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## DETERMINANTS OF ACTIVE MEMBERSHIP IN A PENSION FUND: EVIDENCE FROM MACEDONIA

### Abstract:

*This study examines the factors related to an active membership in a pension fund.. The research distinguishes between structural and cyclical unemployment and assesses how these types affect the labor market. Using a binary logistic regression model on data from 18,281 insurers, the study identifies key factors of being an active member. Findings reveal a U-shaped relationship between age and activity, with activity declining until 39.5 years of age before increasing again. Higher salaries correlate positively with active membership, while men and residents of the capital city, Skopje, are less likely to be active contributors. The study emphasizes the significance of aligning skills with market needs and addressing regional disparities. Although limited by available variables due to data privacy laws, the research offers valuable insights into the employment structure and its implications for pension fund contributions.*

**Keywords: Unemployment, Pension fund, Macedonia**

**JEL Classification: E24, J21**

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## **INTRODUCTION**

One of the crucial element of social protection are pension systems. They play a critical role in ensuring income security for individuals during retirement. Sustainability of pension funds is enabled by an active membership, which is characterized by the continuous contribution of individuals to the fund. However, the level of participation in pension funds is related to different determinants which makes the analysis of active membership in pension funds a significant area of research. Understanding the factors that affect active membership would help policymakers to create better strategies to increase participation rates, and adapt pension systems to demographic and economic changes. The aim of this paper is to investigate the determinants of active membership in a pension fund. By employing a binary logistic regression model on a large dataset of 18,281 insurers, the authors seek to identify key factors related to active contributions to pension funds. Additionally, the paper aims to explore demographic and economic variables such as age, salary, gender, and geographic location to better understand the dynamics of pension fund participation and provide insights for improving alignment between labor market needs and pension system sustainability.

### **1. LITERATURE REVIEW**

The labour market structure is found as one of the essential determinant of an active membership in pension funds. According to Barr and Diamond (2006) individuals in formal employment, especially those with higher income, are more likely to be active members of pension funds because of the greater comfort of enrolment and higher capacity to contribute). On the other hand, Dorfman (2015) found that workers in the informal sector or those with risky employment conditions are less likely to contribute in pension funds due to irregular income and the absence of mandatory enrolment in pension schemes. These labor market conditions often reflect broader economic factors such as cyclical and structural unemployment.

Variations in the economic cycle is often related to cyclical unemployment. Cyclical unemployment is directly related to the phases of the business cycle i.e., recession and expansion (Mankiw, 2015). Cyclical unemployment occurs when there is a downturn in the economy. During recessions, the demand for goods and services falls which leads to reduced production and, as a consequence, a decreased need for labor. As the economy recovers, the demand

picks up, and the cyclical unemployment starts to decrease. This form of unemployment is a temporary one and is expected to decline, as the economy would enter a phase of growth. The cyclical unemployment tends to decrease the number of active members in pension funds. In the period of economic downturns—a period which is characterized with increase in unemployment rates—losing a job usually results with termination of the contributions in pension funds. The cyclical unemployment is mostly problematic for pension systems that rely on continuous contributions to ensure solvency. On the other hand, structural unemployment, which arises from fundamental shifts in the economy that change the demand for labor, can have a more long-term impact on pension fund membership. Structural unemployment, occurs when there is a discrepancy between the skills of the labor force and the needs of the employers. This discrepancy may arise due to technological changes, evolving market dynamics, or geographic reasons (Acemoglu & Autor, 2011). For instance, the decline of a particular industry in a region might leave many skilled workers unemployed because their skills are not transferable to other sectors. Unlike other forms of unemployment, structural issues are not directly related to the business cycle but are more deep-seated in the economy's structure (Blanchard & Summers, 1986). Börsch-Supan (2004) stated that individuals whose skills become obsolete or who are displaced from industries in decline might remain outside the labor market for extended periods, delaying their ability to contribute to pension funds. Demographic factors are significantly related to active membership in pension funds (Ginn & Arber, 2001; Chlon-Dominczak, 2003). Age, gender, and life expectancy influence the likelihood of participating in pension schemes. According to Chlon-Dominczak (2003) younger individuals are less likely to contribute to pension funds due to the observed distance from retirement and competing financial priorities, such as saving for education or housing. Women often face additional barriers to active participation, particularly due to gender wage gaps, interruptions in employment for caregiving, and longer life expectancies, which affect their pension contributions and benefits (Ginn & Arber, 2001).

