Review of Economic Dynamics ••• (••••) •••–•••

Contents lists available at ScienceDirect

Review of Economic Dynamics

www.elsevier.com/locate/red

Sustainable social security: Four options

Sagiri Kitao

Hunter College, CUNY, United States

ARTICLE INFO

Article history:
Received 23 November 2012
Received in revised form 25 November 2013
Available online xxxx

JEL classification:
E2
E6
H55
J2

Keywords:
Social security reform
Retirement age
Demographic shift
Transition dynamics
Intensive and extensive labor supply margins
Welfare analysis

ABSTRACT

Four options to make the social security sustainable under the coming demographic shift are presented; increase payroll taxes by 6 percentage points, reduce replacement rates by one-third, raise the normal retirement age to 73, or means-test the benefits and reduce them in income. The paper accounts for labor supply at both intensive and extensive margins and analyzes welfare effects across agents that differ in age, wealth and cohorts. While the four policies all achieve the same goal, economic outcomes differ significantly. Options to curtail benefits encourage own savings and capital accumulation, while the payroll tax increase and the means-test reduce work effort. Future generations prefer options to reduce benefits, but current generations prefer to finance the transition with payroll taxes.

1. Introduction

"U.S. fiscal policy is unsustainable. […] That can't possibly be true because government budget constraints are going to make it sustainable. […] Certain promises that people have made about taxes, entitlements, …, those are incredible. They are not going to fit together. U.S. fiscal policy is sustainable. […] It's uncertain because it's not clear which of these incredible promises is going to be broken first".

[Thomas Sargent, Nobel Prize Press Conference at Princeton University, October 10, 2011]

The coming demographic shift will pose a significant fiscal challenge on the budget of the social security system in the U.S. The long-run sustainability of the pension system must come with a reform of the existing system to close the budget gap. The question is which of the "incredible promises" is to be broken, how much adjustment is needed and what will be the consequence.

Life expectancy has grown dramatically during last decades to 77 years in 2000 and it is projected to reach 85 years by the end of the century.[1] At the same time, birth rates have declined sharply and the total fertility rate stands at about 2.0 in 2000. The dependency ratio is projected to rise rapidly from the current 22% and reach 38% in 2050 and 45% in

E-mail address: sagiri.kitao@gmail.com.

[1] These life expectancies are based on the average of male and female period life expectancies, as reported in Bell and Miller (2005).

1094-2025/$ – see front matter
http://dx.doi.org/10.1016/j.red.2013.11.004

Please cite this article in press as: Kitao, S. Sustainable social security: Four options. Review of Economic Dynamics (2013), http://dx.doi.org/10.1016/j.red.2013.11.004

2100.[2] More retirees will receive benefits, while fewer individuals work and contribute to the system through taxes. The policy debate and public concerns appear to be mostly focused on the insufficient fund of the pension system imputed from simple accounting exercises. Economic distortions, however, that would emanate from fiscal adjustments to maintain the pay-as-you-go system could exacerbate the fiscal problem. To quantify the effects of the demographic shift and fiscal consequences, we develop an economic model in which individuals make decisions on consumption, savings, labor participation and work hours over a life cycle in a competitive production economy.

The paper builds a model with endogenous saving and labor supply at both extensive and intensive margins and considers four policy options that would make the social security system self-financed and its budget balanced every year; (1) raise the payroll tax by 6 percentage points, (2) reduce the replacement rates of the benefit formula by one-third, (3) increase the normal retirement age from 66 to 73, or (4) make the system means-tested and let the benefits decline one-to-one with income. All of the four options are shown to achieve the same goal of making the system self-financed. The economies, however, implied by alternative policies differ significantly from each other in terms of aggregate economic activities as well as the behavior of individuals along the life cycle. Reducing the spendings through scaling down the benefit replacement rates or raising the normal retirement age will provide strong incentives to increase savings to supplement retirement consumption and the capital stock will be significantly higher than in the other two options. The higher payroll taxes will have negative work incentives and the participation rates in the first option will be much lower than in the second and third options. The average years of work is 44.5 years in option 1, while it is 46.7 and 46.2 years in options 2 and 3, respectively. The option, however, that discourages work effort the most, is the last option of means testing the benefits. The policy significantly reduces the labor force participation among the elderly. The labor force participation will plummet once individuals reach the normal retirement age and only 4.3% of those at age 65–85 will participate, while about 12 to 19% of those individuals would remain in the labor force in other reforms.

We also compute transition dynamics and study welfare effects of alternative policy options across individuals that differ in age and wealth at the time of a reform, as well as across current and future generations. Policies to reduce benefits encourage economic activities, but there will be large welfare costs on the current generations. While future generations will prefer lower benefits and lower taxes, current generations would prefer to finance the demographic transition through taxes, especially the middle-aged individuals who have already contributed to the program through payroll taxation.

This paper builds on the vast quantitative research on social security reforms and aging demographics in the tradition of general-equilibrium life-cycle models pioneered by Auerbach and Kotlikoff (1987).[3] Existing papers study effects of particular and often ad hoc reforms of the current social security system. For example, Nishiyama and Smetters (2007) simulate a 50% privatization and İmrohoroğlu and Kitao (2009) study the effects of half and full privatization of social security system in the U.S. This paper presents a set of policy options that make the social security self-financed as the economy faces the coming demographic shift. The set encompasses the range of possible and well debated reforms and we quantify the magnitude of changes under each option that would restore the long-run sustainability of the program, taking into account the responses to reforms in aggregate variables as well as life-cycle behavior of individuals.

Most papers in the quantitative general-equilibrium literature including the papers listed above assume that labor supply is either exogenous or endogenous only in the intensive margin. Our model endogenizes labor supply in both margins and examines the changes in participation as well as work hours in response to reforms. Recent exceptions are İmrohoroğlu and Kitao (2012) and Díaz-Giménez and Díaz-Saavedra (2009). İmrohoroğlu and Kitao (2012) incorporate endogenous participation as well as social security benefit claims and focuses on two particular reforms to change retirement ages. Díaz-Giménez and Díaz-Saavedra (2009) study the effects of reform of the Spanish pension system to raise the retirement age in a model with endogenous retirement decisions. Reforms are shown to affect both margins in different ways and exhibit a considerable degree of heterogeneity in the responses across them.

The rest of the paper is organized as follows. Section 2 presents the model economy and the calibration of the model is discussed in Section 3. Section 4 presents the quantitative findings of the paper. Section 5 concludes.

2. Model

This section describes the details of the economic model and presents individuals' recursive problem and the definition of a stationary equilibrium.

2.1. Demographics

The economy is populated by overlapping generations of individuals. Individuals enter the economy at age j_0 and face lifespan uncertainty. The conditional probability of survival from age j to age $j+1$ is denoted as s_j. The maximum possible age is $j = J$, with $s_J = 0$. The size of new cohort grows at a constant rate n. Individuals derive utility from leaving bequest

[2] The dependency ratio is defined as the ratio of population above age 65 to that of age 20 to 64. Source: Bell and Miller (2005) for life expectancy and the Census for dependency ratio: http://www.census.gov/population/www/projections/.

[3] See, for example, Conesa and Krueger (1999), De Nardi et al. (1999), Kotlikoff et al. (1999, 2007), Altig et al. (2001), Nishiyama and Smetters (2007), Attanasio et al. (2007) and İmrohoroğlu and Kitao (2009).

Please cite this article in press as: Kitao, S. Sustainable social security: Four options. Review of Economic Dynamics (2013), http://dx.doi.org/10.1016/j.red.2013.11.004