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Safeguarding our Nation's Nest Egg: Necessary Reforms to our Social Security System

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บทสรุป

ข้อคิดเห็นที่ปรากฏในบทความนี้เป็นความเห็นของผู้เขียน ซึ่งไม่จำเป็นต้องสอดคล้องกับความเห็นของธนาคารแห่งประเทศไทย

บทความนี้จะได้ชี้ถึงความเสี่ยงสำคัญในระยะยาวของประเทศ อันเนื่องมาจากปัญหาสังคมผู้สูงอายุ และกองทุนประกันสังคม (ในส่วนของประโยชน์ทดแทนกรณีชราภาพ) ซึ่งจะเป็นภาระสำคัญทางการคลังของประเทศชาติหากไม่ได้รับการแก้ไขอย่างจริงจังนับแต่วันนี้ พร้อมทั้งศึกษาข้อมูลระดับจุลภาคเกี่ยวกับสถานการณ์และปัญหาของผู้สูงอายุไทยในปัจจุบัน เพื่อนำไปสู่การเสนอนโยบายปฏิรูประบบประกันสังคมที่รักษาความอยู่รอดของระบบและสามารถแก้ปัญหาความยากจนในผู้สูงอายุ รวมทั้งได้นำแนวทางการปฏิรูประบบประกันสังคมจากต่างประเทศมาประยุกต์ใช้ในกรณีประเทศไทย เพื่อการแก้ไขปัญหาของกองทุนประกันสังคมอย่างเป็นระบบ ซึ่งเริ่มจากการดูแลให้ระบบประกันสังคมสามารถจ่ายสิทธิประโยชน์ให้แก่สมาชิกได้อย่างเพียงพอ โดยเน้นความเสมอภาคของประชากรในทุกกลุ่ม การสร้างแรงจูงใจให้ประชากรเลือกเกษียณอายุช้าลงให้สอดคล้องกับอายุซึ่งมีแนวโน้มที่จะยืนยาวมากขึ้น และการเตรียมการปฏิรูปโครงสร้างของระบบประกันสังคม ควบคู่ไปกับการส่งเสริมการออมระยะยาว นโยบายเหล่านี้จะช่วยสร้างภูมิคุ้มกันให้ประเทศไทยสามารถตั้งรับและบริหารจัดการความเสี่ยงอันเกิดจากการเปลี่ยนแปลงของโครงสร้างประชากรได้ในอนาคต

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Safeguarding our Nation's Ness Egg:

Necessary Reforms to our Social Security System

One of the most important challenges facing Thai policymakers in the coming decades is to keep the social security system, especially with regard to the old-age pension, solvent as the baby boom generation starts to retire and longevity continues to rise.

For many countries around the world, social security is one of the most popular and largest public programs. Through its risk sharing and transfer mechanism both across cohorts, and across generations, it provides its members with social insurance against risks such as job loss, illness, disability, and death, thereby serving as the main cornerstone of the social safety nets for many countries. But more importantly, social security through its old-age pension provision provides the government with the most important tool to fight against the problem of elderly poverty and offer the populaces insurance against the problem of inadequate assets during retirement and against the risk of longevity. In fact, in the US the country with the largest social security program in the present day, the income transfer from the social security accounts for roughly 40 percent of the income received by people age 65 or older and accounts for more than 90 percents of the income received by the poorest age family in 1999.[1]

This paper begins by providing the brief overview on the demographic trend in Thailand. As in other countries around the world, Thailand is also facing with the problem of rapidly aging population which will inevitably have great economic

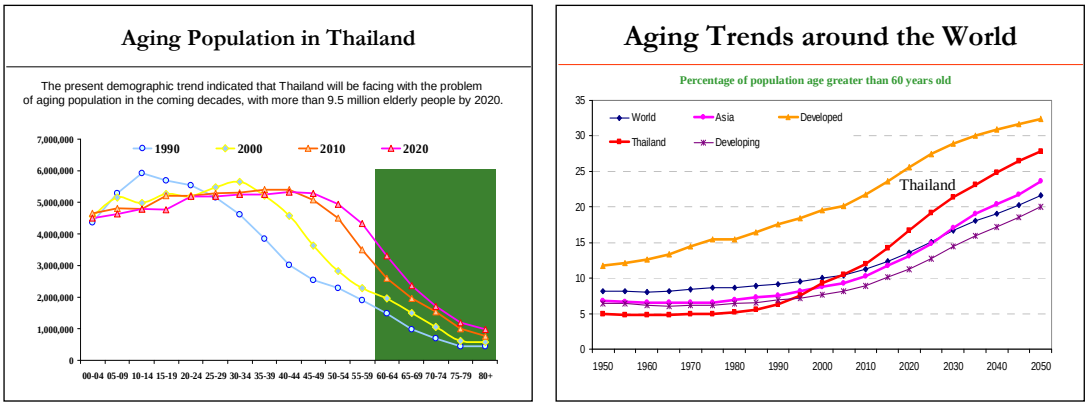
[1] Congressional Budget Office, "*Social Security: A Primer*," September 2001: P37.

