal risk determinants, while HICP as an inflation indicator or HICP do not exert significant impact on government debt either on short term or long term. While the average salary constantly exerts a significant and positive influence on the government debt, the change in the active population leads to a change of the same sign in the government debt in the short term, but of the opposite sign in the long term. The main recommendation for the government that derives from the results of the study is to implement measures to increase the active population and increase the degree of employment, in order to decrease the pressure on the government debt and fiscal risks, both in the short term and long-term. This is in line with the results of numerous studies that show that the decrease in the active population, combined with the rise in retired people, lead to increasing indebtedness.
Keywords: fiscal risk; government debt; demographic tendencies; average salary
JEL: H63; J01; H50

1. Introduction

There are studies whose empirical results show that the evolution of government debt is influenced in the same way by the evolution of social assistance expenditures (Porumboiu & Brezeanu, 2022). Through this article we aim to identify if there is an interaction between the

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government debt (*debt*), the number of people active on the labour market (*activepop*), the level of the average salary in the economy (*sal*), the harmonized index of consumer prices (*HICP*) and the RON-EURO exchange rate (*exchange*). The reasoning for which we consider it appropriate to estimate a VECM (vector error correction model) has foundations of macroeconomic logic, explained in the following, but it is also suggested by the typology of the series included in the analysis. This econometric model allows, in turn, the analysis of the impact on each variable used, determined by changes in the other variables, and quantifies the interdependencies between each of them. However, the main objective is to identify if and how much the number of active people, the average salary in the economy, the HICP or the RON-EUR exchange rate can lead to increases in the public debt, given the fact that an increase in the public debt represents a risk fiscal, a potential threat to macroeconomic sustainability.

The macroeconomic system is composed of components that evolve depending on the measures that are taken with impact on themselves but also depending on the changes of the others. For example, the public debt can be a consequence of some government measures that do not find their financing in tax revenues, but then it can itself constitute a determinant of the level of taxes and fees established, since the credit must be repaid.

The increase in government debt and the payment of the related interest can translate into a reduced ability to cover social expenses and expenses with the salaries of the budget workers, a fact that is quickly reflected in the level of the average salary in the economy and can also influence the number of people active on the labour market. A government debt accompanied by a budget deficit is most often the cause of adjustments to public spending, for example through reforms with an impact on administration spending, which are felt in the incomes of people employed by the state and even in the structure of the active population.

In the field of the labour market, governments propose to match vacant jobs with the existing labour force (a complex process, which involves accompanying the individual in the long term through education and training, for the acquisition of skills and even professional reprofiling). In this way, the appropriate placement of the active population is ensured, workers will obtain their own income and the need for financial support from the public authorities will decrease (social assistance expenses). Placement of the labour force implies the reduction of the number of unemployed beneficiaries and the increase of the number of employed people. Of course, the situation will generate positive consequences on the average salary in the economy.

The intervention of the state in the labour market by establishing minimum levels of salary income should be carried out with caution, always taking into account the ability of employers in the private sector to comply with the regulations without reducing the number of employees. Setting a higher level of the economy's minimum salary is a welcome measure for people employed on such a salary, but governments must ensure that this does not backfire on the state by increasing unemployment and social spending. We appreciate that the main objective of public policies on the labour market is to support the development of commercial companies that offer new jobs, to facilitate the access of the active population to vacant positions, to have a high level of employment and thus reduce the pressure on expenses public with social assistance.

The changes regarding the active population are in turn the effect of several factors, among which the demographic one deserves to be remembered as a priority. The low birth rate and the increasing life expectancy are the phenomena that determine the working population (people having the working age – from 15 to 64 years) in the long term and which also affect the active population (employed and unemployed population). If we also take into account the growing phenomenon of migration, we can say that the active population is fundamentally determined by three major demographic phenomena: "reducing mortality, reducing birth rates and external migration" (Rangelova & Bilyanski, 2019). The decrease in the number of employed people, against the background of the increase in the number of retired and jobless people, can lead to greater pressure on the component of social contributions of people who earn income. Net salaries are negatively influenced, so there will also be changes in the average salary in the economy. The decrease in the active population, against the background of the two mentioned demographic phenomena, will require the addition of social expenses from the governments, financing that could sometimes only be done through loans.

Part of the products and services that are sold, and even part of the salaries in Romania have as a reference point the EUR value at a given moment, the price being represented by the counter value in RON, paid in the national currency, but in fact also determined by the evolution the exchange rate. Also, the structure of Romania's government debt shows a well-defined component represented by loans in EUR currency. A possible change in the exchange rate translates into lower/higher interest costs for loans in EUR.

The specialized literature abounds in studies that quantify the impact of demographic changes on government debt, ex-ante analyses whose primary objective is to raise an alarm signal to public authorities that the situation can only be partially resolved through reforms and additional revenues (Afflatet, 2018). We therefore observe that there is a dynamic of the variables: the government debt, the active population, the average salary in the economy, and the complexity of the system is undoubtedly greater, given the correlations with other macroeconomic variables. The use of a VECM model is justified.

2. Literature Review

Among the variables included in the analysis, the specialized literature most often concludes that demographic factors are the ones that constitute fiscal risk and represent a vulnerability of long-term fiscal sustainability.

In 2009, amid the economic crisis, the International Monetary Fund stated that, in the conditions of increasing government debt and contingent liabilities, the main threat to fiscal solvency is the ageing population trend. Although the countries of reference at that time were advanced economies, as expected, this demographic problem extended to developing economies as well. The estimated solution to prevent a government debt boom was to reduce the level of government debt, spending and maintaining the level of taxes, in order to subsequently have available fiscal space.

Increasing life expectancy does not only mean that people are living longer, but that they can survive longer from diseases (Birg, 2015), and this reality of life entails increasing costs for

the healthcare system that has to treat them (Lee & Tuljapurkar, 1998). Yared (2019) shows that government debt fulfils three functions, as follows: it allows for lower taxation, it represents an asset of safe value and determines the efficient use of capital over time. The author raises the following fundamental question: does the fact that the use of the growing government debt is done in order to increase the social benefits of the population compensate for the risk it entails?

The way demographic phenomena affect the government debt of OECD countries has attracted the attention of authors since the end of the last century, against the background of the increase in life expectancy and the decrease in the birth rate. The fact that the working population is declining, while the number of elderly people is high, has been flagged as a challenge to the sustainability of public finances since 1995. Authors Jensen and Søren opined that, for intergenerational equity to exist, in periods when there is a significant labour force governments must focus on reducing the government debt so that, in times when the ageing population requires financial support, there is not a large burden on workers contributing to the social insurance fund. The two authors carry out an analysis regarding the sustainability of public finances and the possibilities of adjusting the tax rate, starting from the study of Blanchard, Chouraqui, Hagemann and Sartor (1990), in which the current tax rate is compared with the permanent one (calculated in such a way as to ensure the sustainability of public finances, the government debt to tend to 0, or at least at the time of projection to be lower than the current one). Under normal circumstances, a current tax rate that exceeds the permanent tax rate allows tax reduction, and vice versa. But Jensen and Søren show that the ageing population makes the decision to cut tax levels unsustainable and will actually lead to a more costly deferment of government debt service.