In the context of Macedonia, similar trends are observed, though there are specific national factors that also influence active pension fund membership. The transition from a state-controlled economy to a market-based system in the 1990s had a significant impact on the pension system. Macedonia adopted a three-pillar pension system, consisting of mandatory state and private pension funds. However, economic instability, high unemployment rates, and the prevalence of informal labor have posed significant challenges to pension fund

participation (Stamenkova, 2017). Workers in informal sectors are not covered by the mandatory pension system, which leads to decrease in participation rates.

Moreover, structural unemployment in Macedonia has long-term consequences for pension contributions. Workers displaced from declining industries, such as manufacturing, have struggled to reintegrate into the labor market, further reducing active membership in pension funds (Ananiev & Mojsoska-Blazevski, 2008). Additionally, low wages and limited job opportunities in Macedonia have discouraged many individuals, particularly younger workers, from contributing to pension plans, opting instead for immediate financial needs.

In conclusion, active membership in pension funds is determined by a range of factors, including macroeconomic conditions, labor market dynamics, demographic characteristics, and behavioral patterns. While global trends highlight the challenges posed by economic cycles and labor market changes, national contexts, such as that of Macedonia, reveal additional challenges related to economic transition and structural unemployment.

## **2. RESEARCH METHODOLOGY AND DATA**

To carry out their primary function – management of pension funds' assets, pension companies receive funding through legally set charges. This represents their main category of income which includes fees deducted from contributions, fees based on the assets of the pension funds, and funds transfer fees. Additionally, pension companies generate financial income by investing the assets under management in deposits and securities, as permitted by the regulations outlined in the Law on Voluntary Fully Funded Pension Insurance. Therefore, it is of crucial importance for the pension funds, to maximize the actual number of members and secure monthly income from the provisions generated from the contributions that employers are paying on the basis on regular monthly salaries. This notion attracts valuable attention of the pension funds management, to the developments and status of each member of the fund, which eventually is considered to be a valuable monthly regular income that the fund consecutively manages or invests in financial instruments.

According to internal analyses conducted by the management of pension companies, significant emphasis is placed on the movement and status of membership, a data point, tracked at least once on a monthly basis. This category, which practically reveals notable variations and deviations, is proven

to be a source of valuable input on potential income for the pension funds and provides a solid basis for assessing the degree of continuity and consistency in the employment status of each individual member in the context of the topic addressed in this study.

For example, the annual report of one private pension fund for 2023 shows that more than 1% of total membership base, has zero (0) denars contributions paid to the pension savings account in a period of 12 months. Therefore, it can be concluded, that these individuals, were employed in the past, but within a period of one year, have become either unemployed, or for some reason, their employer does not pay their contributions to the salary, which at the end of the day is a legislatively regulated process. These group of members, which have certain levels of assets under management, but have no income from contributions within the last 12 months, are classified as inactive members/insurers.

Sparked by this indicator, similar information has been requested from other two private pension funds. Results of the findings are presented in the table below, which gives an insight of number of members with 0 income for the last 12 months on December 31, 2022.

**Table 1 : Indicator om active and inactive membership in mandatory pension funds**

Pension Fund Mandatory Funding	Number of members with 0.0 annual Income (inactive)	Total number of members	% of TOTAL
Triglav PD	1.455	47.458	3.07 %
KB Prvo	6.392	273.164	2.34 %
Sava P	5.590	255.254	2.19 %
TTL	13.479	572.094	2.36 %

Analyzing the data in table, and, taking into consideration that the Macedonian unemployment statistics are deriving from surveys and not on actual data from the employment agency, one can conclude that additional 2% of the total working population has been unemployed in the last 12 months.

Initiated by this findings, further analyses of the data from one of the pension companies explore into a more detailed evaluation of this category of active or inactive membership, dividing the period of inactivity into quarterly intervals. In this context, interruptions in regular contribution payments of membership are analysed over a period shorter than one year but longer than one quarter. This indicator primarily points to seasonal employment, employment through temporary labor force agencies, regional migration, or other reasons. On one hand, it provides significant insights into the expected contribution revenues to pension funds, but it also offers a potential understanding of the reasons behind this category of fund membership. Concurring to the topic of this study, it may be related to cyclical or temporary unemployment and potentials factors for such occurrence.

The additional analysis of the Triglav pension fund, shows a much larger percentage of partially active members, (appendix 1 to this document), which for internal use and easier categorization is named as passive/inactive membership. The overall percentage of inactive members according to these statistics is approximately 20% of the total members of the fund. Taking into perspective, that all private pension funds are transferring among themselves the same base of mandatory system members, and additionally, are provided with payments from the singular base in property of the state agency PDIFNM, it can be concluded that similar indications can derive from the internal reports from other private pension companies.