consequences on our labor markets, national savings, and overall economic performances as well as will exert great pressure on our social security system. Section II then describes the current arrangement of our pension system and discusses its sustainability both in the short-run and long-run as the demographic change takes place. In particular, we will point out in this section that our current pension scheme is too generous and will not be sustainable over the long-run. So, a major overhaul of the system is needed. Section III turns to micro-data to identify problems that the elderly households in Thailand currently face to help direct our reform efforts. Given that appropriate design of the social security system is country-specific and depends very much on the current shortcomings of its elderly population, this section will be quite important. Section IV then proposes and discusses the necessary reforms to our social security system, drawing from reform experiences in other countries. Finally, section V concludes the paper.

I. Overview of the Demographic Trends in Thailand

According to the estimate of the National Economic and Social Development Board of Thailand (NESDB), the number of people with age greater than 60 will increase from 5.7 millions people or 9.4 percent of the total population in 2000 to 9.5 millions people or 13.9 percent of the total population in 2020. (Note that this is considered to be in the lower range of the estimates that are available from various official sources. For instance, the Thai National Statistical Office provides estimate for the year 2020 with the number of population with age greater than 60 years to be around 10.7 millions people or around 15.2 percent. Meanwhile, the United Nation's Revised 2004 World Population Prospect forecasts the number to be around 11.7 millions people or around 16.7 percent and will rise further to 20.7 million people or around 27.8 percent by the year 2050.)

Figure 1: The Problem of Aging Population



Sources: NESDB and UN 2004 World Population Prospect

However, Thailand is not alone in facing this problem. From the UN's forecast, all regions around the world are on the aging trend with the developed countries facing the most severe problem with the number of those with age 60 years old and above to rise to around 32.4 percents of the total population by the year 2050. Yet when compare with the world and Asia, the problem of aging population in Thailand – though very similar to the world average at the present time – will worsen rapidly in the next 45 years. In fact, aging problem in Thailand will be much worse than in other Asian countries except of China, Singapore, Hong Kong and Korea.

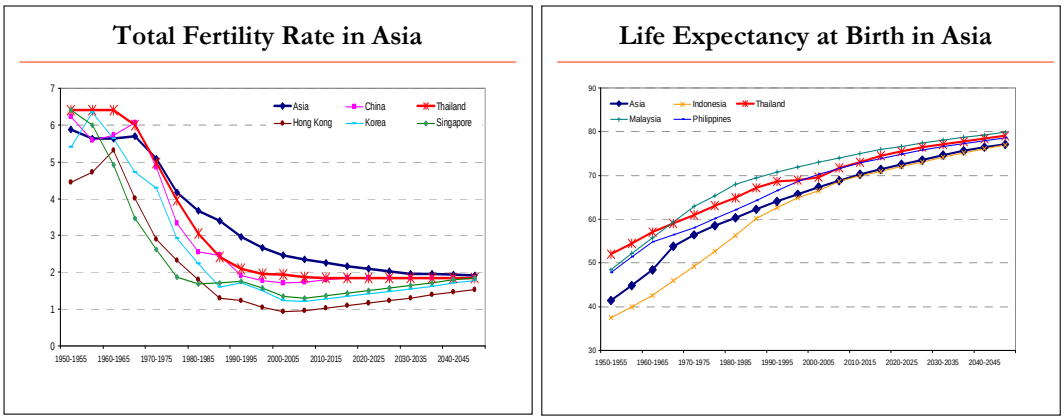
Table 1: Percentage of population with age 60 and above in Asia

	1970	2005	2020	2050
Asia	6.5	9.3	13.1	23.6
Philippines	6.8	6.1	9	20
India	6	7.9	10.6	20.7
Malaysia	5.2	7	11.5	21.6
Indonesia	4.9	8.4	11.4	23.7
Thailand	6.5	10.5	16.7	27.8
China	5.5	10.9	17.1	31
Singapore	4.8	12.2	26.1	38
Hong Kong	5.4	15.4	25.5	38.7
Korea	5.7	13.7	23	41.2

Source: UN 2004 World Population Prospect

Usually, as we find across countries around the world, population aging is caused by (1) the reduction in the level of total fertility and (2) the increase in the longevity of the population. Nevertheless, in the case of Asia, closer examination of the data reveals that the differential in the degree of population aging among countries in Asia comes mainly from the differences in the path of total fertility reduction. China, Thailand, Singapore, and Hong Kong, and Korea (who will be facing with higher level of population with age 60 and above with comparison to the average of Asia) have much sharper and much earlier reduction in their fertility rates that occurred during 1960s and 1970s. This sharp reduction in the level of fertility translates into the decline in the number of offspring in the later cohorts at the time and 50-60 years later (around 2020-2030) will subsequently lead to the rapid rise in population aging. As for the differential in the level of life expectancy at birth among these countries, it contributed much smaller variation to the severity of the problem of aging. In fact, if one compares Malaysia and Thailand who have very similar paths of life expectancy at birth, one will find that the divergence in the level of aging population between the two countries can be attributed mainly to the difference in their path of total fertility.

