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The Aging Population and Sustainability of the Pension Scheme: Simulations of Policy Options for Vietnam

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Abstract

Various population projections show that Vietnam's population will age swiftly in the coming decades. As such, the operation of a pay-as-you-go financing mechanism would inevitably find the pension fund unbalanced as well as generate pension liabilities, which in turn would threaten financial sustainability and affect inter- and intra-generational inequities. To compare with previous studies, this paper provides calculations for the pension fund balance and close-group pension liabilities for Vietnam under new social insurance regulations. The simulated results show that the pension fund will be fully depleted in about 30 years, and pension liabilities – though small as a percentage of national income – would involve higher taxes for future workers. Based on these findings, the paper suggests an income security system in which contributory and non-contributory pensions would be supplementary to each other with clear roles in redistribution and consumption smoothing.

Keywords: Aging; pension fund; pension liability/debt; retirement; Vietnam.

1. Introduction

Changes in the age structure of populations have various impacts on economic growth and social aspects in countries, regions, and the world as a whole. One of the obvious changes in recent years is population aging, in which the older population (those aged 60 and over) has increased in both relative terms (as a percent of the total population) and absolute terms (in number). The UN population projection's 2017 revision (UN, 2017) shows that the number of older people will rise from 962 million globally in 2017 to 2.1 billion in 2050 (or from 13% to 25% of the world population, respectively).

Vietnam is not exceptional in this demographic trend. Statistics and projections by GSO (2016) show that Vietnam has entered an "aging" population stage (when the number of people aged 65 and over account for 7% of the total population) since 2010, and it will take Vietnam less than 20 years to transit to an "aged" population (when the number of people aged 65 and over account for 14% of the total population). A fast lowering fertility rate and increasing life expectancy have contributed significantly to this status (UNFPA, 2011). The aging index – which is measured by the number of older people to 100 children (aged 0-14) – will surpass 100 in 2033, meaning that the older population will be higher than the child population from 2033 onwards. The older population will account for 26% of the total population by 2050, which will be higher than the world average.

An aging population requires comprehensive sets of strategies, policies and programs for healthcare and retirement of the aged, and as such it will affect financial sustainability of the pension fund in particular and the national budget in general. Positive or negative impacts of an aging population on the pension fund balance will depend on how the pension scheme is designed (World Bank, 1994; Kunieda, 2002; ILO, 1998, 2013). There has been a widespread recognition that the financial viability of the pay-as-you-go defined benefit (PAYG DB) pension system will deteriorate in an aging population since it is mostly unfunded, and such a pension scheme will result in both inter- and intra-generational inequities (World Bank, 1994; ILO, 1998, Holzmann et al., 2000; Giang, 2012). Thus, under swiftly aging populations, many governments are seeking ways to reform their PAYG DB pension schemes so as to reach financial sustainability. Vietnam – with its PAYG DB pension system – has faced a variety of challenges in regard to financial balance, and it is now also seeking different policy options under aging population and contexts of a middle-income country.

This paper is an updated version of Giang (2012) with new calculations of the pension liabilities of the pension fund in Vietnam, based on new regulations from the Social Insurance Law. In addition, not only will this paper discuss the policy options for the pension fund sustainability, it will also discuss the design of the income security system for older people in Vietnam in the coming years under an aging population. The paper is structured as follows. In Section 2, we will provide an analytical framework and data to calculate financial flows of the pension fund (following ILO, 2013) and the pension liabilities (following Franco et al., 2004). Section 3 will provide key findings and analyses, while Section 4 will discuss policy

options to reach pension fund sustainability and design of an income-security system for older people in Vietnam. Concluding remarks will be provided in Section 5.

2. Analytical framework and data

2.1. Calculations of the long-term pension fund balance

To calculate the long-term financial balance of the pension fund, we will forecast the related indicators, including demographic factors (such as population and active labor force), macroeconomic factors (such as inflation and wage growth), and pension scheme indicators (such as active contributors and pensioners). The general projection flows are illustrated in Figure 1.

