



June 2024

National Assembly Budget Office
I Economic Trends I Volume 43

NABO Economic Trends

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국회에산정책처
NATIONAL ASSEMBLY BUDGET OFFICE

Pending Economic Issue

Relationship between Retirement of Korean Baby Boomers and Employee Compensation

“The content of the Pending Economic Issue was prepared by reflecting the individual opinions of the author and may differ from the official opinion of the National Assembly Budget Office.”



Pending Economic Issue

Relationship between Retirement of Korean Baby Boomers and Employee Compensation¹⁾

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1 The Aging of the Baby Boom²⁾ Generations

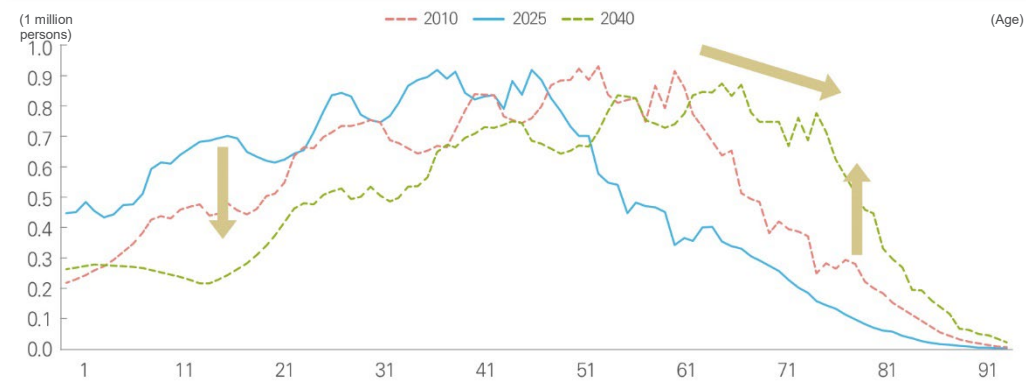
The aging of baby boomers is currently underway and is having a great impact on the economy and society across the board

- **The baby boom generations (First period: Born in 1955-1963, Second period: Born in 1968-1974) form the largest population group in Korean society and are at the peak of the population curve by age**
 - Based on the future population estimate (2022-2072) median scenario released by Statistics Korea in December 2013, if a population curve by age is drawn, it would look like Figure 1
- **Looking at the movement of the population curve by age, while the peak of the curve where the baby boomers are located moves downward to the right, there is a wave that repeats the peak and the trough even after the baby boomers**
 - When comparing the demographic curve by age 15 years ago (2010) and 15 years later (2040) as of 2025, the population in their teens and 20s decreases, while the population in their 70s and 80s increases

1) Employee compensation includes wage or welfare expenses such as housing services, health and health care expenses, and childcare subsidies received by wage workers. Refer to National Assembly Budget Office, 2024, "2024 Economic Outlook III – Income"

2) The baby boom refers to a situation in which the birth rate increases rapidly at a specific time and the number of births increases rapidly, and the first and second periods are divided into the period immediately after the Korean War and the period of rapid economic growth.

| Figure 1 | Changes in Population Composition by Age



Source: Prepared by NABO based on data from Statistics Korea's Future Population Estimate

The retirement of baby boom generations (First period: 61-69 years old, Second period: 50-56 years old) is approaching

- Over the next 10 years, the first baby boomers will exceed their effective retirement age, and the second baby boomers will exceed the official retirement age
 - The official retirement age in Korea is 60, but as of 2022, the average effective retirement age (age when one leaves the labor market completely) is 65.4 for men and 67.4 for women.³⁾

3) Refer to OECD, "Pensions at a Glance 2023."