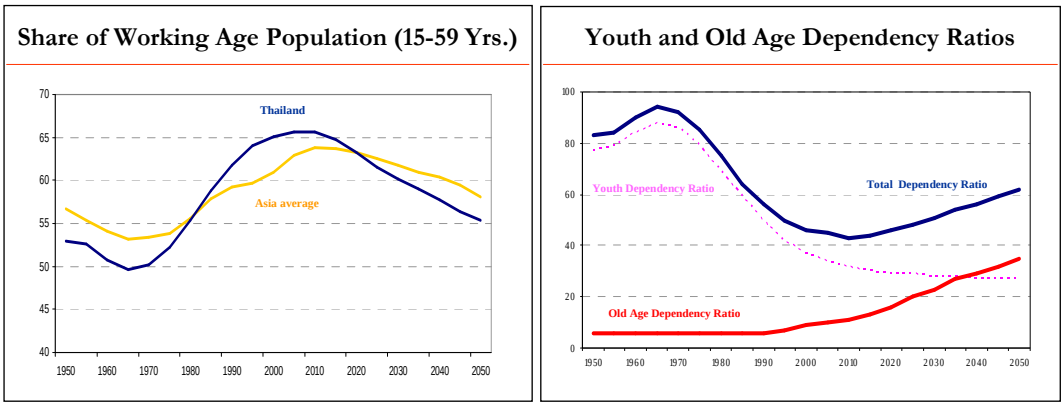
Figure 2: The Main Sources of Population Aging



Source: UN 2004 World Population Prospect

As a consequence of this high total fertility rate during 1950-1965 and sharp reduction in the level of fertility in the subsequence period, the population of Thailand experienced a baby boom period that sent the level of youth dependency to its peak around late 1960s. Since then the rapid reduction in the level of fertility has resulted in a fall in the number of children and the subsequence rapid decline in the level of youth dependency ratio during 1970 to 2005. As this baby boom generation began to enter and move through the labor force, the share of the working age population was on the rise

Figure 3: Shifting Demographic Structure



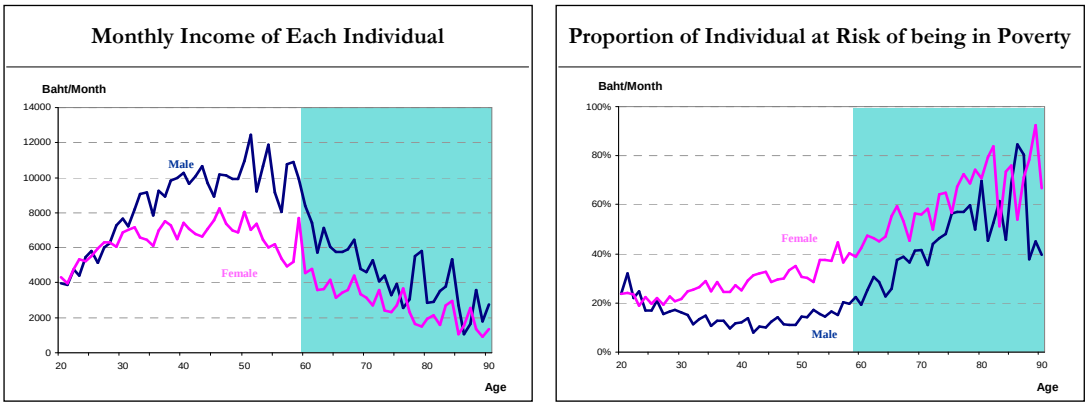
Source: UN 2004 World Population Prospect

from around 50 percent in 1970 to its peak of 65 percent in 2005 and is expected to decline rapidly in the years after as the baby boom generation began to retire and the level of old age dependency ratio increases.

It is quite interesting to note that the observed swing in the share of working age population in the total population is much more pronounced in Thailand than Asia as a whole. This has much implication on the size of the labor force as well as the fiscal consequences. Unfortunately, the demographic dividend that occurred during 1970-2005 will soon be ended and by the year 2015. More importantly, and with great consequences on the sustainability of the social security system that we will discuss in the next section, Thailand will now face the period within which the level of total dependency ratio increase steadily from 0.45 to 0.62, within most of the contribution came from the rapid rise in the old age dependency that overwhelm the positive benefit that we continued to get from the decline in the youth dependency ratio as the level of total fertility continue to fall.