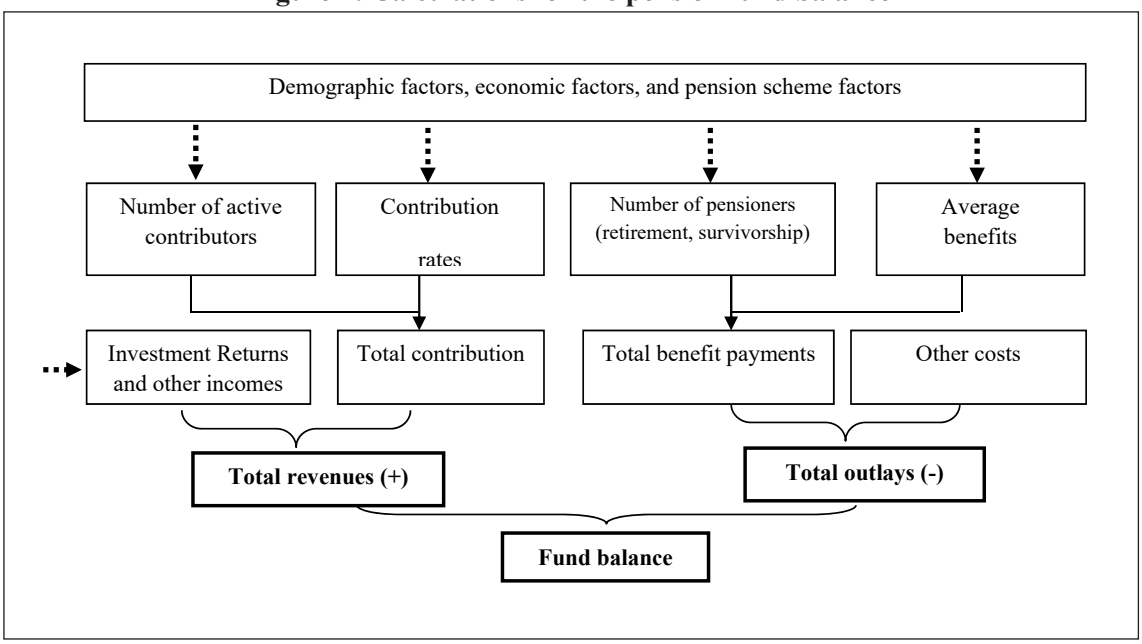
2.2. Calculations of the pension liabilities

Pension liabilities can be calculated in various ways (Holzmann et al., 2004). To provide arguments for the pension reform options for Vietnam, this paper will apply the close-ended approach proposed by Franco et al. (2004). This means that with the current settings of the pension scheme in Vietnam, the pension liabilities will be calculated until the youngest contributors in the year 2015 will die (assuming they were 20 years old in 2015), and there will be no new entrants to the scheme. The pension liabilities include those for the current pensioners and those for the current contributors, as follows.

2.2.1. Pension liabilities of the current pensioners

Suppose that, in the year 2015, N_j is the number of pensioners of age j, each of whom receives B_j as their average pension, and that their survivorship probability in a certain year

Figure 1: Calculations for the pension fund balance



Source: Own modifications, based on ILO (2013)

i is $S_{j,i}$. We also assume that they will survive until age D, meaning that they will receive benefits in (D-j) more years. In addition, it is assumed that the government will adjust the pension benefit at p% per annum during the forecast period; set $\bar{j}$ as the minimum age of pensioners, and set r as the discount rate, the present value of the pension liabilities of these people at the year 2015 ($PVP_j(2015)$) will be:

$$PVP_j(2015) = \sum_{j=\bar{j}}^{D} N_j B_j \sum_{i=2015}^{2015+D-j} S_{j,i} \left(\frac{1+p}{1+r}\right)^{i-2015} \quad (1)$$