In this context, and for the objectives of this paper, a representative subset of actual fund members from the Triglav Pension Fund has been obtained. This sample was generated using system analytics and subjected to detailed examination of the personal pension fund accounts, with the members categorized as passive insurers or “passive contributions payers”. The aim was to identify and assess the causes behind this passive membership status and/or the factors contributing to cyclical unemployment. Analysis use integrated dataset from Triglav Pension Fund for passive and active payments of the contributions and small portion of demographic characteristics of the insurers. Due to the law for personal data, the author was not able to use larger scale of personal characteristics of the insurers.

In order to reveal the determinants related to the method of payment of the contributions, the author divided the insurers into two categories: active and passive insurers. Active insurers pay their contributions every month, through regular monthly salaries), while inactive insurers have periodic payments, or actually have interruptions in the process, which relates to either a job loss, job switch or other reasons for a cyclic unemployment.

We regress the dependent variable (dummy variable 1=active insurers, 0=inactive insurers in the Pension fund) on a set of variables: i) age of the insurer, ii) gender, (iii) place of residence, (iv) salary (for those without temporary job, the last salary is recorded).

The econometric specification is as follows:  $P(Y_i=1)=\alpha+\beta A_i+\gamma B_i+\delta C_i+\varepsilon D_i+\mu_i$ , where  $Y_i$  takes value of 1 if the insurer is considered as active 0 otherwise, A is for the age of the respondent, B represent the gender of the insurer, C represents the place of residence of the insurer and D is the salary of the insurer. The author included the age-squared in the regression in order to capture the non-linearity of this variable. The idea is to reveal the age at which the insurers are the most active or least active as insurers in this Pension fund.

Variables used in this research are presented in Table 2.

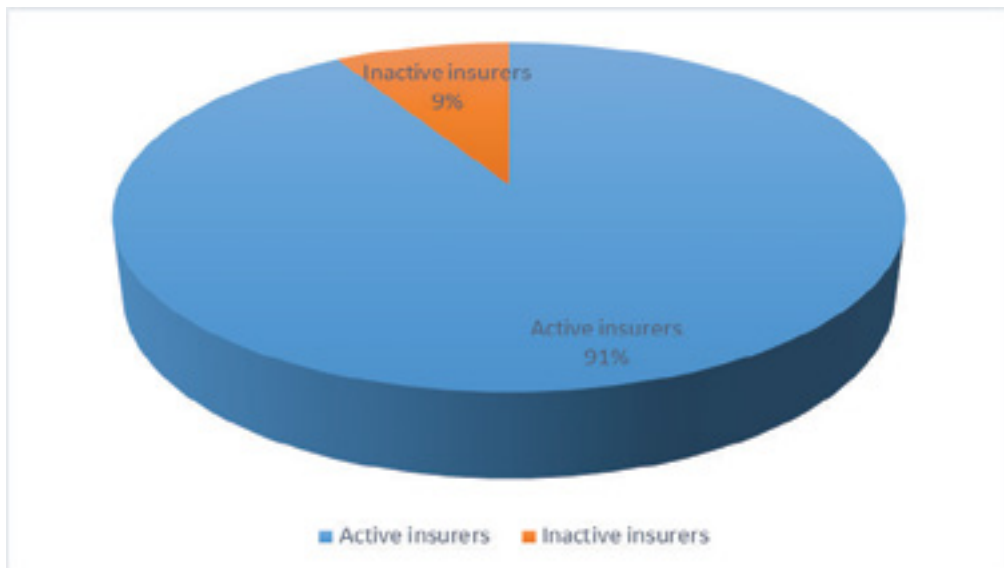
**Table 2: Description of variables**

<b>Activity of the insurer in the Pension fund</b>	<b>1=active 0=inactive</b>
Age of the female	Continuous variable
Age squared	Continuous variable
Gender	1=male 0=female
Place of residence	1=Skopje 0=otherwise
Salary	Continuous variable

Tables from A1 to A8 (in appendix A) present in detail descriptive statistics of the sample.