In fact, according to the UN 2004 World Population Prospect, not only the population with age greater than 60 years will be rising, but within the old age group themselves, those with older ages will constitute a larger share. Specifically, in 2005, there were roughly 0.8 million elderly with age 80 and above, accounting for roughly 11.5 percent of the elderly population. This particular group of elderly will grow to 4.7 million people accounting for 23.5 percent of the elderly population in 2050. This is

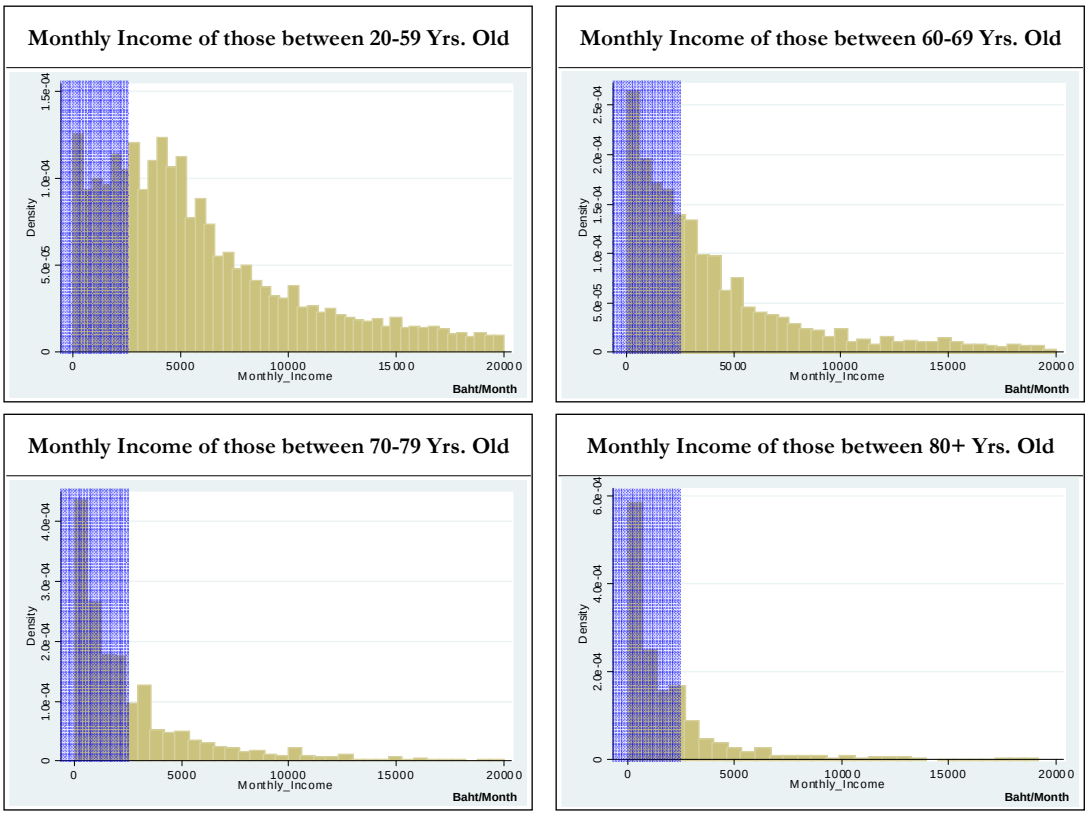
Figure 4: The Problem of Elderly Poverty



Source: SES 2004 (Authors' Calculation)

quite worried-some development since available data as shown in Figure 4 indicates that as people grow old, their income starts to decrease sharply and the portion of the elderly at risk of having inadequate income for their livings and at risk of being in poverty[2] will increase markedly. And the problem is more pronounced for the group of female elderly. This is why there is an urgent need of having a good public pension system that will help the government fight the problem of elderly poverty as the overall population start to age as projected. And this is also why we have to look carefully at the issue of social security reforms to ensure that the main instrument of the government in its fight against elderly poverty will be designed properly and will be sustainable as the population start to age rapidly in the coming decades.

Figure 5: Distribution of Monthly Income for Various Cohorts



Source: 2004 SES (Author's Calculation)