Other authors (Jensen & Søren, 1996; Balassone et al., 2009; Cecchetti et al., 2010) raised the issue of the burden that the ageing population can constitute on the government debt and sought to propose alternatives, but as observed relevant in repeated articles (Preston, 1984; Sinn & Silke, 2002; Auerbach, 2009), possible fiscal consolidation reforms with an impact on the elderly are all the more difficult to implement the larger their number, and implicitly, and their political decision-making power is more significant. Although the private pension system already operates in many countries, where the state only has the obligation to provide a minimum level of pension (more like subsistence), pensions are still a concern for industrial economies (Klyvienė, 2004).

The connection between the government debt and the active population is an obvious one: the interest payment is based on the tax revenues collected by the public authorities, where an essential place is occupied by labour taxation. People need a job, hence the rigidity of labour as a factor of production. According to Menguy (2020), from a fiscal point of view, this translates into greater efficiency in raising tax revenues by increasing labour taxation than by raising other types of taxes. The same author develops an econometric model applied to the euro states which confirms that states with a low level of labour taxation are those with a lower debt ratio. Because of the need to finance interest, states with high government debt have higher labour tax rates to meet their tax revenue targets. For employees, this means a lower net salary.

However, an unjustified level of taxes on labour can also generate undesirable consequences, such as increasing the unemployment rate and illegal work, that is, forms of tax evasion that reduce the level of budget receipts (Genschel, 2001). The same idea emerges from the recommendations made by Dieppe et al. (2015): to ensure economic growth in the medium term in countries with high government debt and an ageing population, fiscal consolidation requires prudent implementation, so as not to generate undesirable effects of decreasing labour supply.

The fact that demographic phenomena affect government debt derives from the following reasoning: starting from the last century, most European countries have used a system called PAYG (pay-as-you-go) to obtain pension funds, a system that is based on social contributions, determined by the number and salaries of active people. A larger pensionable population and a decline in the working population are driving governments to identify new sources of funding – even possibly borrowing. Precisely for this reason, the ageing of the population is a challenge for the sustainability of finances and a matter of inter-generational equity (Sánchez-Romero et al, 2019).

Empirical research with panel data models carried out on the Member States of the European Union proved that there is a correlation between the active population represented by young people who do not hold a job and macroeconomic conditions, in the sense that high government debt, low GDP growth and poor development of the construction sector are associated with a higher vacancy rate (Tomić, 2018). Hansson (2010) also explains with reference to the EU that against the background of increased mobility of capital and people, and in the context of an ageing population (he uses the example of Sweden), the use of the PAYG system proves to be inefficient and cannot be corrected by increasing the level of taxation of the work, but a possible source of financing the expenses with the elderly could be the increase in property taxation. The objective of identifying sustainable sources to cover these expenses results from the idea of not resorting to government debt to compensate for this imbalance between the active population and the population benefiting from social support. Bengtsson and Scott (2011) warn that it is unlikely that the problem of population ageing will be solved only by increasing taxation since employees have (well-founded) expectations that the evolution of labour productivity will be felt in the level of income and living conditions. Bongaarts (2004) even expects a reduction in pension 'generosity' to be inevitable.

Demmel and Keuschnigg (2000) opine that the alternative to the PAYG pension system and the accumulation of excessive government debt is the development of the private pension system, which would have a positive impact on the employment rate and capital accumulation.

Moreover, there are studies that show not only that government debt negatively influences the level of net income of the population, but even contributes to an unequal distribution of wealth (Chatzouz, 2020). Topal et al. (2018) show that the government debt Granger causes the unemployment rate, leads to an increase in the number of unemployed, as the unemployment rate also leads to an increase in the government debt. Farmer and Kuplen (2018) also confirm that higher government debt favours higher unemployment and slows the growth rate of GDP and the interest rate.

Regarding the studies carried out on this topic and the methodology used, we note the analysis by Afflatet (2018) which uses panel data for 18 European countries to identify whether demographic factors (number of unemployed, age structure of the population) have influenced the evolution of government debt. The regression results demonstrate that until 2015 the changes produced in the debt level were not mainly due to demographic factors, but this does not exclude the future influence they will exert, a study that also confirms empirical results previously obtained by Razin et al. in 2001, or Chen in 2004.

The study of Tanchev & Mose (2023) confirms the fact that government initiatives on the labour market to develop human capital, although they involve additional expenses, have measurable effects of increasing productivity and contribute to economic growth. However, the recommendation is that these increases in expenses should be done at a reasonable cost, since debt financing can translate into pressure on the economy and the private sector (in order to obtain tax revenues intended for reimbursement) and, in the long term, in a delay of economic development.

3. Methodology

Quarterly government debt (abbreviated *debt*) is, according to the European System of Accounts ESA 2010, the 'total gross debt at nominal value outstanding at the end of each quarter for the general government sector". The variable is expressed in million units of national currency, RON. The active population (*activepop*) concerns both employed and unemployed people, aged from 15 to 64 years, and it is synonymous to the labour force, in accordance with the definition provided by the International Labour Organization. The active population is expressed in thousands of persons. The average salary in the economy (*sal*) refers to the average quarterly amounts paid by employers to their employees, and it is expressed in the national currency, RON. The Harmonised Index of Consumer Prices (abbreviated *HICP*) is an "economic indicator that measures the change over time of the prices of consumer goods and services acquired by households" (definition provided by Eurostat) and constitutes an indicator for inflation. The variable is expressed as an index, for which the reference moment is represented by the first quarter of the year 2005. Finally, the exchange rate between RON and EUR (*exchange*) represents the rate at which one currency (RON) will be exchanged for another currency (EUR).

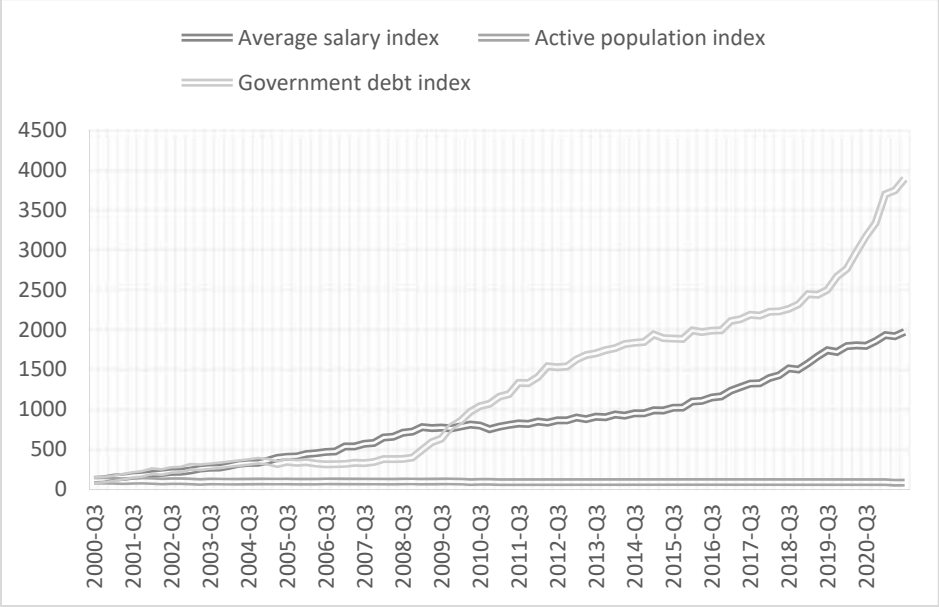
To proceed with the estimates for Romania, we used quarterly data starting from the 1st quarter of 2000 and up to the 2nd quarter of 2021, the data being mostly provided by the Eurostat database (for government debt, active population, HICP, exchange) and by the website of the Ministry of Labour (only the evolution of the average salary in the economy).We used log transformation for data, except for the exchange rate and the HICP.