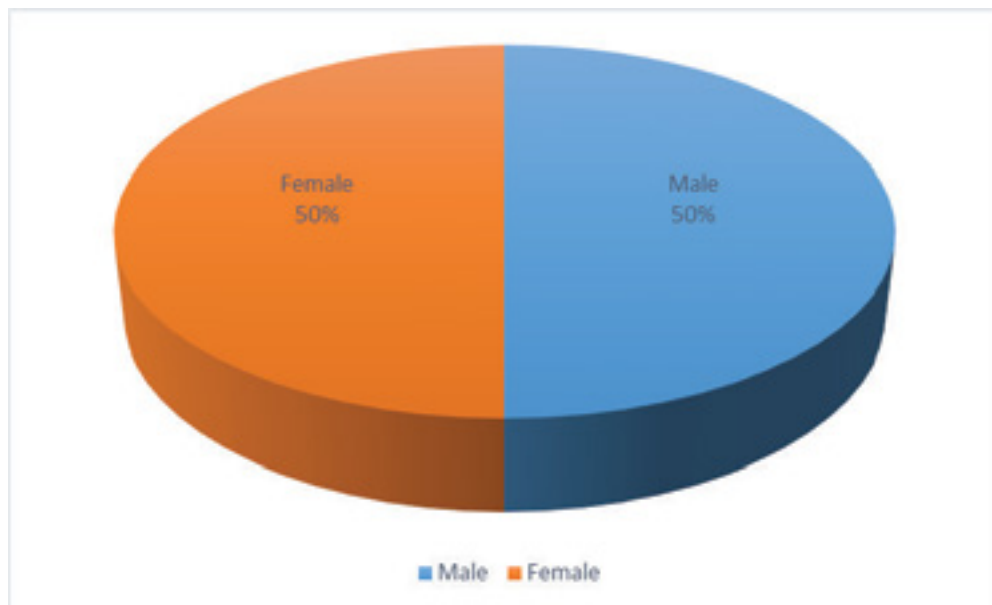
The sample counts 18.281 individuals from the Triglav pension fund. Figure 3 presents share of active vs inactive insurers. Inactive insurers constitute a significantly smaller share compared to active insurers. Figure 4 presents the gender structure of the respondents included in the dataset, while figures 5 and 6 present the gender structure of the insurers with respect to the activity of the payments in the private pension account.

Figure 3: Share active (inactive) insurers in the dataset.



Source: Authors own calculations based on data from TPD

Figure 4: Gender structure of the insurers in dataset



Source: Authors own calculations based on data from TPD



Figure 5: Gender structure – Inactive

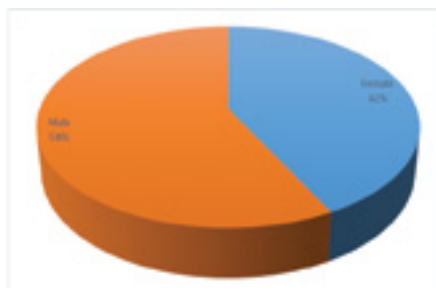
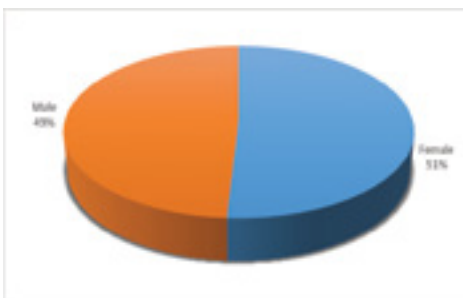


Figure 6: Gender structure – Active



Source: Authors own calculations based on data from TPD

The youngest insurer is 16 years old, the oldest is 60 years old, with average age of insurers of 33 years and standard deviation of 8.5 years. From the inactive insurers, the youngest is 20 years old, the oldest 56 years old with the average age of inactive insurers 34.4 years and standard deviation of 7.5 years. In the dataset, the lowest salary reported is 0 denars, the highest salary reported is 521.009 denars with average salary of 28.659 denars and standard deviation of 18.817 denars. From the inactive insurers, the highest salary reported is 195902 denars, with average salary of 4.768 denars and standard deviation of 14.716 denars. From the active insurers, the minimum reported salary is 194 denars, with average salary of 30.886 denars and standard deviation of 17571 denars.

Regarding the place of residence, 23% of the insurers reported the capital city Skopje as their place of residence. With respect to activity of the insurers, 27% of the inactive insurers are from Skopje and 23% of the active insurers reported the capital city as their place of residence.

### 3. DISCUSSION OF THE FINDINGS

The results from performed binary logistic regression are presented in Appendix B. Regression is performed with SPSS – Statistical Package for Social Sciences.

In order to check the robustness of the model and capture whether the difference in the number of active insurers and inactive insurers have influence on the result first we run the regression over reduced number of active insurers. Then we use the original data set in the regression concluding that the significant difference in the number of active and inactive insurers does not affect the results.

The model explained 77.1% (Nagelkerke  $R^2$ ) of the variance in activity of the insurers in the insurance company and correctly classified 98.4 % of cases. In other words, the model has high explanatory power. Below we present the main findings of the econometric analysis.