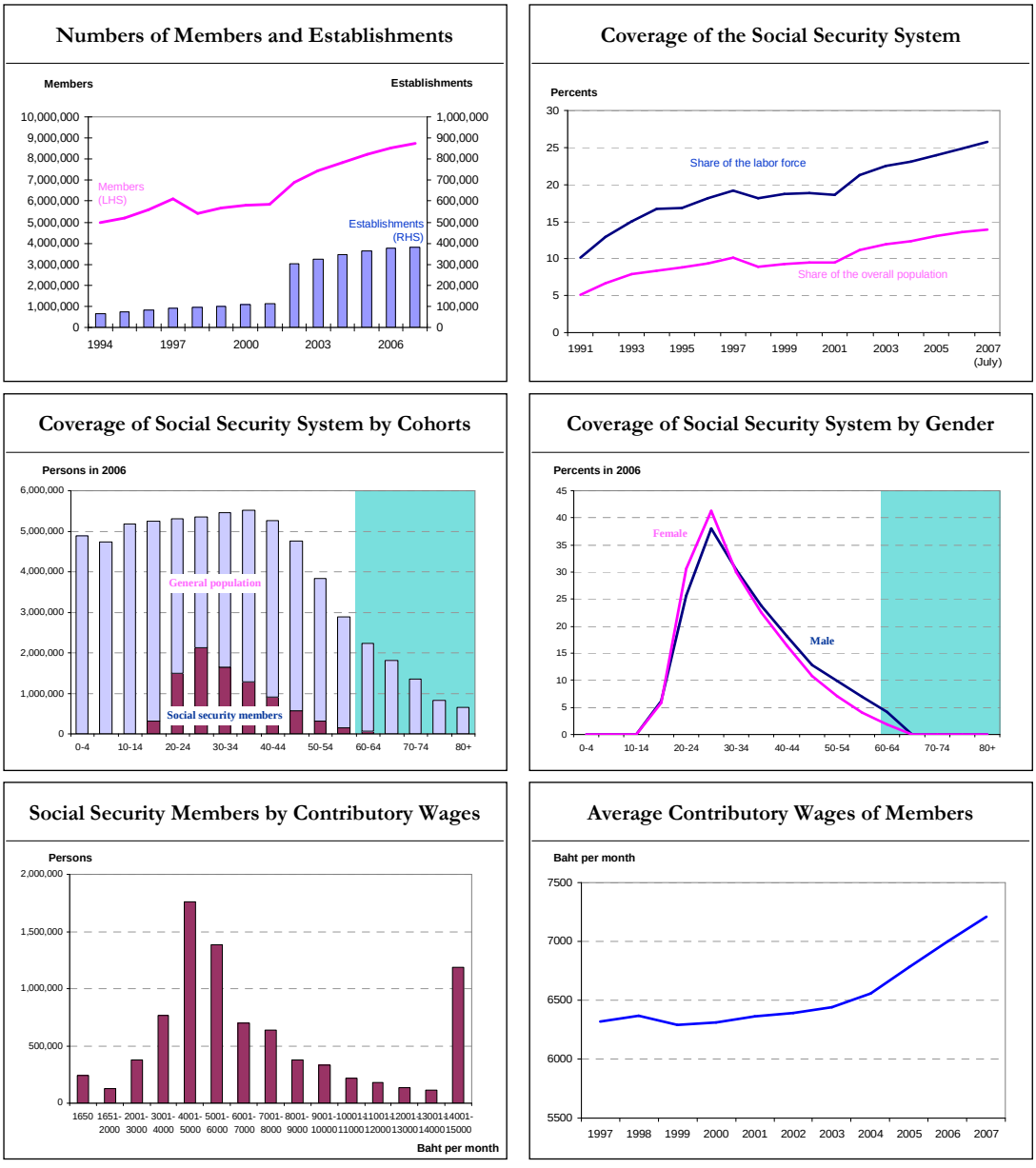
II. Current Arrangement of our Social Security and its Sustainability

When compared with mature social security systems such as those in the US or in the European Union, our social security system is still quite young and at its early stages. Even tough the Social Security Act was first enacted in 1954 but given the limited resource available to the government at the time, the Social Security Act was not put into effect. Only 36 years later in 1990 that the government at the time revisited the issue and successfully passed the Social Security Act (B.E. 1990) through the parliament and put the law into effect. At first, it provided benefits on and protection against illnesses,

[2] This is done by comparing the monthly income of each individual against the two times the level of the 2004 national poverty line of 922 baht/month. This is not a precise measure but it will suffice as an indicator for those who are at risk of being under the poverty line.

disability, not-worked related death, as well as child delivery to workers in those establishments with more than 20 workers and was subsequently extended to workers in establishments with more than 10 workers and with less than 10 workers in 1993 and 2002, respectively. As for its benefits, the ranges of social security benefit was also enlarged to include the case of old age and child assistance in 1996, and finally to the case of unemployment.[3]

Figure 6: Number of Members and Coverage of the Social Security System



Source: SSO and NSO

Since its inception, the numbers of insured members of social security system have been increasing steadily from 2.9 millions in 1991 to currently 8.7 millions in July 2007. Only during the aftermath of the 1997 financial crisis did the number of its members was in the decline and stagnated for four years and once the new regulation

[3] Data and information in this section comes from the Social Security Office.

extending the coverage of the social security system to those establishments with less than 10 workers was introduced and in effect since April 2002, the number on insured persons started to rise steadily again. During this period, the numbers of the contributing establishments rose from 56,191 establishments in January 1994 to roughly 380,000 presently. However, despite the sharp increase in the number of insured members over the last decade, the coverage of the social security system is still quite limited. There is much room for improvement when compared to the general population of 65.7 millions and the overall labor force of Thailand of 37.8 millions, especially when we compare the coverage ratios with those of mature social security system such as those in the US which began in 1935 and now cover 96 percents of all US workers.