Compared to the first quarter of 2000, the second quarter of 2021 shows very different values for the analysed variables, as follows: the active population is 19 percentage points lower, in absolute terms it is about 1.9 million people less for the workforce represented by employees and the unemployed. The average salary in the economy experienced gradual increases, reaching in 2021 a value 19 times higher than in 2000. The government debt increased gradually, reaching in 2003 a value three times that of 2000, and this value was somewhat

maintained at a similar level until 2008. Then, given the context of the financial crisis, the government debt increased, and the COVID-19 pandemic period caused that during 6 quarters (2020Q1 – 2021Q2) accumulate a surplus of government debt, equivalent to 9 times the value of the entire government debt from the year 2000.

The HICP had a gradual evolution, reaching in 2021 to have 4.66 times the value of the year 2000, which shows that inflation had a slower growth, there were no periods of inflationary boom. As for the RON-EUR exchange rate, it increased the least among all the other variables included in the study, compared to its own value from the year 2000. With an increase of 2.66 times compared to the year 2000, we can say that the exchange rate had a controlled flotation and therefore, even at first glance, it does not seem to constitute a fiscal risk.

Figure 1. The evolution of the analysed variables compared to their value from the year 2000, quarter I



Source: own representation using Eurostat and Romanian Ministry of Labour data.

4. Modelling and Findings

To check if there are links between the five variables that are included in the analysis, we started with the following hypotheses:

H1: l_debt = F(exchange, HICP, l_debt, l_activepop, l_sal)
H2: l_sal = F(exchange, HICP, l_debt, l_activepop, l_sal)
H3: l_activepop = F(exchange, HICP, l_debt, l_activepop, l_sal)
H4: HICP = F(exchange, HICP, l_debt, l_activepop, l_sal)
H5: exchange = F(exchange, HICP, l_debt, l_activepop, l_sal)

Table 1 includes the main statistical parameters of the variables included in the analysis:

Table 1. Descriptive statistics

	EXCHANGE	HICP	L_DEBT	L_ACTIVEPOP	L_SAL
Mean	3.994993	125.1977	11.60796	9.123588	7.073937
Median	4.257000	137.9650	11.92217	9.111310	7.269255
Maximum	4.924000	175.9800	13.17346	9.278064	8.169336
Minimum	1.850600	37.76000	9.511326	8.993986	5.187386
Std. Dev.	0.734462	37.38058	1.026696	0.057982	0.761393
Observations	86	86	86	86	86

Source: own results obtained through Eviews software

The correlation coefficients are presented in Table 2 and illustrate a strong correlation between the variables under analysis.

Table 2. Correlation matrix

	EXCHANGE	HICP	L_DEBT	L_ACTIVEPOP	L_SAL
EXCHANGE	1.000000	0.934750	0.925912	-0.888426	0.920761
HICP	0.934750	1.000000	0.970304	-0.881426	0.986515
L_DEBT	0.925912	0.970304	1.000000	-0.885611	0.945281
L_ACTIVEPOP	-0.888426	-0.881426	-0.885611	1.000000	-0.855317
L_SAL	0.920761	0.986515	0.945281	-0.855317	1.000000

Source: own results obtained through Eviews software.

To verify the stationarity of the series, we applied unit root tests. In order to determine whether the series are integrated of order 0, we used two unit root tests, both the Augmented Dickey-Fuller test and the Phillips-Perron test in Eviews.

The ADF test gave us a probability of 65% for government debt, 43% for the labour force, and 70% for the average salary (greater than 5%), which means that we will not reject the null hypothesis, so these series are non-stationary. As for the exchange rate and the HICP, the probabilities indicated by the test are less than 5%, so we will accept the null hypothesis that there is a unit root and the series are stationary. Similar results are also indicated by the PP test, except for the series corresponding to the average salary in the economy, which is suggested to be a stationary series (obtained probability of 0%).

Table 3. ADF-level stationarity test for the studied variables

Variable	exchange	l_debt	HICP	l_activepop	l_sal
Test critical values	t-statistic	t-statistic	t-statistic	t-statistic	t-statistic
ADF test statistic	-3.105720	-1.243046	-6.990468	-1.691584	-1.128088
1%	-3.510259	-3.511262	-3.509281	-3.513344	-3.513344
5%	-2.896346	-2.896779	-2.895924	-2.897678	-2.897678
10%	-2.585396	-2.585626	-2.585172	-2.586103	-2.586103
Interpretation	Stationary series	Non-stationary series	Stationary series	Non-stationary series	Non-stationary series

Source: own results obtained through Eviews software

Table 4. PP-level stationarity test for the studied variables

Variable	exchange	l_debt	HICP	l_activepop	l_sal
Test critical values	t-statistic	t-statistic	t-statistic	t-statistic	t-statistic
PP test statistic	-4.613771	-1.609957	-11.65858	-2.171072	-5.233594
1%	-3.509281	-3.509281	-3.509281	-3.509281	-3.509281
5%	-2.895924	-2.895924	-2.895924	-2.895924	-2.895924
10%	-2.585172	-2.585172	-2.585172	-2.585172	-2.585172
Interpretation	Stationary series	Non-stationary series	Stationary series	Non-stationary series	Stationary series

Source: own results obtained through Eviews software

Since the ADF test indicates three of the variables as non-stationary, we applied the first-order difference for them. We have obtained stationary series for all the variables in question, which are now integrated in the first order. Consequently, we expect the relationships between the variables under analysis to manifest themselves in the long run.

Table 5. ADF stationarity test - differences of the first order for the studied variables

Variable	exchange	l_debt	HICP	l_activepop	l_sal
Test critical values	t-statistic	t-statistic	t-statistic	t-statistic	t-statistic
ADF test statistic	-6.560735	-3.585188	-5.372754	-17.60305	-3.249879
1%	-3.510259	-3.511262	-3.510259	-3.511262	-3.513344
5%	-2.896346	-2.896779	-2.896346	-2.896779	-2.897678
10%	-2.585396	-2.585626	-2.585396	-2.585626	-2.586103
Interpretation	Stationary series	Stationary series	Stationary series	Stationary series	Stationary series

Source: own results obtained through Eviews software

Table 6. Stationarity test PP- differences of the first order for the studied variables

Variable	exchange	l_debt	HICP	l_activepop	l_sal
Test critical values	t-statistic	t-statistic	t-statistic	t-statistic	t-statistic
PP test statistic	-6.549692	-7.569184	-5.204739	-12.76910	-9.470411
1%	-3.510259	-3.510259	-3.510259	-3.510259	-3.510259
5%	-2.896346	-2.896346	-2.896346	-2.896346	-2.896346
10%	-2.585396	-2.585396	-2.585396	-2.585396	-2.585396
Interpretation	Stationary series	Stationary series	Stationary series	Stationary series	Stationary series

Source: own results obtained through Eviews software

Given the expert recommendation to use the Schwartz criterion for quarterly series that have more than 20 observations, we will take this into account to determine the number of lags of the model. According to this criterion, the optimal number of lags is 3.