2.2.2. Net pension liabilities of the current contributors

The pension liabilities of the current contributors will be calculated using (i) their accrued contributions and benefits up to the year 2015 and (ii) their future contributions and benefits from 2015 until they all die. Let us assume that N_j^c is the number of active contributors of age j in the year 2015; B_j^c is the average pension paid at retirement to the contributors of age j in the year 2015 measured as contributions already paid (in other words, accrued-to-date contributions); $Q_{j,i}$ is the probability of receiving a pension at year i for active contributors of age j in the year 2015; $S_{j,i}^c$ is the probability of being alive in the year i for a contributor of age j in the year 2015; PF_j^c is the average pension paid at retirement to contributors of age j in the year 2015 measured on the basis of future contributions; C is the contribution rate according to labor income in the year i for the contributor of age j in the year 2015 (i.e. $F_{i,j}$); and $R_{i,j}$ is the probability of being in employment in year i for contributors of age j in the year 2015. The total present value of pension liabilities of the current contributors is:

$PVC_j(2015) = PVC_j1(2015) + PVC_j2(2015) =$

$$= \sum_{J=\bar{j}}^{D} N_j^c \left[B_j^c \sum_{i=2015}^{2015+D-j} Q_{j,i} S_{j,i}^c \left(\frac{1+p}{1+r}\right)^{i-2015} \right] + \sum_{J=\bar{j}}^{D} N_j^c \left[PF_j^c \sum_{i=2015}^{2015+D-j} Q_{j,i} S_{j,i}^c \left(\frac{1+p}{1+r}\right)^{i-2015} - C \sum_{i=2015}^{2015+D-j} - R_{j,i} FI_{j,i} \left(\frac{1+p}{1+r}\right)^{i-2015} \right] \quad (2)$$

Where: $PVC_j(2015)$ is the present value (in 2015) of net pension liabilities to the current contributors; $PVC_j1(2015)$ and $PVC_j2(2015)$ is the present value of the accrued contributions and net benefits, respectively.

For each generation, the present value of (net) pension liabilities may be taken to represent its generational account. A positive value of this account indicates that the generation receives transfers from other ones, and vice versa.

To pay for such pension liabilities to both current pensioners and current contributors, we assume that the annual payment will be a constant proportion (t%) of the national income Y. Suppose Y will grow at g% per annum, and r% is the discount rate for the whole forecast period. As such, the pension liabilities (PL) as a function of Y, t, g, r in a period of n years is presented as:

$$PL = \left[tY_1 + tY_2(1+r)^{-1} + tY_3(1+r)^{-2} + ... + tY_n(1+r)^{-(n-1)} \right]$$

$$= tY_1 \left[1 + \left(\frac{1+g}{1+r}\right) + \left(\frac{1+g}{1+r}\right)^2 + ... + \left(\frac{1+g}{1+r}\right)^{n-1} \right]$$

$$= \text{tY1}[1 + \text{a} + \text{a}^2 + \ldots + \text{a}^{\text{n-1}}] = t.Y_1 \frac{(a^n - 1)}{(a-1)} \quad (3)$$

Where: $a = \left(\frac{1+g}{1+r}\right)$

As such, $t = \frac{PL}{Y_1}\left[\frac{a-1}{(a^n-1)}\right]$ for all $a \neq 1$ (4)

2.3. Data and assumptions

Population projections by gender and 5-year age groups for the period 2014-2049 are from

GSO (2016).

Data for the current pensioners are categorized by gender and 5-year age groups. Their respective survival rates are adapted from the population projections by GSO (2016).

Data for the current contributors are also categorized by gender and 5-year age groups. The projections of the future benefits and contributions follow two key assumptions: (i) no early or late retirement; and (ii) no differences in average wages between contributors working for public and private organizations. These assumptions are adapted from the Social Insurance Law in 2014. The respective survival rates are also adapted from the population projections by GSO (2016). For the sensitivity tests, it is assumed that the current normal retirement age for men (60) and women (55) will be increased to 63 and 58, respectively.

The growth rate of average wages (or average compensations) of contributors, which are used in calculating contributions to the pension scheme, are assumed to grow at the same rate (p). It is supposed that p is the same as the productivity growth rate, which is assumed to be 3 percent for the whole forecast period. In the sensitivity tests, this growth rate will have a ±1 percent difference.

The discount rate (r) is the critical factor for determining the size of pension liabilities since a lower discount rate leads to a greater present value of (net) pension liabilities, and vice versa. In the base case, it is assumed that the discount rate is the same as the wage growth rate. In sensitivity tests the discount rate will be examined with a ±1 percent difference from the wage growth rate.