For the case of Thailand, the share of the insured persons in the labor force and in the overall population has been increasing from 10.1 and 5.1 percents since its beginning year in 1991 to 25.7 and 13.9 percents, respectively in July 2007. If we consider only those working as employee of the private sector, the coverage ratio is now roughly 65.4 percents.[4] So, the problem of limited social security coverage in Thailand still remains for workers in the private sector but even more so in the informal sector especially those own-account worker and un-paid family workers in the rural areas and in the agriculture sector.

Breaking down the social security members by cohorts reveals additional information. The current members concentrate mostly in those workers with ages between 20-39 years old with the coverage ratio of those within the 20-24 years old cohort peaks around 40 percents. Nevertheless, for the baby boom generation who is now roughly around 35-45 years of age, the coverage is roughly 20 percent. And for those who are now entering the retirement age of 60 years old, the coverage drops further to below 3 percents. And if we break down the members by gender, the coverage of female and male workers seem to be quite similar with slightly lower social security coverage for the group of older female workers where women usually participates less in the formal sector and slightly more coverage for younger female workers.

The Old-age Pension scheme

Now let us now turn to the problem of the old-age pension. As part of the social insurance programs, the old-age pension has at least 4 important objectives. The foremost important objective is to provide adequate, affordable, sustainable and robust retirement income to elderly to allow worker to retire and live adequately when no longer productive. Second, as a consequence, children do not have to support their parents. Third, to create job for a younger workers as the retirement of the older workers will open up more job promotion possibility. Fourth, with a well designed pension scheme, it will help increase the national savings, improve capital market efficiency as well as prepare the country for the aging society by saving now and transferring resources from today to the time when population aging occurs.[5]

For most countries, the old-age pensions despite its popularity pose important challenge to authorities who administer the program. Most are under-funded and operated as pay-as-you-go system where the benefits are paid out of the contribution

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[4] This is based on the number of employee of 13.3 millions persons according the recent labor force survey (July 2007).
[5] ABD and Anita Swartz, *"Pension System Reforms*," September 2006: p. 15.

collected in that very same year. So, while most will be able to help support elderly during their retirement and achieve the first 3 objectives, they often fail to achieve the final objective. In particular, when the demographic change has taken place with continued lowering of the number of workers to elders (or the numbers of contributors to present collectors of benefits), the whole pension system is put under severe stress and reforms is called for and resulted in the breaking of government's promises on the level of benefits to the present or future generations, or resulted in the imposition of additional payroll tax to keep the system in balance.

For Thailand, our old-age benefits scheme began on 31 December 1998. Under the stipulation of the Social Security Act (B.E. 1990), insured members of the old-age pension must contribute at least for 180 months (or equivalent to 15 years) and must be at least 55 years of age to be eligible for the lifetime monthly payment equal to the average of the last five years of contributory wages by the workers multiplied by the replacement rate which will be calculated based on the number of years that the workers has been contributing to the old-age pensions.

Table 2: Details of the Old-age Pension Scheme in Thailand

Main Element	Details
1. Contribution	Worker 3 % Employer 3 %
2. Wages to include in the payroll tax	Floor 1,650 baht per month Cap 15,000 baht per month
3. Wage indexation	None (will be adjusted on an ad-hoc basis)
4. Benefits	Lump sum payment or lifetime monthly payment
5. Eligibility criteria	Must contribute for at least 180 months to be eligible for the lifetime monthly payment
6. Retirement age	55 years old
7. Incentives for early or delayed retirement	None. Workers cannot receive pension before 55 years old and for each year of working above the retirement age will help increase the replacement rate.
8. Benefit formula	Average of the last 5 years of contributory wage multiply by the replacement rate
9. Replacement rate	15% for the first minimum 15 years 1% for each additional 12 months of contribution paid
10. Benefit indexation	None (will be adjusted on an ad-hoc basis)
11. Taxation of Benefit	None

Source: Social Security Office

At the beginning of the program, the contribution rate began at 1 percent each for workers and employers. However, the contribution rates have been subsequently and gradually increased to 2 and 3 percents in the year 2000 and 2003 respectively. Presently, the monthly contribution is calculated from the 3 percent payroll tax from both workers and employers from the floor of 1,650 baht/month up to the cap of 15,000 baht per month. So, thus far the system have been collecting contribution for almost 9 years and accumulating reserves now up to 300 billion baht to pay for the first group of retirees who meet the eligibility criteria for pension benefits in 2014, or seven years from now.

