11. Social Security

**11.1** For a given economy with a pay-as-you-go system, it is expected that the employed population will grow by 0.3% per year over the next 20 years and that, due to the ageing of the population, the number of pensioners will grow at an average annual rate of 1.6%. The government wants the average pension to grow at 2% per year.

a) Suppose the social security system is currently financially balanced. What should the annual GDP growth rate be in order to maintain this balance, without increasing the rate of contributions to the system and assuming that the functional distribution of income does not change during this period?

b) Consider now that while the functional income distribution remains unchanged, average labour productivity grows at 1% per annum and the employed population grows at 0.2% per annum. As before, the annual growth in the number of retired persons is 1.6% (as before) and the government wants the average pension to grow at 2% per annum. Compute the implication in terms of the contributions rate and discuss it.

**11.2** Consider an economy whose social security system is based on a pay-as-you-go system. Its Office of Studies and Planning has the following projections for the next 20 years: the working-age population in 2019 (all employed) is estimated at 5 million people and is expected to grow to 5.526 million by 2039; the number of pensioners will grow at the annual average rate of 4% in the period; it is also predicted that GDP, at constant prices, will grow at the annual average rate of 4% and that there will be no change in the functional distribution of income. Based on these elements, the Government has set the objective of increasing the average retirement pension by 1% per annum without raising the rate of contributions but maintaining the balance of the system.

a) Check whether the objective set by the Government is attainable under the projections indicated above.

b) If it is not feasible, what change can be made to the contribution rate to help achieve this objective?

c) If 600,000 migrant workers enter the labour force, evenly distributed throughout the 20 years, and assuming that all other variables remain unchanged from (a), what should be the change in the rate of contribution to achieve the government's goal? Discuss.

**11.3** Consider an economy whose Social Security is based on a pay-as-you-go system, where for the next twenty years (2023 to 2043) the following information is projected: GDP will grow at an average annual rate of 2%; the labour force (all employed), at the end of the period, will be 20% higher than in 2023; the number of pensioners in proportion to the working population will be 30% higher in 2043; and real wages are expected to grow in line with average labour productivity. Suppose, furthermore, that the Government's objective is to increase the average retirement pension by 1% per annum without increasing the rate of social security contributions.

a) Check whether this Government objective is feasible.

b) Indicate and explain adequately an example of an additional measure that the Government could take to make possible the objective considered above.

c) If the Government chooses to attain this objective through faster economic growth, what should GDP growth be to ensure the desired real growth of the average retirement pension?

**11.4** In economy X, GDP per capita (Y/N) grew by 3% per year between 2014 and 2022, while, due to demographic ageing, the share of the working-age population in the total population (P\*/N) decreased by 2% per year in the same period.

a) If average labour productivity (Y/L) grew by 2% per year in this period, compute by how much the employment rate (L/P\*) grew in this period.

b) Consider the data from (a) and assume further that the working-age population remained constant throughout the same period; that the average wage decreased by 5% per year; that the retired population increased by 2%; and that the both the rate of social security contribution and the contribution from the government budget to the social security remained unchanged. Under these assumptions, what was the annual rate of change in the average pension?

**11.5** Discuss the following statement: “Population ageing in advanced economies can only be adequately addressed through a combination of delaying the retirement age and reducing the average pension.”

**11.6** If, in country A, GDP per capita grew in 2022 by 3.4%, average labour productivity grew by 1.6% but the ratio of employed persons to old-age pensioners has remained constant, what conclusion can you draw regarding the share of old-age pensioners in this population?

**11.7** Discuss the main risks posed by a private fully-funded social security system compared to a publicly-funded pay-as-you-go system.