3. Analysis of findings

Table 1: Coverage by participation type, 2007-2014

	Indicators	2007	2008	2009	2010	2011	2012	2013	2014
	Total labor force (1,000 persons)	47,160	48,210	49,322	50,393	51,398	52,348	53,246	53,748
	Employed (1,000 persons)	45,208	46,461	47,744	49,049	50,352	51,422	52,208	52,745
I	***Mandatory Scheme***								
	Persons (1,000)	7,429	8,539	8,901	9,441	10,104	10,432	10,889	11,452
	As % of labor force	15.75	17.71	18.05	18.74	19.66	19.93	20.45	21.31
	As % of the employed	16.43	18.38	18.64	19.25	20.07	20.29	20.86	21.71
II	***Voluntary Scheme***								
	Persons (1,000)	0	6	41	81	96	134	168	196
	As % of labor force	0	0.01	0.08	0.16	0.19	0.26	0.32	0.37
	As % of the employed	0	0.01	0.09	0.17	0.19	0.26	0.32	0.37
III	***Total***								
	Persons (1,000)	7,429	8,546	8,942	9,523	10,201	10,565	11,057	11,648
	As % of labor force	15.75	17.73	18.13	18.90	19.85	20.18	20.77	21.67
	As % of the employed	16.43	18.39	18.73	19.41	20.26	20.55	21.18	22.08

Source: Authors' compilations from MOLISA (2015) and GSO (2015)

Table 2: Coverage by ownership type

No.	Types of ownership	2007	2008	2009	2010	2011	2012	2013	2014
1	***Public***								
	Total employees	4,988	5,059	5,041	5,107	5,251	5,354	5,330	5,474
	SI participants	3,840	4,443	4,552	4,570	4,701	4,766	4,829	4,923
	SI participants as % of total public employees	76.97	87.82	90.32	89.48	89.53	89.03	90.59	89.94
2	***Non-public & foreign-related***								
	Total employees	40,220	41,402	42,703	43,941	45,101	46,069	46,877	47,271
	SI participants	3,589	4,096	4,349	4,871	5,404	5,665	6,060	6,529
	SI participants as % of total non-public and foreign-related employees	8.92	9.89	10.18	11.09	11.98	12.30	12.93	13.81

Source: Authors' compilations from MOLISA (2015) and GSO (2015)

3.1. Overview of the Vietnamese pension scheme

The Vietnamese pension scheme is designed as a PAYGDB scheme. Currently, the scheme is covering a small proportion of the labor force as well as the total employed (Table 1). In terms of participation type, the majority are from the mandatory scheme, while it has been extremely limited for the voluntary scheme.

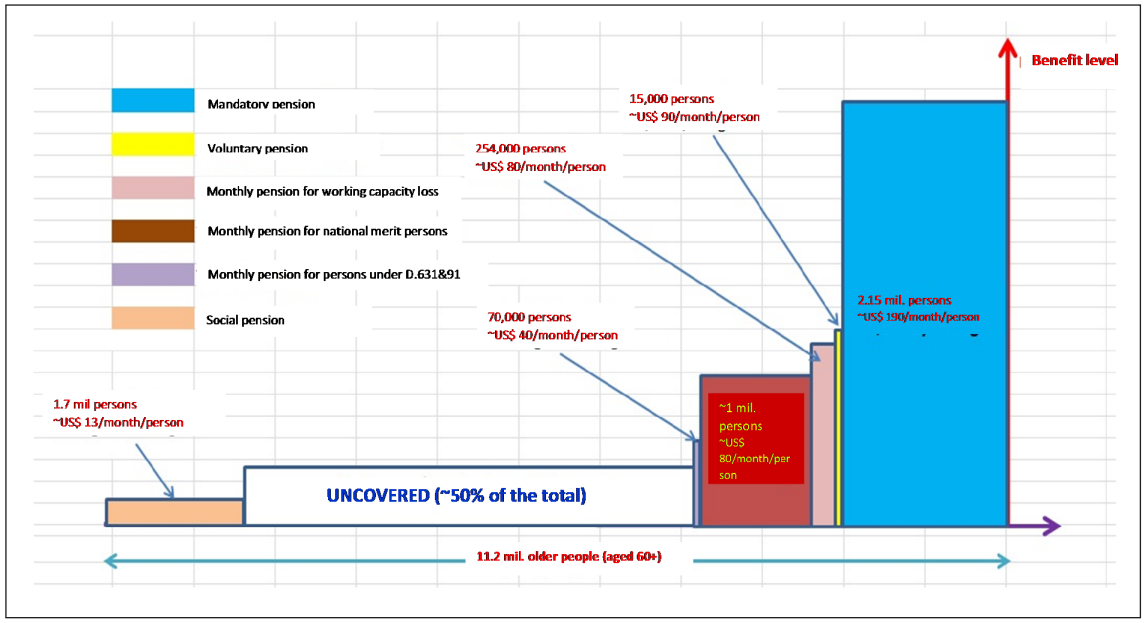
In terms of ownership type, workers from the public sector account for the majority. This is really a biased coverage, since public sector workers account for a small proportion of the labor force as well as the total employed. At the same time, the non-public sector and foreign-related workers are the majority in the labor force, but their coverage by pensions is really limited (Table 2).