The Inherent Weakness in the Current Old-age Pension Scheme

There are two main problems with our current old-age pension scheme. First, the system is quite young given its recent establishment when compare with other mature pension systems. As a result, there are some important components of the scheme that have not been resolved. These include the issues on the wage and benefit indexations as well as incentives for delayed retirements, for instance. Closer look at Figure 5 reveals that there a significant number of workers whose contributory wage base is at the top bracket of 14,001-15,000 baht per month. Although, this partly reflects the fact that the system concentrate mostly on the less well-off workers, from available data, the share of workers in this top bracket, however, has been steadily increase from roughly 11 percent of the members in 1998 to roughly 14 percents in 2006. It also reflects the simple fact that with inflation, nominal wage continue to rise and push these group of workers against the formal wage cap. Over the long term, if this problem is not resolved, it means that the program will matter to worker less and less since the share of real income taxable to the pension scheme will decline.

Here, we would like to stress that the issue of indexation is quite critical for the success of the pension program if its main objective is to provide the adequate income during retirement to elderly people. Without indexation, elderly poverty will increase as time passes by. As for the wage indexation, it is also important for the pension fund to keep its aggregate contribution constant in real term in order to help pay out steady real benefits to its members. At the present time, the Social Security Office is considering increasing the level of wage cap from its present level of 15,000 baht per month to 20,000 baht per month.

Second, the program in its present form as summarized in Table 2 is quite generous in fact too generous with benefits given out to an average member will exceed what an average member will contributed to the system plus the interest rate earning from that income. So, despite the fact that the system is currently trying to save some money now for the benefits that will pay out later but the reserve will not be adequate. And a large part of the future benefit will be covered by pay-as-you-go system, so sustainability and solvency of the system will become a major concern for policymakers especially when the number of retirees per contributors is expected to decline sharply as the demographic change occurs.

The diagram in Figure 7 illustrates the time profile of the asset accumulation path with the old-age pension of a representative member who enters into the labor force this year at the age of 20 in the year 2007. For illustrative purposes, this representative individual is assumed to earn an average wage of 5,000 baht per month and expected to live for 70 years[6]. As we discussed above since the issue of indexation will be inevitably introduced to the system, so we estimate the time profile for two cases that we will use as the main diagrams that we will revisit several time from the next sections. The left diagram illustrated the time profile of accumulated assets of workers under the current old-age pension scheme with the retirement age of 55 under the economic assumptions as appears in Annex 1.[7] The right diagram illustrated under the assumption that both the wage and benefit will be automatically indexed with inflation.

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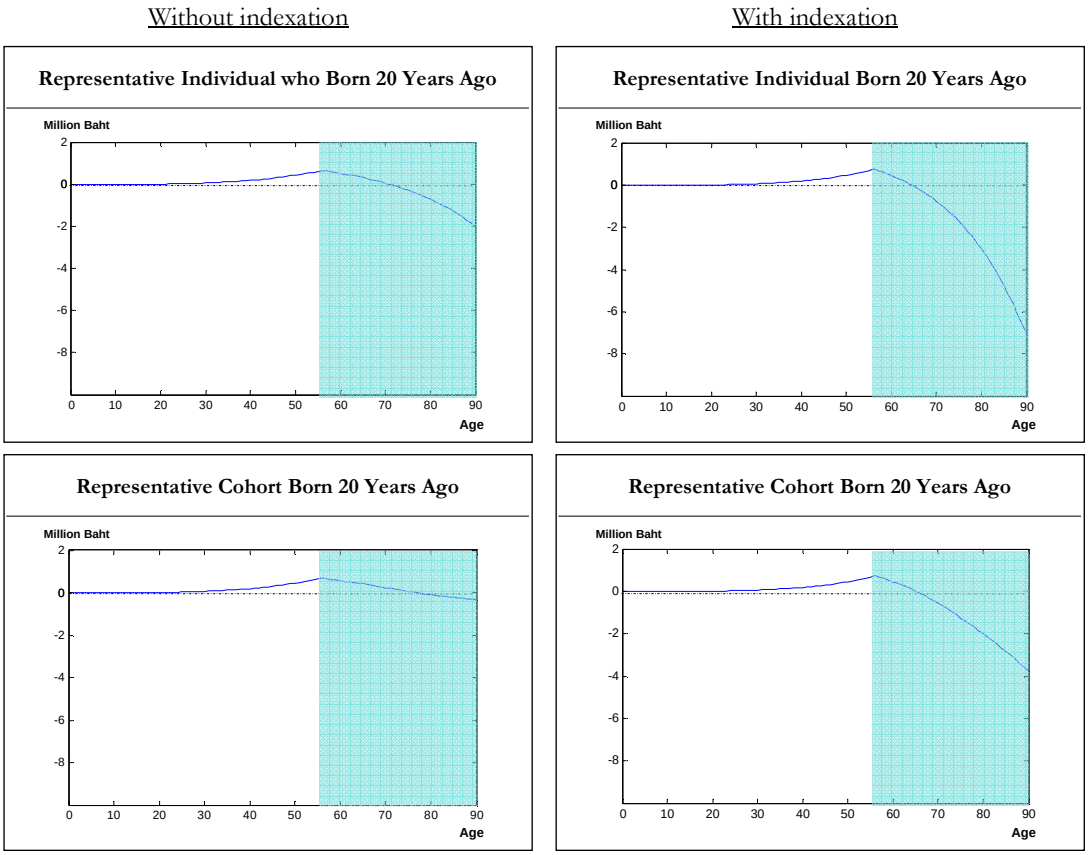
[6] From WHO, for the year 2005, male, female, and both-sexes life expectancy at birth in 2005 for Thailand is 67.5, 73.3 and 70.3, respectively.