Table 7. Criteria for determining the number of lags

Lag	LogL	LR (sequential modified LR test statistic)	FPE (Final prediction error)	AIC (Akaike information criterion)	SC (Schwarz information criterion)	HQ (Hannan-Quinn information criterion)
0	88.03907	NA	2.27e-05	-2.180489	-2.089846	-2.144203
1	472.3199	729.1483	1.50e-09	-11.80308	-11.44050	-11.65793
2	502.2979	54.57530	8.78e-10	-12.34097	-11.70647	-12.08697
3	529.8995	48.12578	5.47e-10	-12.81793	-11.91151*	-12.45508
4	541.1222	18.70448	5.19e-10	-12.87493	-11.69657	-12.40321
5	565.3879	38.57627	3.54e-10	-13.26636	-11.81607	-12.68578
6	576.1907	16.34269	3.42e-10	-13.31258	-11.59037	-12.62315
7	593.1593	24.36520*	2.84e-10*	-13.51690*	-11.52277	-12.71861*
8	601.4855	11.31506	2.95e-10	-13.49963	-11.23356	-12.59248

* indicates lag order selected by the criterion

Source: own results obtained through Eviews software

However, it must be taken into account that the macroeconomic variables are both stationary and non-stationary, which also implies checking the cointegration of the time series, in order to determine which estimate can be accepted.

Table 8. Cointegration test

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.365652	84.77993	69.81889	0.0020
At most 1	0.289998	47.00181	47.85613	0.0600
At most 2	0.104009	18.57533	29.79707	0.5238
At most 3	0.088938	9.459821	15.49471	0.3246
At most 4	0.020614	1.728802	3.841466	0.1886
Trace test indicates 1 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Source: own results obtained through Eviews software

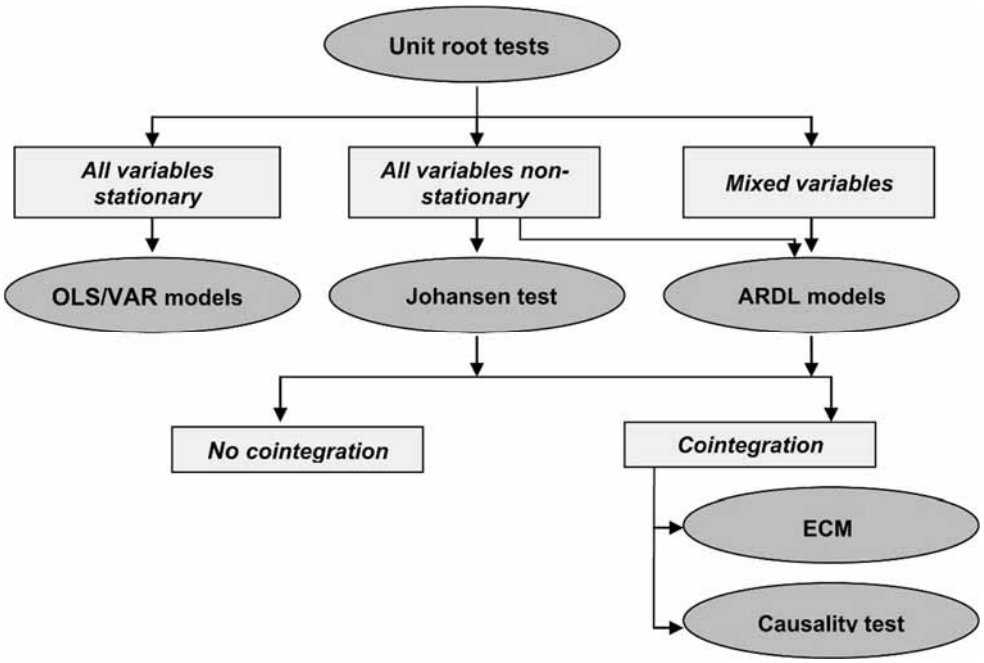
Table 9. The coefficients of the cointegration equation

1 Cointegrating Equation(s):		Log-likelihood	541.4410	
Normalized cointegrating coefficients (standard error in parentheses)				
L_DEBT	L_SAL	L_ACTIVEPOP	EXCHANGE	HICP
1.000000	1.993308	-6.072202	-0.875232	-0.076134
	(0.49530)	(4.76459)	(0.29863)	(0.01263)

Source: own results obtained through Eviews software

The fact that there is cointegration between the variables under analysis, and there are both stationary and non-stationary series, denotes that the VECM model can be estimated, as indicated by Shrestha, M.B & Bhatta, G.R. (2018).

Figure 2. Determination of the right model according to the specifics of the analysed series



Source: Shrestha, M.B & Bhatta, G.R. (2018)

The cointegration equation of the ECT considering debt as the interest variable, as announced in the objectives of the paper, and the long-term model obtained by running the VECM in Eviews is as follows:

$$\mathrm{ECT}_{t-1} = 1.000L_{DEBT(t-1)} + 2.234L_{WAGE(t-1)} - 5.580L_{ACTIVEPOP(t-1)} - 0.952EXCHANGE_{t-1} - 0.079HCPI_{t-1} + 37.331 \quad (1)$$

Therefore, in the long term, we note that the value of the average salary in the economy exerts a significant influence in the same direction on the government debt, while the active population exerts an influence in the opposite direction, but with a larger value impact. the economic foundation that explains these relationships is the following: the increase in the average salary in the economy also includes the salary level of budget workers, therefore, the increase in the average level would mean an increase in public expenses for the payment of employees employed by public institutions, hence an increased need to obtain income public, even by the instrumentality of indebtedness. On the other hand, the opposite relationship between the active population and long-term government debt confirms the fact that a growing labour force can generate additional sources of tax revenues and social contributions for the government, thus new public revenues that would decrease the need to obtain credits.

Compared to the other variables, the HICP and the exchange rate exert a less important influence on the public debt in the long run.

If we consider the *debt* as the target variable, we can say that in the short term, estimates show that the deviations of previous quarters from the long-term equilibrium are corrected in the current period at a speed of 0,8%. If we refer to *sal* as the main variable, the previous period deviations from the long run equilibrium are corrected in the current period at an adjustment speed of 4.9%, while for *activepop* the speed is of 1.4%, for *exchange* is of 5%, and for *HICP* it is of 138%.

In conditions of caeteris paribus, as the coefficients estimated in Table 10 reveal, among the variables under analysis, the change in the average salary and the change in the active population are more able to produce effects on the government debt. 1% shocks in the level of the exchange rate or the prices of consumer goods are not likely to generate an impact on the government debt. Thus, considering the number of lags and the error correction estimates presented in table 10, we will present the main consequences in the short run between the variables in the following: 1% change in *sal* is associated to a 0.33% decrease in *debt*, on average caeteris paribus, in the short run; in the same time, a 1% modification of *activepop* leads to a 0.55% decrease in *debt*; 1% change of exchange would lead to 0.06% increase in debt, while 1% modification of HICP conduces to only 0.01% increase of debt.

If we focus on the government debt as a possible indicator of fiscal risk, we observe that if the number of active persons and the average salary increase, this will diminish the value of the government debt, which confirms the economic principles which show that these positive changes on the labour market mean an increase in public revenues, thus a greater capacity to finance public expenses, to the detriment of the government debt.