Evidence suggests that increasing age is associated with a decreased likelihood of activity in the labour market by 0.73 times. In order to capture the non-linearity of the age we include its squared term, and we find evidence of a U-shape relationship between age and activity.

From the regression, likelihood of being active insurer decreases with age until the insurer reaches 39.5 years old. Afterwards, the likelihood of being active insurer increases.

Increasing the salary is positively associated with being active insurer; increase of the salary increases the likelihood of being active insurer for 1.01 times.

Men are less likely active insurers compared to women, being male reduces likelihood for being active insurer for 0.76 times compared to women.

Residents of the capital city of Skopje are less likely active insurers compared to insurers from other places in North Macedonia; living in Skopje reduces the likelihood for being active insurer for 0.6 times compared to residents in other cities in North Macedonia.

## CONCLUSION

The aim of this research is to examine the factors that affect the likelihood of being an active insurer in second mandatory pension fund i.e., Triglav Penzisko Drustvo AD Skopje. Using the available data from this private pension fund, we regress the dependent variable over several characteristics of the insurers: age, salary, gender, place of residence. In order to capture the non-linearity of the variable age, we include age squared in the regression. We found getting older reduces the likelihood of being active insurer. Results from the age of the insurer and active payment of the contributions in the fund indicate U-shape relationship-age of the insurer decreases the likelihood of being active insurer until the age of 39.5. Afterwards the likelihood of activity increases. Gender has also a significant relationship in the activity of the insurers; men are less likely active insurers than women are. Insurers from the municipalities in the capital city of Skopje are less likely to be active insurers compared to the insurers from other districts in the Republic of North Macedonia.

The main limitation of the study is in the number of variables used as determinants of the activity in the Triglav pension fund. Due to the law for personal data, the author was not able to use more characteristics of the insurers from this insurance company. One way of overcoming this issue is to ask the insurers for permission to use their data for the research, which in this case was not possible because of the number of individuals in the data set (18.281). Future research should include more characteristics of the insurers (like the level of education, marital status, number of people in the household etc) to reveal the determinants of being active insurer in the Pension fund.

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## Appendix A

**Table A1: Descriptive statistics of the sample**

	N	Minimum	Maximum	Mean	Std. Deviation
Active_passive_payment	18281	0	1	,91	,279
Age	18281	16,0	60,0	33,149	8,5365
Salary	18281	,0000000000	521009,98320	28659,1513704	18817,706781
GENDER	18281	0	1	,50	,500
Place_Of_Residence	18281	0	1	,23	,422
Valid N (listwise)	18281				

**Table A2: Descriptive statistics of the inactive insurers**

	N	Minimum	Maximum	Mean	Std. Deviation
Active_passive_payment	1559	0	0	,00	,000
Starost	1559	20,0	56,0	34,447	7,4852
Neto plata	1559	,000000000000	195902,263400	4768,46036189	14716,1080880
GENDER	1559	0	1	,58	,494
Place_Of_Residence	1559	0	1	,27	,443
Valid N (listwise)	1559				

a. Active\_passive\_payment = 0

**Table A3: Descriptive statistics of the active insurers**

	N	Minimum	Maximum	Mean	Std. Deviation
Active_passive_payment	16722	1	1	1,00	,000
Starost	16722	16,0	60,0	33,028	8,6183
Neto plata	16722	194,619109021	521009,983207	30886,491837	17571,7303897
GENDER	16722	0	1	,49	,500
Place_Of_Residence	16722	0	1	,23	,420
Valid N (listwise)	16722				

a. Active\_passive\_payment = 1

## Appendix B

### Table B1: Results from binary logistic regression

**Table B1: Model Summary**

Step	Nagelkerke R Square
1	,711

**Table B2: Classification Table<sup>a</sup>**

		Predicted			
		Active	passive	payment	Percentage Correct
	Observed	0	1		
Step 1	Active_passive_payment	0	1304	255	83,6
		1	39	16683	99,8
Overall Percentage					98,4

a. The cut value is ,500

**Table B3: Coefficients from the regression**

		Sign	Significance	Likelihood
Step 1 <sup>a</sup>	Starost	-0,316)	0,000***	0,729
	Age_SQ	0,004	0,000***	1,004
	Netoplata	0,000	0,000***	1,010
	GENDER	-0,275)	0,003***	0,760
	Place_Of_Residence	-0,515)	0,000***	0,597

**Note:** \*,\*\* and \*\*\* indicate significance at the 10, 5 and 1% level, respectively.