Regarding coverage, the current scheme is also covering a small proportion of the older population (merely about 23%). Figure 2 shows that more than 25% of the older population is covered by other social protection benefits (such as national merits and other social assistance benefits). As such, only about 50% of Vietnamese older people are receiving benefits from the social protection system in Vietnam. This is a critical issue for the Vietnamese pension system in Vietnam – low coverage rates for both contributors and beneficiaries.

3.2. Long-term pension fund balance and pension liabilities

Figure 3 presents the status-quo projections (i.e., if no policy changes are taken) for the pension fund up to 2049. As it is presented, the pension fund will be balanced (i.e., total contributions will be equal to the total benefit payments) by 2033. From 2034 onwards, the

Figure 2: The current coverage of social protection benefits for older people



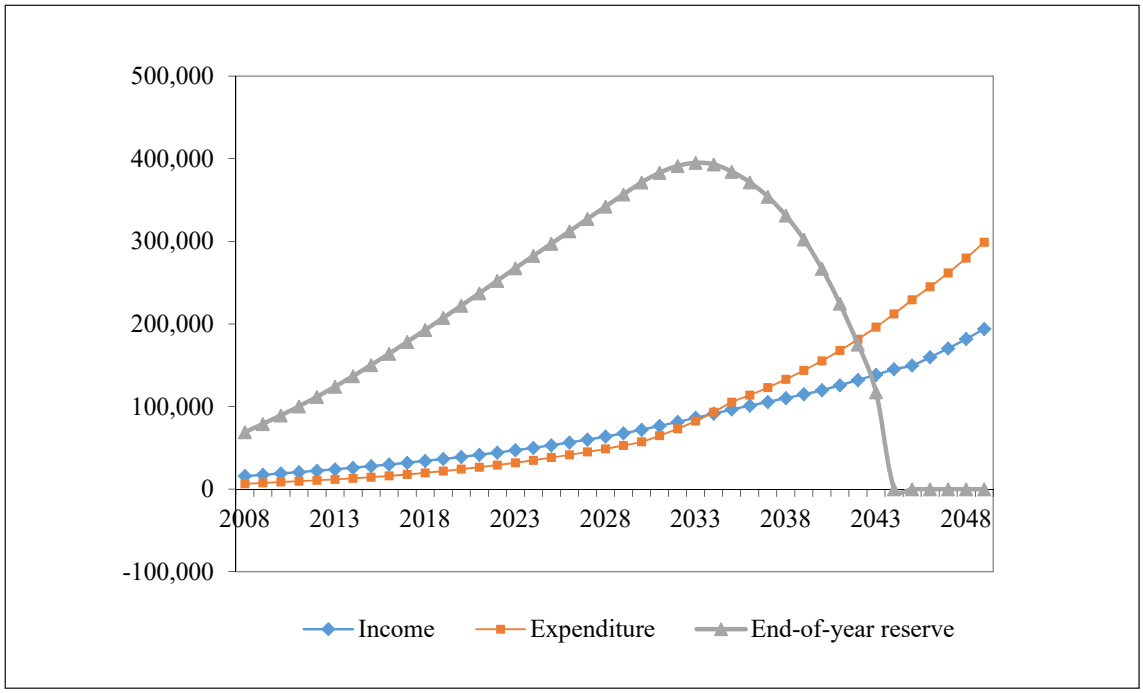
Source: MOLISA (2017)