Table 10. VECM estimates for the variables under analysis

Vector Error Correction Estimates	
Sample (adjusted): 2001Q1 2021Q2	
Included observations: 82 after adjustments	
Standard errors in ( ) & t-statistics in [ ]	
Cointegrating Eq:	CointEq1
L_DEBT(-1)	1.000000
L_SAL(-1)	2.234770
	(0.37584)
	[5.94610]
L_ACTIVEPOP(-1)	-5.580016
	(4.01443)
	[-1.38999]
EXCHANGE (-1)	-0.952348
	(0.24455)
	[-3.89436]
HICP(-1)	-0.079593
	(0.00981)
	[-8.11309]

C	37.33150				
Error Correction:	D(L_DEBT)	D(L_SAL)	D(L_ACTIVEPOP)	D(EXCHANGE)	D(HICP)
CointEq1	-0.008460	0.049314	-0.014786	0.050870	1.389985
	(0.01969)	(0.00895)	(0.00718)	(0.03992)	(0.40359)
	[-0.42954]	[5.50942]	[-2.05829]	[1.27430]	[3.44408]
D(L_DEBT(-1))	0.165748	-0.186429	-0.087998	0.422005	-1.542798
	(0.12571)	(0.05713)	(0.04585)	(0.25480)	(2.57600)
	[1.31854]	[-3.26320]	[-1.91917]	[1.65622]	[-0.59891]
D(L_DEBT(-2))	0.437101	-0.078100	0.002745	-0.021710	2.797173
	(0.12714)	(0.05778)	(0.04637)	(0.25770)	(2.60531)
	[3.43806]	[-1.35167]	[0.05919]	[-0.08425]	[1.07364]
D(L_DEBT(-3))	0.085575	-0.103780	-0.020775	-0.164704	-1.432176
	(0.13825)	(0.06283)	(0.05043)	(0.28023)	(2.83308)
	[0.61899]	[-1.65171]	[-0.41196]	[-0.58775]	[-0.50552]
D(L_SAL(-1))	0.461707	-0.513574	0.058346	0.220677	-8.134823
	(0.25530)	(0.11603)	(0.09312)	(0.51748)	(5.23167)
	[1.80849]	[-4.42628]	[0.62655]	[0.42645]	[-1.55492]
D(L_SAL(-2))	0.364534	-0.043958	0.132890	-0.316072	-5.985569
	(0.25197)	(0.11451)	(0.09191)	(0.51072)	(5.16336)
	[1.44676]	[-0.38387]	[1.44592]	[-0.61887]	[-1.15924]
D(L_SAL(-3))	-0.330139	-0.254706	0.120570	0.191603	-4.929696
	(0.22231)	(0.10103)	(0.08109)	(0.45061)	(4.55559)
	[-1.48506]	[-2.52099]	[1.48690]	[0.42521]	[-1.08212]
D(L_ACTIVEPOP(-1))	-0.242940	0.354343	-0.289748	-1.122037	0.273715
	(0.36239)	(0.16470)	(0.13218)	(0.73454)	(7.42616)
	[-0.67039]	[2.15147]	[-2.19200]	[-1.52753]	[0.03686]
D(L_ACTIVEPOP(-2))	0.440340	0.580881	-0.745456	0.326987	12.22438
	(0.25258)	(0.11479)	(0.09213)	(0.51198)	(5.17606)
	[1.74333]	[5.06016]	[-8.09112]	[0.63867]	[2.36172]
D(L_ACTIVEPOP(-3))	-0.555423	0.598075	-0.113337	-1.415589	7.292355
	(0.34915)	(0.15868)	(0.12735)	(0.70770)	(7.15483)
	[-1.59080]	[3.76906]	[-0.88994]	[-2.00025]	[1.01922]
D(EXCHANGE (-1))	-0.047531	0.016170	-0.004308	0.232696	1.290988
	(0.06116)	(0.02780)	(0.02231)	(0.12398)	(1.25340)
	[-0.77710]	[0.58168]	[-0.19312]	[1.87692]	[1.02999]
D(EXCHANGE (-2))	0.015183	0.042301	0.023696	-0.177239	-1.098480
	(0.06327)	(0.02875)	(0.02308)	(0.12824)	(1.29645)
	[0.23998]	[1.47118]	[1.02683]	[-1.38213]	[-0.84730]
D(EXCHANGE (-3))	0.063231	0.022750	0.014235	0.201903	0.318334
	(0.06013)	(0.02733)	(0.02193)	(0.12187)	(1.23214)
	[1.05163]	[0.83254]	[0.64905]	[1.65665]	[0.25836]

D(HICP(-1))	-0.005994	0.001841	-0.001623	-0.008450	0.180321
	(0.00569)	(0.00259)	(0.00208)	(0.01153)	(0.11660)
	[-1.05349]	[0.71181]	[-0.78181]	[-0.73269]	[1.54651]
D(HICP(-2))	-0.002156	0.003045	0.004444	0.003388	0.074334
	(0.00569)	(0.00259)	(0.00208)	(0.01154)	(0.11663)
	[-0.37874]	[1.17714]	[2.14063]	[0.29363]	[0.63733]
D(HICP(-3))	0.008979	-0.000359	-0.003206	-0.005100	0.156379
	(0.00559)	(0.00254)	(0.00204)	(0.01134)	(0.11460)
	[1.60559]	[-0.14143]	[-1.57183]	[-0.44993]	[1.36459]
C	-0.008053	0.068733	-0.012700	0.021928	1.580580
	(0.02344)	(0.01065)	(0.00855)	(0.04751)	(0.48032)
	[-0.34356]	[6.45234]	[-1.48549]	[0.46154]	[3.29071]
R-squared	0.423411	0.679892	0.715836	0.355649	0.579748
Adj. R-squared	0.281482	0.601097	0.645888	0.197040	0.476301
Sum sq. resids	0.149954	0.030973	0.019951	0.616094	62.97116
S.E. equation	0.048031	0.021829	0.017520	0.097357	0.984270
F-statistic	2.983248	8.628548	10.23384	2.242295	5.604317
Log likelihood	142.1170	206.7822	224.8155	84.18112	-105.5272
Akaike AIC	-3.051633	-4.628833	-5.068670	-1.638564	2.988469
Schwarz SC	-2.552679	-4.129879	-4.569716	-1.139610	3.487423
Mean dependent	0.041037	0.031907	-0.002841	0.033524	1.552683
S.D. dependent	0.056664	0.034562	0.029441	0.108647	1.360108

Determinant resid covariance (dof adj.)	2.29E-12
Determinant resid covariance	7.16E-13
Log likelihood	564.7770
Akaike information criterion	-11.57993
Schwarz criterion	-8.938407
Number of coefficients	90

Source: own results obtained through Eviews software

In addition to estimating the VECM model, it is important to determine whether there are indeed interdependencies between the variables under analysis. We will apply the Granger causality test (Appendix 1). It studies pairs of variables (X and Y) and identifies whether the evolution of one variable (Y) produces a change in the other analysed variable (X). The null hypothesis of the causality test shows that the evolution of one variable does not produce results on the other variable, and vice versa. When the probability of the F-Statistic estimated by the test has a value lower than 0.05 (5%), then the null hypothesis is rejected, in which case there is a Granger causality between the analysed variables. This means that a change in one variable will also influence the evolution of the other variable. The existence of cointegration also confirms the validity of the Granger causality test. According to the authors Sims et al. (1990), if the variables are non-stationary and the cointegration condition would not have been met, the results provided by the Granger test could not be accepted. The results of the Granger causality test can be found in Appendix 1 and show that:

- Government debt Granger causes the active population;
- Government debt Granger causes the exchange rate;
- The active population Granger causes the average salary;
- The exchange rate Granger causes the active population;
- The average salary Granger causes the HICP;
- There is bidirectional Granger causality between the HICP and the labour force.