2

Possibility of a Fall in the Employee Compensation Ratio

As baby boomers start retiring, the overall economy is expected to gradually lose its vitality

- **As the baby boomers age, the Korean economy faces several challenges⁴⁾ in the process of ending the era of population bonus and transitioning to the era of population onus⁵⁾**
 - (Labor supply) The retirement of baby boomers involves a decrease in the labor supply, but the impact may not be significant if the generation's tendency to remain in the labor market intensifies
 - (Public finance) Fiscal income linked to employee compensation may decrease, while fiscal expenditures may increase, mainly on public transfer expenditures for retired baby boomers
 - (Asset demand) When the savings that the baby boomers had accumulated prior to retirement are exhausted, they may sell their financial and real estate assets to raise post-retirement income
 - (Consumption) The demand and supply of related goods and services may expand as the baby boomers who have entered the elderly group emerge as the main consumers

Baby boomers' retirement may affect employee compensation (workers' salaries and wages)

- **Employee compensation refers to wages, salaries, additional benefits, etc. distributed in exchange for labor among the value added incurred in the production activities of a country⁶⁾**
 - In 2022, employee compensation was 1,030 trillion won, accounting for 47.6% of nominal GDP
- **Retirement of baby boomers may primarily affect labor supply and employee compensation**
 - The size of employee compensation may vary depending on how long that generation remains in the labor market after retirement age, changes in the labor productivity of subsequent generations, and changes in average wages
- **Secondarily, the retirement of baby boomers may affect transfer and asset income, consumption, etc.**
 - While conditions such as baby boomers' income and assets remain in good condition, the impact of their retirement will be limited
 - The impact on the national economy may increase in earnest when income conditions deteriorate and the sale of assets, consumption contraction, and dependence on transfer income begin

4) Refer to the Bank of Korea, 2016, "Impact and implications of retirement and aging of baby boomers in major developed countries."

5) There is a high risk that the virtuous cycle (population bonus), which expanded the labor supply as the working-age population increased and economic growth based on it caused population growth again, will turn into a vicious cycle (population onus) between a decrease in the working-age population, a decrease in labor supply, a slowdown in economic growth, and a deepening low birth rate. Refer to NABO, 2020, "Structural Change of the Korean Economy and Response Strategy I."

6) Refer to NABO, 2024, "2024 Economic Outlook III – Income."

Estimation of the impact on employee compensation as baby boomers retire

- **Considering the possibility of a nonlinear relationship between the input and output variables, a hidden layer is set up, and a deep learning neural network model is estimated using the following assumptions:⁷⁾**

- In the input layer, the rate of change of population by age is set as the input variable (80), and in the output layer, the rate of change of national account items (expenditure, production, income) are set as output variables (41)
- Statistics Korea's population data by age from the Future Population Estimates and Bank of Korea's national accounts data were used

| Table 1 | Assumptions Related to Deep Learning Neural Network Analysis

Category	Description
Model learning period	1971-2022 (52 years)
Employee compensation estimation period	2028-2040 (13 years)
Input variable	Rate of change of population by age (Age 1-80) (80 variables)
Output variable	Rate of change of national account items (expenditure, production, income) (41 variables)
Number of estimated models	100 models

Source: National Assembly Budget Office

Proportion of employee compensation to GDP may fall during baby boomers' retirement

- **The trend of the employee compensation ratio for 31 years (2010-2040) before and after 2025 were checked**

- The figure below shows the performance value for 2010-2022, the outlook value of the National Assembly Budget Office for 2023-2027,⁸⁾ and the estimates using deep learning neural networks for 2028-2040
- The employee compensation ratio between 2010 and 2040 is calculated, and a Hodrick-Prescott filter (HP filter) is applied to the ratio to check the trend of changes that will appear during the analysis period

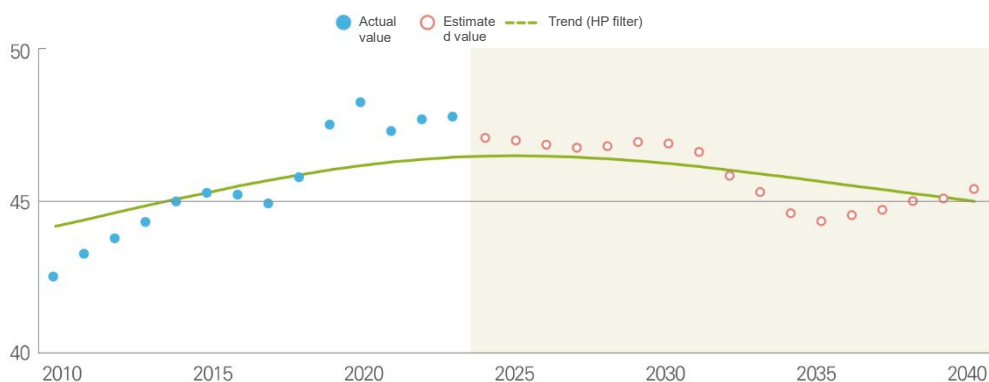
7) Deep learning is a branch of machine learning built on artificial neural networks (ANN). By applying a neural network model to a macroeconomic variable with a small number of observations, regularization (drop-out) is applied to reduce over-fitting, and analysis is performed using the average value after estimating a number of models. Refer to the NABO policy research service report, "Study on GDP Forecasting Model Using Deep Learning Methodology."