pension fund will be financially operated by its accumulated savings. The pension fund will be fully depleted about 10 years later, i.e., by 2044. Even though the starting year for projections was different, these findings are not different from those from Giang (2012) and ILO (2013), mainly because the coverage rate is assumed to change slowly while other macroeconomic factors are assumed to remain the same. As such, the total contributions will increase more slowly than the total benefit payments.

Figure 4 presents how the pension fund would be changed if in the base year (i.e., 2015): (i) the normal retirement ages for men and women would be increased from 60 and 55 to 63 and 58, respectively; or (ii) the total contribution rate (from both employers and employees) would be increased from the current level (22%) to 28%. It shows that increasing the contribution rate would help to extend the pension fund balance for 5 more years compared to the status-quo situation (from 2033 to 2038). Increasing normal retirement ages by 3 years for both men and women would help to extend the pension fund balance for about 10 more years compared to the status-quo situation (from 2033 to 2043). It is worth noting however, that in either case the pension fund would be finally depleted, meaning that various reforms would be necessary to make the pension fund balanced in the long-term.

Along with the pension fund balance, Table 3 shows the projected pension liabilities for the whole projection period under the assumptions that the discount rate will be equal to the wage growth rate (at 3% per annum). Two scenarios, in which the discount rate is at about a ±1 percentage point difference, are also presented.

Figure 3: Long-term pension fund balance



Source: Authors' calculations, updated using assumptions from Giang (2012)

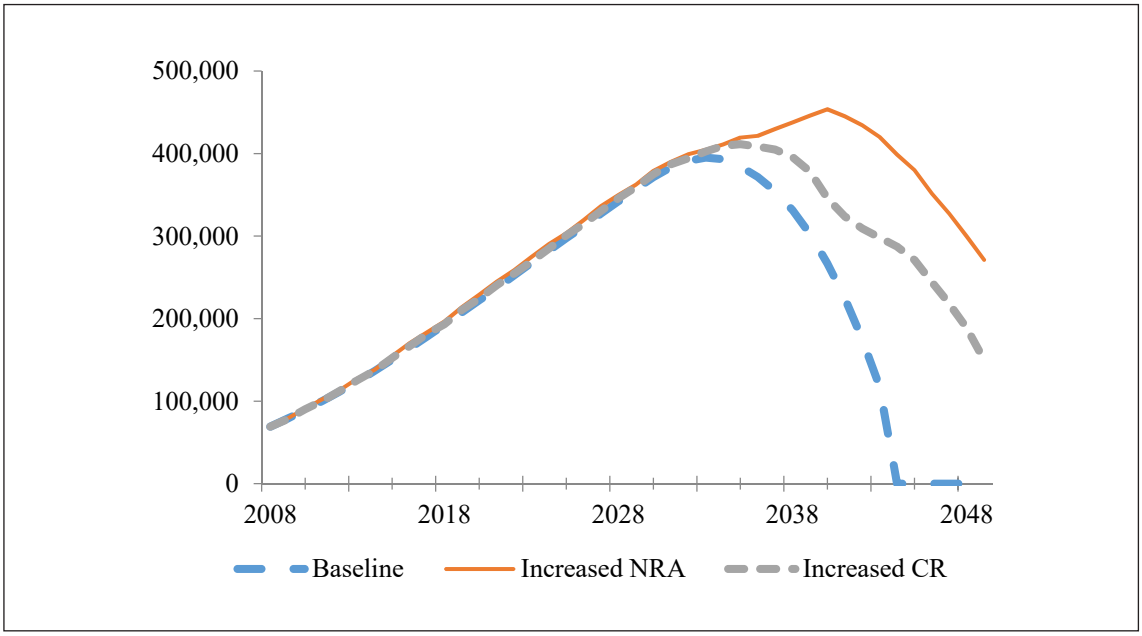
Table 3 indicates that in comparison with the 2015 GDP, the total pension liability is quite small. This result can be explained by the fact that the current PAYG DB pension scheme in Vietnam has a quite low coverage rate and that average labor compensation and pension payments are low. Another possible cause for such a low pension liability is that we use the closed-group approach, which limits the number of future contributors and pensioners. As expected, in the baseline case, the generational accounts of pensioners are positive, and the estimated total pension liability of these pensioners will be about 2.1 percent of 2015 GDP. Both generational accounts of the current contributors are also positive, and their estimated net pension liability will be about 2.5 percent of 2015 GDP, meaning that they will also be positive bene-