Therefore, the VECM model is representative to explain the interdependencies that are created between the government debt variables, the level of the average salary in the economy, the active population, the HICP and the RON-EURO exchange rate and above all, to quantify the evolution of the government debt in case of possible changes to the level of the studied variables. The impulse responses that evaluate the shock on each variable of interest to a change in the reference variable are shown in Figure 3. Some of the estimates that can be formulated starting from the graphical representation would be the following:

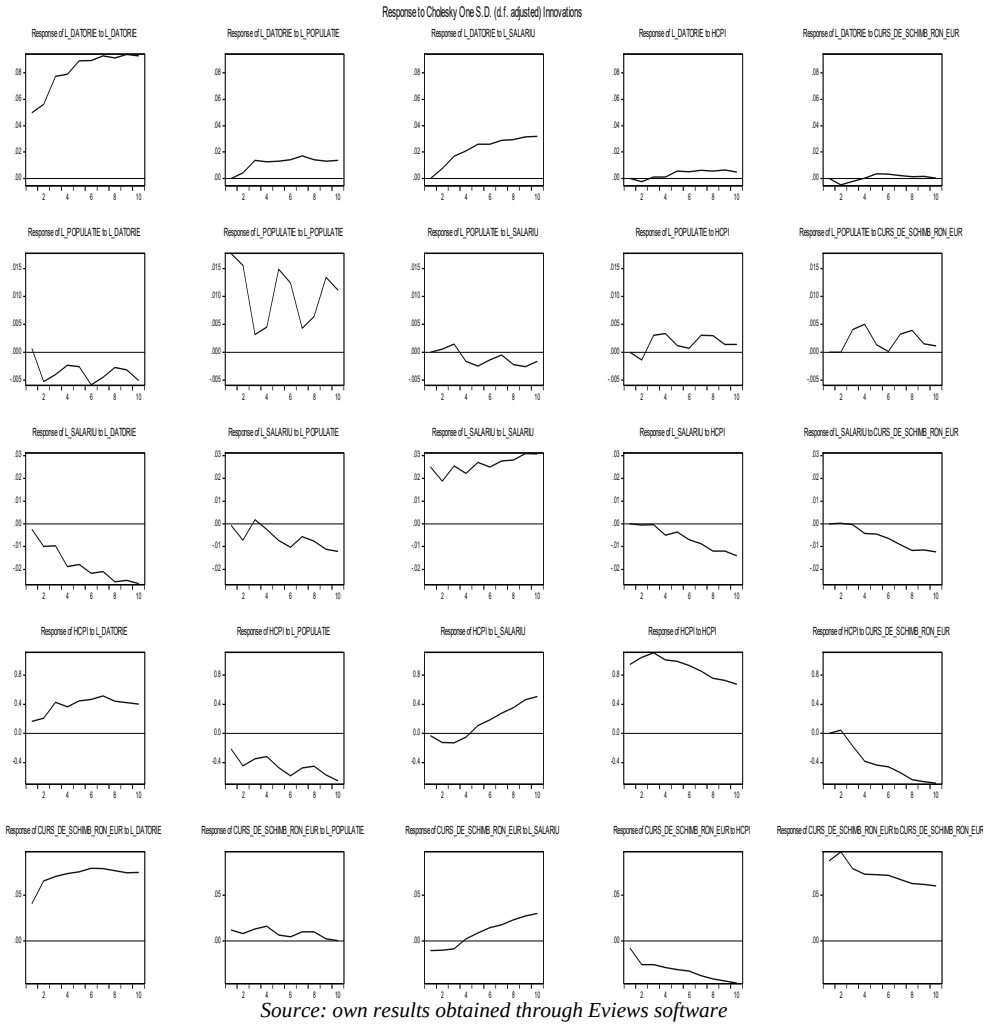
- A 1% shock to the average salary in the economy is quickly reflected in the government debt, which experiences considerable growth in the medium term. The government debt also responds to the shock produced by an evolution of the active population, but the response is more moderate than in the case of the evolution of the average salary. This practically confirms the economic theory since the determination of the price on the labour market is not a simple result of the meeting between the demand and the supply of labour, and the salary expenses are one of the key components of public expenses, less flexible expenses due to their social characteristics;
- Broadly speaking, a 1% shock on the RON-EURO exchange rate does not generate significant changes on the government debt. The interdependence between the exchange rate and the government debt deserves to be studied separately, as several other factors must be considered: the structure of the government debt portfolio in currencies, payment terms, the history of the country regarding the payment of foreign interests, etc.
- The impulse response of the average salary level on the active population and vice versa suggests, as expected, that a change in the average salary causes an increase in the active population in the short term, but the trend is not maintained in the medium term, given the fact that the labour market knows numerous imperfections, and the employee status is the result of several demographic, social, cultural conditions in a context that exceeds the country's borders.

Appendix 2 captures the variance decomposition of the forecast error. The evolution of the government debt is weakly influenced during the next 10 quarters by the evolution of the other analysed variables, the only variable that exerts an influence greater than 2% is the average salary in the economy. Therefore, government debt is a strongly endogenous variable, or whose change is generated by other variables than those included in the present study.

The variables labour force, HICP and exchange rate are explained to a proportion of 50% or more by their own evolution, although there is also an important influence on them from the other variables.

During the evaluation period, we observe that the average salary is the variable least affected by its own evolution. Although it was expected that the salary level would be correlated with the evolution of the exchange rate and with the HICP for example, the estimate denotes the fact that it is more strongly influenced by the evolution of the government debt even than by its own change.

Figure 3. Impulse response estimates



Source: own results obtained through Eviews software

5. Conclusions

This article aims to identify the interdependencies between the government debt, the number of people active on the labour market, the level of the average salary in the economy, the harmonized index of consumer prices and the RON-EURO exchange rate, for Romania during the period starting from the 1st quarter of the year 2000 and up to the 2nd quarter of the year 2021. Given the specificity of the series under analysis, the economic model used for estimations is VECM.

The focus of the analysis is still related to fiscal risks, which can be measured by government debt. Thus, the main objective of the study is to identify which of the other variables used exert a greater impact on the government debt: the size of the average salary and the number of employed people that can bring increases in public revenues (or, on the contrary, increases in social assistance expenses and budget employees' salary expenses), HICP which is a form of measuring inflation (inflation is a known means of reducing of the value of the government debt), or the RON-EUR exchange rate that can influence the government debt depending on the predominant currency of the loans and the evolution of the national currency?