8) The change rate of the GDP deflator presented in the "Economic Outlook for 2024 I-Expenditure" and the "Economic Outlook for 2024 and Medium-Term I-Expenditure" is subtracted from the change rate of the nominal employee compensation presented in the "Economic Outlook for 2024 III-Income" and the "Economic Outlook for 2024 and Medium-Term III-Income" of the National Assembly Budget Office.

■ Existing upward trends may turn downward in the process of the baby boomers' retirement

- The result is based on the implicit assumption that the correlation established in the past between the change in demographic structure by age and the major variables of the national economy will remain the same afterwards
- Compared to the slowdown in gross domestic product growth following the retirement of baby boomers, the slowdown in employee compensation growth was more severe, and so it can be seen that the employee compensation ratio is getting lower
- Changes in labor productivity, changes in average wages, changes in new labor supply, and intensifying automation in post-baby boom generations will be factors in how fast the employee compensation ratio declines

| Figure 2 | Compensation of Employees as a Percentage of GDP



Source: National Assembly Budget Office

3 Implications

Comprehensive countermeasures are needed to prepare for the decline in employee compensation ratio following the retirement of baby boomers

- **If the baby boomers, who account for a high proportion of the population in Korean society, retire, there is a risk that the income conditions of the population will deteriorate after their retirement, and the economic and social burden will become full-fledged**
 - As shown in the analysis, if the employee compensation to gross domestic product ratio declines in a trend due to the retirement of baby boomers, there may be difficulties in household consumption and financial management
 - The greater the change in behavior following the retirement of baby boomers, the greater the economic shock
- **Comprehensive countermeasures are needed to soften the shock of the retirement and aging of baby boomers**
 - Promote employment of the elderly, including the extension of the retirement age,⁹⁾ and expand employment of women and foreigners
 - Improve labor productivity and support a stable rise in earned income linked to it
 - Asset market shock risk management, considering the sale of financial and real estate assets of the elderly¹⁰⁾
 - Strengthen the connection between public safety net (social insurance) and private safety net (private insurance) to cope with complex tasks (guaranteeing old-age income for the elderly, fiscal soundness of public safety net, burden on future generations, etc.)
 - Provide institutional support to support the expansion of the supply of goods and services (e.g., health care, medical care, social welfare, etc.) for which demand is expected to expand with the increase of the elderly and the transformation of related industrial structures, etc.

9) The extension of the retirement age is examined in detail by NABO in 2024, "Challenges to the Korean Economy for Sustainable Growth," "VI. Employment: Measures to Promote Employment of the Elderly, Such as Extending the Retirement Age."

10) Refer to "If the timing of the sale of financial and real estate assets of baby boomers is delayed depending on the future economic environment, there may not be a drastic change," Bank of Korea 2016, "Impact and implications of retirement and aging of baby boomers in major developed countries"; CBO 2009, "Will the Demand for Assets Fall When the Baby Boomers Retire?"

nabo Economic Trends
Economic Trends

June 2024 Issue Volume 43

Published on	June 26, 2024
Approved by	Jo Ui-seop, Chief of National Assembly Budget Office
Editing	Economic Analysis Department Economic Analysis Coordination Division
Published by	National Assembly Budget Office 1 Uisadang-daero Yeongdeungpo-gu, Seoul, Korea (02-2070-3114)
Produced by	Design Yeobaek Plus Inc. 02-2672-1535

새로운 **희망**을 만드는 국회



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Tel. 02-2070-3114 www.nabo.go.kr

Publication Registration Number	
31-9700495-002038-07	
ISSN	2950-922X



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