Table 3: Net pension liabilities (as % of 2015 GDP)

Category	Discount Rate		
	2%	3% (Baseline)	4%
Pensioners	2.4	2.1	1.9
Contributors	2.6	2.5	2.4
Total	5.0	4.6	4.3

Source: Authors' calculations

Figure 4: The pension fund balance under different options



Source: Authors' calculations, updated using assumptions from Giang (2012)

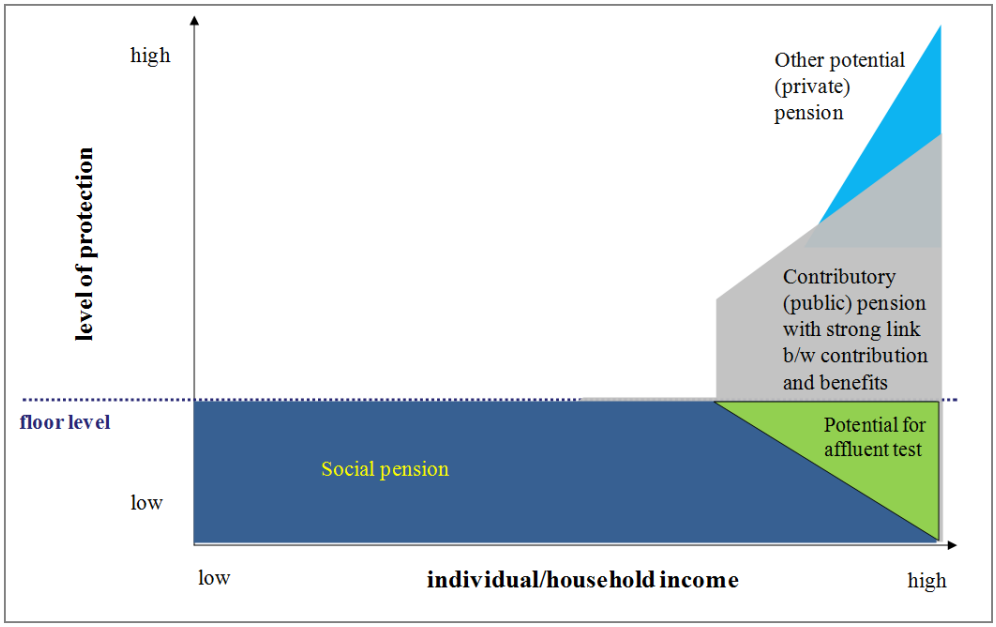
ficiaries in the future. For the two alternative scenarios (where the discount rate is at about a ±1 percentage point difference from the baseline case), we find similar trends for both pensioners and contributors in the future.

In all cases, intergenerational and intra-generational inequities are obvious since the current workers (who are not participating in the pension scheme) and the future workers will be losers in the "generational battle" as long as the government pays these liabilities using higher tax rates. It is, however, also apparent that the government must pay these liabilities in any case, so it remains important to find appropriate payment settings which ensure the government's financial solvency. As presented in equation (4), t will be about 0.15% of GDP annually. As argued in Kunieda (2002), if the Vietnamese economy is dynamically efficient (i.e., if g will be smaller than r), the tax rate (t) must be higher and thus both intergenerational and intra-generational inequities will become more severe. Higher economic growth is one possible source of mitigating the financial and generational problems of the pension scheme.