In the long term, the average salary exerts a significant impact in the same direction on the government debt, whilst the labour force (active population) exerts an influence in the opposite direction, but with a larger value impact. Two very important conclusions emerge from this. The first is that an increase in the average salary that does not have a corresponding increase in productivity only increases the government's indebtedness and fiscal pressure for the next generations. The salary increases of budget officers require prudence in order not to become a risk for fiscal sustainability in the long term. The second conclusion is that government measures to increase the active population prove to be beneficial in the long term and make the public debt decrease faster than the number of active people increases.

Thus, it is recommended that the government implement measures to increase the labour force by: discouraging the phenomenon of early retirement, better visibility of existing jobs, attracting foreign investors to open workplaces in Romania, encouraging local businesses, the implementation of professional training and conversion programs (including the fruition of human capital development opportunities through projects financed by the European Union).

We note that HICP and RON-EUR exchange rate don’t have as much influence on the evolution of government debt as the other two variables mentioned before, from which it follows that there were generally neither large fluctuations in prices, nor major changes in the exchange rate that would require the refinancing of the public debt at high costs.

Instead, in the short term, the modifications in the average salary and in active population are more able to produce effects on the government debt: 1% change in *sal* is associated to a 0.33% decrease in *debt*, on average caeteris paribus, in the short run; in the same time, a 1% modification of *activepop* leads to a 0.55% decrease in *debt*; while 1% change in HICP or in exchange rate conduct to less than 0.10% change in government debt.

Not least, according to the variance decomposition of the forecast error, the most important conclusions show that the government debt is influenced, among the variables included in

the study, by changes in the average salary in the economy. The increase in the average salary implies (and derives from) also increases in expenses with the salaries of budget workers. The latter is a rigid public expenditure, that needs financing funds, obtained even through borrowing. Fluctuations in the number of active persons do not have a medium-term impact on the government debt, just as the change in the average salary does not have the ability to maintain in the medium and long term an evolution in the same direction of the active population. As for the ability of the RON-EUR exchange rate to influence the government debt, the estimates do not prove a sensitivity of the latter determined by the euro currency, which denotes, at least at first glance, a prudent structure of the government debt portfolio.

References

Afflatet, N. (2018). The Impact of Population Ageing on Government debt: A Panel Data Analysis for 18 European Countries. – International Journal of Economics and Financial Issues, 8 (4), pp. 68-77.

Auerbach, A. J. (2009). Long-Term Objectives for Government Debt. – FinanzArchiv / Public Finance Analysis, 65 (4), pp. 472-501.

Balassone, F., Cunha, J., Langenus, G., Manzke, B., Pavot, J., Prammer, D., Tommasino, P. (2009). Fiscal Sustainability and Policy Implications for the Euro Area. – Working Paper Series No 994, Frankfurt am Main, European Central Bank.

Bengtsson, T., Scott, K. (2011). Population Aging and the Future of the Welfare State: The Example of Sweden. – Population and Development Review, 37, pp. 158-170.

Birg, H. (2015). Die alternde Republik und das Versagen der Politik: Eine demographische Prognose. Münster, Berlin: LIT-Verlag.

Blanchard, O., Chouraqui, J., Hagemann, R., Sartor, N. (1990). The sustainability of fiscal policy: new answers to an old question. – OECD Economic Studies, 15, pp. 7-36.

Bongaarts, J. (2004). Population Aging and the Rising Cost of Public Pensions. – Population and Development Review, 30(1), pp. 1-23.

Cecchetti, S. G., Madhusudan, M., Zampolli, F. (2010). The Future of Government debt: Prospects and Implications. – BIS Working Papers No. 300.

Chatzouz, M. (2020). Government debt and Wealth Inequality. [Online], [Retrieved April 24, 2022],http://dx.doi.org/10.2139/ssrn.3531199.

Chen, D. H. C. (2004). Population age structure and the budget deficit. – Journal for Insurance and Financial Management, 1(4), pp. 32-67.

Demmel, R., Keuschnigg, C. (2000). Funded Pensions and Unemployment. – FinanzArchiv/Public Finance Analysis, 57(1), pp. 22-38.

Dieppe, A., Guarda, P., Albani, M., Gonzalez Pandiella, A., Grech, O., Irac, D., Kilponen, J., Kulikov, D., Marchiori, L., Félix, R., Papadopoulou, N., Rodano, M. L., Sideris, D., Vogel, E., Gordo Mora, E. (2015). Government debt, Population Ageing and Medium-Term Growth. – ECB Occasional Paper No. 165.

Farmer, K., Kuplen, S. (2018). Involuntary Unemployment in a Neoclassical Growth Model with Government debt and Human Capital. – Studia Universitatis Babes-Bolyai Oeconomica, 63(2), pp. 3-34.

Genschel, P. (2001). Globalization, tax competition, and the fiscal viability of the welfare state. – MPIfG Working Paper, No. 01/1, Cologne, Max Planck Institute for the Study of Societies.

Hansson, A. (2010). In This World Nothing Is Certain but Death and Taxes: Financing the Elderly. – Population Ageing – A Threat to the Welfare State?, Heidelberg, Springer Berlin, pp. 23-45.

International Monetary Fund. (2009). The IMF on the Fiscal Impact of Population Aging. – Population and Development Review, 35(2), pp. 437-442.

Jensen, S. E. H., Søren, B. N. (1995). Population Ageing, Government Debt and Sustainable Fiscal Policy. – Fiscal Studies, 16(2), pp. 1-20.

Klyvienė, V. (2004). The Government debt and the Problem of Population Ageing in Lithuania. Available at http://dx.doi.org/10.2139/ssrn.2070664, referred on 20/04/2022.

Lee, R., Tuljapurkar, S. (1998). Uncertain demographic futures and social security finances. – The American Economic Review, 88(2), pp. 237-241.

Menguy, S. (2020). Tax Competition, Fiscal Policy, and Government debt Levels in a Monetary Union. – Journal of Economic Integration, 35(3), pp. 353-395.

Porumboiu, A. E., Brezeanu, P. (2022). Determinants of Government Debt in the Member States of the European Union: Sources of Fiscal Risk. – Proceedings of the International Conference on Business Excellence, 16(1), pp. 707-721.

Preston, S. H. (1984). Children and the elderly: Divergent paths for America's dependents. – Demography, 21(4), pp. 435-457.

Rangelova, R., Bilyanski, V. (2019). Economic Aspects of Demographic Changes in the European Union and in Bulgaria. – Economic Studies (Ikonomicheski Izsledvania), 28(5), pp. 25-54.

Razin, A., Efraim, S., Phillip, S. (2001). The Aging Population and the Size of the Welfare State. – NBER Working Paper Series 8405.

Sánchez-Romero, M., Abío, G., Botey, M., Prskawetz, A., Sambt, J., Juvés, M. S., Souto, G., Vargha, L., Patxot, C. (2019). Welfare State Winners and Losers in Ageing Societies. – Vienna Yearbook of Population Research, 17, pp. 9-36.

Shrestha, M. B., Bhatta, G. R. (2018). Selecting appropriate methodological framework for time series data analysis. – The Journal of Finance and Data Science, 4(2), pp. 71-89.

Sinn, H. W., Silke, Ü. (2002). Pensions and the path to gerontocracy in Germany. – European Journal of Political Economy, 19, pp. 153-158.

Tanchev, S., Mose, N. (2023). Fiscal Policy and Economic Growth: Evidence from European Union Countries. – Economic Studies Journal (Ikonomicheski Izsledvania), 32(3), pp. 19-36.

