




## The impact of demographic factors and labor market variables on the crisis in Iranian pension funds

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Type of Article: **Research**

 10.22126/pse.2026.13127.1223

Received: 09 November 2025; Accepted: 20 January 2026

pp. 83-110

### Abstract

The crisis of Iranian retirement funds has raised serious concerns about the financial sustainability of these funds and long-term consequences of related policies. Demographic changes and changes in labor market are important factors affecting the financial status of funds. The purpose of this study is to investigate the effect of demographic factors and labor market variables on pension funds crisis and ranking factors affecting it. Factors such as ratio of elders to total population, population growth rate, employment status, economic participation rate, minimum wage, temporary employment contracts and women's economic and social status have been studied. The present study is an applied and descriptive-analytical one. T-test, structural equation modeling and factor analysis were used to analyze the data. The research questionnaire was completed by the participation of 59 university professors, capital market and pension funds experts through purposive and snowball sampling. The results showed that the ratio of the elderly to the whole population has the most important effect and temporary contracts and social and economic status of women have the lowest significant effect on the fund crisis. Policy makers can prevent crisis in pension funds by focusing on elderly population management, promoting economic participation rate and improving market conditions.

**Keywords:** Demographic factors, Labor market variables, Financial crises, Pension funds.

**JEL Classification:** G32, H55, J11, J32.

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**Citations:** Sakifar, A., Miraskari, S. R., & Rezaei Pitenoei, Y. (2026). "The impact of demographic factors and labor market variables on the crisis in Iranian pension funds". *Public Sector Economics Studies*, 5(15), 83-110.

**Homepage of this Article:** [https://pse.razi.ac.ir/article\\_4149.html?lang=en](https://pse.razi.ac.ir/article_4149.html?lang=en)

## 1. Introduction

Today, pension systems are a vital element in social protection for the elderly. Because pensions are vested in individuals' retirement years, these systems are highly vulnerable to future changes in demographic and economic variables, etc. A look at the available information from the country's pension funds shows that the pension system faces major challenges that have a significant impact on how to ensure the future well-being of the elderly, as well as sufficient reserves to meet their future obligations.

Iran's Social Security Pension Fund currently has about 3.8 insurers per retiree, a figure that is below the desired level and is a warning sign for the fund's financial resources. Also, the national pension fund's support ratio reached about 0.5 in 2023, indicating a critical situation and the fund's heavy dependence on government support. Demographics are a determining factor, and the right policies can minimize the negative effects of demographic changes on the economy. Age structure has been identified as one of the key determinants of economic trends.

This study, for the first time, simultaneously examines the impact of demographic factors and labor market variables on the sustainability of pension funds and provides a comprehensive analysis of the role of these components.

The financial imbalance of pension funds in Iran has become a critical issue in recent years, threatening the long-term sustainability of retirement benefits for millions of workers. While previous studies have focused on individual aspects of this crisis, a comprehensive analysis of the simultaneous effects of demographic transformations and labor market dynamics remains largely unexplored. Demographic shifts, including declining fertility rates and increasing life expectancy, have fundamentally altered the age structure of the population, placing unprecedented pressure on pay-as-you-go pension systems. Concurrently, labor market challenges such as low participation rates, informal employment, and early retirement have further weakened the contributory base of these funds. The interaction between these two sets of factors creates a vicious cycle: population aging reduces the number of active contributors while increasing the number of beneficiaries, and labor market rigidities prevent the necessary expansion of the insured population. This study addresses this research gap by employing structural equation modeling to examine the causal relationships between demographic factors, labor market variables, and pension fund sustainability, providing empirical evidence that can inform targeted policy interventions.

## 2. Theoretical framework

Age structure has been identified as one of the key determinants of economic trends. Age structure affects the size of populations that are recipients or donors in intergenerational flows, and therefore, changes in age structure can disrupt these economic structures. The resources and expenditures of each country's social insurance organizations and funds are directly related to the population ratio and pyramid of that country, because the country's young population is considered a productive force and, if employed, will be able to pay insurance premiums. Thus,

the more the number of pension fund insurers than its pensioners, the higher the so-called support coefficient will be and the fund will be in a more stable state.

Labor market variables are affected through policies related to retirement age and exit pathways, such that raising the retirement age and limiting early retirement would enhance older labor force participation and improve the financial sustainability of pension funds. In addition, working conditions and job quality are also important, as work hardship and lack of adequate protections can lead to early retirement due to health problems.

### 3. Methodology

The aim of this study is to investigate the impact of demographic factors and labor market variables on the pension fund crisis and to rank the components that affect it. Factors such as the ratio of elderly people to the total population, population growth rate, employment status, economic participation rate, minimum wage, temporary work contracts, and the social and economic status of women have been investigated. The present study is of an applied and descriptive-analytical type. One-sample t-test, structural equation modeling, and factor analysis were used to analyze the data. The research questionnaire was completed with the participation of 59 university professors, capital market experts, and pension fund specialists through purposive and snowball sampling.

### 4. Discussion

The findings of the present study show that demographic factors and labor market variables play a tangible and meaningful role in creating imbalances and crises in the funds. The ranking of effective dimensions shows that the ratio of elderly people to the total population has the greatest impact, and the growth of the elderly population, along with the decline in the potentially active population, increases the fund's obligations and puts pressure on its resources. After that, the employment situation is of great importance; without creating new job opportunities, the financial stability and sustainability of the funds is threatened and the ability to support the population under coverage is reduced. Labor market booms and busts severely affect their financial performance through changes in the fund's income sources and expenses. Population growth rates also have a third impact on the Fund's resources, while minimum wages and economic participation rates, given the impact of inflation and the decline in formal work incentives, are an additional factor in reducing the Fund's revenues. Temporary employment contracts and restrictions on women's entry into the labor market also play a small but consistent role in exacerbating the crisis by reducing the labor force entering the insurance system and reducing insurance coverage.

### 5. Conclusion

The findings of this study are consistent with the real developments in the Iranian economy; the economic participation rate has declined to around 40–41 percent in recent years, and the combination of labor force exit from the labor market, population aging, and inflationary pressure on costs has exacerbated the structural challenges of the funds. Based on this analysis, focusing on managing the effects of population aging, improving employment opportunities and quality, reforming wage policies, and promoting economic

participation can have the greatest impact on improving labor market performance and the sustainability of the funds, and provide the basis for achieving development goals and more effective support for the elderly. Therefore, policymakers and fund managers must take these aspects seriously and design and implement coordinated and structural measures to reduce imbalances, improve financial transparency, revise the retirement age and deduction rate, reduce unrealistic obligations, and increase insurance participation so that the funds can emerge from the crisis and play their supportive role sustainably.

## **6. Ethical considerations**

### **6.1. Conflict of interest**

The authors declare no conflict of interest.

### **6.2. Acknowledgments**

This study does not receive financial or moral support from any university or organization. The authors would like to thank the esteemed reviewers who improved the quality of the article with their valuable comments.