4. Policy options

Up to this point, this paper has shown that the current PAYG DB pension scheme in Vietnam has a low coverage rate of both the labor force and the employed, and that an expansion of the coverage (via increasing normal retirement ages for both men and women) or an increase in contribution rates (for both employers and employees) would help improve its financial viability. The same as other previous studies, however, this paper indicates that the pension fund would be fully depleted because such parametric reforms would not be able to pro-

Figure 5: Design option of the income security system for older people



Source: UNFPA and ILO (2014)

vide long-term sustainability, and the pension scheme would be involved in a "vicious circle" of both inter- and intra-generational inequities, especially in regard to paying pension liabilities by collecting more taxes or contributions from the future generations. This means that the current pension scheme should be re-designed so as to adapt to a swiftly aging population in the coming years. More importantly, such a re-designed pension scheme should serve to provide income security for older people. This means that not only contributory pensions are needed, but non-contributory (or social) pensions are also designed to provide supplementary income for older people.

Under the social protection floor (SPF) proposed by the ILO, it is suggested that Vietnam provides an income security system composed of both non-contributory and contributory pensions, which are distinct in the function of redistribution (for the former) and consumption smoothing (for the latter), as presented in Figure 5. For this income security system, the foundation of the pension system is a tax-financed universal (or near-universal) social pension with a flat-rate benefit. Rather than being earning's-related, there is a certain benefit level for all older people regardless of their income levels. This shows the role of a non-contributory pension. At the same time, a contributory pension scheme will provide additional income for contributors. With the primary redistribution function of the pension system being performed by a non-contributory pension, the contributory pension scheme will be more clearly focused on consumption smoothing. More importantly, such a contributory pension scheme will be likely to make a

closer link between contributions and benefits – rather than the current pension scheme which provides mixed functions of redistribution and consumption smoothing.

More critically, the current low coverage of the pension scheme in Vietnam has been due to the fact that informal sector workers account for a large proportion of the labor force, and thus the pension scheme should be designed in ways to encourage more informal sector workers to participate, as Holzmann et al. (2014) argued, a careless design of a pension scheme might result in counterproductive issues if it reduces the incentive to become formal while increasing pressure on formal sector workers to become informal as their tax burden increases. As such, the simplest model for the non-contributory pension scheme is a universal pension based solely on citizenship/residency and age. This scheme avoids the disincentive to work and save inherent in means-tested plans (World Bank, 1994).

To save financial resources for the government, it is also suggested that some form of "affluence test" be introduced for high-income older people by either (i) excluding those with adequate pension benefits from the social pension (such as in the current pension-tested social pension scheme, and which also exists in Chile, Sweden and the Maldives), or (ii) excluding those with high levels of income or assets from the social pension (as exists in South Africa and Australia). In either case, it is optimal to gradually exclude higher-income individuals from the system rather than remove the full social pension at a given income cut-off point. By introducing an effective tax on the decision to save into a contributory scheme, the latter can create perverse incentives to save. In the context of Vietnam where the records of income sources and assets tend to be incomplete, an affluence test using a pensions test would likely be more workable than one using an income or assets test.

5. Concluding remarks

This paper aimed at providing calculations of the long-term pension fund balance as well as the pension liabilities of the current PAYG DB pension scheme in Vietnam. The simulated results indicate that the pension fund will not be financially sustainable, as it will be fully depleted in about 30 years. Due to a closed-group approach, the size of pension liabilities will be small as a percent of GDP, but it indicates both inter- and intra-generational financial inequities as future workers would have to shoulder higher taxes to pay for pension liabilities. To provide income security for the older people in the coming years, the paper suggests that Vietnam re-designs the pension scheme based on the ILO approach with a social protection floor in which contributory and non-contributory pension schemes would complement each other by a clear role in redistribution and consumption smoothing.

Although this paper could provide indicative results for the pension scheme in Vietnam, there have been a number of limitations resulting from static forecasts with heroic assumptions, which produced estimates to be subject to differing degrees of uncertainties, and thus policy implications may be over- or understated.

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