Tomić, I. (2018). What drives youth unemployment in Europe? Economic vs non-economic determinants. – International Labour Review, 157(3), pp. 379-408.

Topal, M. H., Bölükbaş, M., Bostan, M. K. (2018). The Government debt and Unemployment Growth Nexus in the PIIGS (Portugal, Ireland, Italy, Greece and Spain) Countries and Turkey: Empirical Evidence. – Studies on Balkan and Near Eastern Social Sciences, 2, pp. 1-16.

Yared, P. (2019). Rising Government Debt: Causes and Solutions for a Decades-Old Trend. – The Journal of Economic Perspectives, 33(2), pp. 115-140.

Appendix 1

Granger causality test

Null Hypothesis:	Obs	F-Statistic	Prob.
L_ACTIVEPOP does not Granger Cause L_DEBT	83	2.44671	0.0702
L_DEBT does not Granger Cause L_ACTIVEPOP		7.15844	0.0003
L_SAL does not Granger Cause L_DEBT	83	1.48340	0.2258
L_DEBT does not Granger Cause L_SAL		1.39540	0.2507
HICP does not Granger Cause L_DEBT	83	1.19855	0.3161
L_DEBT does not Granger Cause HICP		1.82251	0.1502
EXCHANGE does not Granger Cause L_DEBT	83	1.08992	0.3586
L_DEBT does not Granger Cause EXCHANGE		3.35675	0.0231
L_SAL does not Granger Cause L_ACTIVEPOP	83	2.06470	0.1119
L_ACTIVEPOP does not Granger Cause L_SAL		11.7493	2.E-06
HICP does not Granger Cause L_ACTIVEPOP	83	3.74250	0.0145
L_ACTIVEPOP does not Granger Cause HICP		5.66151	0.0015
EXCHANGE does not Granger Cause L_ACTIVEPOP	83	4.02693	0.0103
L_ACTIVEPOP does not Granger Cause EXCHANGE		2.68983	0.0522
HICP does not Granger Cause L_SAL	83	1.29596	0.2820
L_SAL does not Granger Cause HICP		2.92603	0.0391
EXCHANGE does not Granger Cause L_SAL	83	0.66056	0.5789
L_SAL does not Granger Cause EXCHANGE		1.48654	0.2249
EXCHANGE does not Granger Cause HICP	83	0.98309	0.4053
HICP does not Granger Cause EXCHANGE		1.26722	0.2917

Source: own results obtained through Eviews software

Appendix 2

Decomposition of forecast error variance

Variance Decomposition of L_DEBT:

Period	S.E.	L_DEBT	L_SAL	L_ACTIVEPOP	EXCHANGE	HICP
1	0.048031	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.071697	97.06874	2.091219	0.145329	0.197629	0.497081
3	0.102940	94.50962	3.672110	0.770145	0.212689	0.835438
4	0.129501	95.55705	3.181306	0.511160	0.166162	0.584322
5	0.159034	96.02821	2.947297	0.340292	0.296745	0.387452
6	0.186213	96.49320	2.612465	0.248735	0.336586	0.309016
7	0.213345	96.69091	2.552267	0.191250	0.311748	0.253824
8	0.238281	96.86589	2.446594	0.161430	0.303961	0.222124
9	0.263491	96.89309	2.466633	0.148255	0.289585	0.202437
10	0.287002	96.96159	2.440336	0.129872	0.259773	0.208434

Variance Decomposition of L_SAL:

Period	S.E.	L_DEBT	L_SAL	L_ACTIVEPOP	EXCHANGE	HICP
1	0.021829	1.189430	98.81057	0.000000	0.000000	0.000000
2	0.027543	12.34495	85.92132	0.327328	0.889564	0.516840
3	0.034752	15.12480	78.80928	4.773992	0.861504	0.430425
4	0.041987	28.44087	62.28280	6.807582	0.978428	1.490316
5	0.049716	33.30501	58.07903	4.877168	1.679675	2.059117
6	0.058551	40.33927	49.79460	3.567126	2.839019	3.459981
7	0.068842	40.46952	45.93426	3.157552	4.538871	5.899802
8	0.079905	43.19655	39.77462	3.078150	6.332991	7.617696
9	0.090397	44.30046	37.59241	2.501413	7.314248	8.291471
10	0.100665	45.89219	34.93076	2.024022	8.004720	9.148311

Variance Decomposition of L_ACTIVEPOP:

Period	S.E.	L_DEBT	L_SAL	L_ACTIVEPOP	EXCHANGE	HICP
1	0.017520	1.465850	0.310026	98.22412	0.000000	0.000000
2	0.022605	2.606718	0.544643	96.66057	0.152974	0.035090
3	0.023836	3.170772	0.565670	88.06258	3.172622	5.028357
4	0.025176	3.391752	0.580837	82.32175	8.179525	5.526132
5	0.029330	2.965058	0.443631	85.66082	6.749332	4.181163
6	0.032461	5.335667	0.374519	84.78302	5.937477	3.569321
7	0.033754	7.372661	0.360304	79.74551	7.991042	4.530480
8	0.034847	8.139082	0.338887	77.04927	9.865719	4.607038
9	0.037682	8.329344	0.291694	78.49993	8.935112	3.943921
10	0.040294	10.01171	0.263643	77.91921	8.279349	3.526087

Variance Decomposition of EXCHANGE

Period	S.E.	L_DEBT	L_SAL	L_ACTIVEPOP	EXCHANGE	HICP
1	0.097357	17.97981	0.146384	0.159123	81.71468	0.000000
2	0.159174	24.02357	0.099340	1.322598	73.99798	0.556515
3	0.194940	28.91296	0.118503	1.557413	68.18984	1.221281
4	0.228593	29.69810	0.601428	1.654309	64.96015	3.086010

5	0.262869	30.88257	0.764920	2.153226	61.98742	4.211865
6	0.293384	32.26979	1.049924	2.428865	59.06119	5.190226
7	0.320131	33.21993	1.403103	2.354517	56.26570	6.756750
8	0.344985	33.88148	1.819987	2.431621	53.78860	8.078309
9	0.368760	34.29200	2.213809	2.667903	51.64911	9.177180
10	0.391548	34.68398	2.656722	2.742265	49.47846	10.43857

Variance Decomposition of HICP:

Period	S.E.	L_DEBT	L_SAL	L_ACTIVEPOP	EXCHANGE	HICP
1	0.984270	1.739118	2.355293	2.443715	0.299583	93.16229
2	1.478220	1.500530	4.577816	5.056199	0.300388	88.56507
3	1.866653	3.710542	5.343116	4.452801	2.216124	84.27742
4	2.202938	3.786926	5.650759	3.628472	5.595714	81.33813
5	2.509342	4.334810	4.852778	4.160208	8.583813	78.06839
6	2.810398	4.858230	4.228982	5.517831	11.45524	73.93972
7	3.060681	5.754609	3.611752	5.329459	15.34158	69.96260
8	3.288317	6.108548	3.154579	4.886057	19.95577	65.89504
9	3.522318	6.336670	2.755468	5.013423	23.78140	62.11304
10	3.746673	6.501581	2.461009	5.513684	27.13522	58.38850

Cholesky Ordering: L_DEBT L_WAGE L_ACTIVEPOP EXCHANGE HICP

Source: own results obtained through Eviews software