[7] Here, we assume real wage growth of 2.5 percents, real interest rate of 2.75 percents, and inflation of 2.5 percent.

Figure 7: Time Profile of Accumulated Assets for Representative Individual and Representative Cohort (20 Yrs old)



Source: Authors' Calculation

Without indexation, the individual member would accumulate asset with interest up to 680,000 baht at the time he is 55 years old when he is eligible to retire.[8] Should he decide to retire on that year, he will start to receive monthly pension at the 35 percent replacement rate thereafter at 5,250 baht per month (given that his contributory wage over the last five years will be exactly at the cap of 15,000 baht per month). The assets that he has been accumulated at the pension will last roughly sixteen years or until he or she become 71. Afterward, if the member lives longer than 71 years old then the pension will start to experience a loss and the loss will grow exponentially. When the member reaches his or her 80 years, the pension fund will already have accumulated losses of around 680,000 baht. So it is precisely those groups of people who live long that are the principle liabilities of the pension scheme. Unfortunately, according to the recent report on population change by NSO, Thai male and female who live to the age of 60 are expected to live on average until 79 and 82 respectively. So, there is high probability that the pension on average will pay out more benefits to its member more than it takes in its contribution plus interests.

On the bottom left diagram, if we calculate the time profile of accumulated assets of a representative cohort who enter the labor force at the same time at the age of 20 in the year 2007 and retire at the age of 55 as before. Compare to the previous case where

[8] Since this is just an illustrative example so we will assume that the member will retire at the age of 55 years old. Later when we calculated the current obligation of the pension funds, we will use the case of 60 years and steadily increasing afterward to reflect the rise in the life expectancy.

individual death is uncertain depend on the longevity of each individual, as a cohort, we can now calculate the exact share of cohort continued to live according to life table of Thai population. Given that as time passes by, less and less members of this particular cohort will still be alive and receive the monthly pension from the social security. So, the pay out will drop and as a result, if we compare this diagram with the first diagram on the top left, we can see that the decline in asset is less steep and the accumulated asset will last twenty years. In particular when member of this cohort is eighty year old, the average loss per person for this cohort will be around 130,000 Bath per person.

Note that part of the reason why the current system seems to be operating well in this last example is because that the benefit will be quite small in real term and the return on the interest rate will be adequate for supporting the benefits given out to members of the cohorts. Nevertheless, if the Social Security decides to index both the wage and the benefit of members to ensure that members have adequate income in real term[9] then diagrams, on the right hand side, illustrate how much it would cost to the Social Security office for representative individual and cohort. Quick inspection indicates that even though the accumulated assets will be larger than under the current system (up to around 750,000 baht) but with benefit indexation, it will last only 8 years and when member reach the age of 80, the accumulated loss on the system will be around 3.3 million baht. If we look at the member as a cohort, then the accumulated assets will last 9 years and the accumulated loss per person will be around 2.2 million per member.

Of course, these calculations are based on several assumptions especially those concern the rate of return on the accumulated assets of the pension funds.[10] So, we do not intend to be defensive over this figure. Indeed, they mean to be illustrative examples for those who want to understand the basic working of the pension scheme. They also intend to point out that the problem is not the system is a defined-benefits system. A defined benefit system can be adequately well-designed and it can be sustainable. But the main issue here is that the present system is quite generous (with or without the indexation) especially in light of the fact that life expectation is projected to increase further from the present level.

Sustainability of a Pension Fund

Over the last few decades, the issues on sustainability and soundness of pension funds has been hotly and thoroughly discussed, both by academics and policymakers who are responsible for keeping the pensions under their supervision solvent and continue to fulfill the promises made to the general public.

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[9] Here, we assume that the contribution will be indexed to wage growth instead of inflation. This is to ensure that members of the pension fund will not be pushed against the wage cap over time. But inspecting the simulation results reviewed that for most members, this will not make much difference since it will not be binding even though we are using the inflation indexation as the rule. What is more critical is the benefit indexation. In several country, nowadays, the benefit indexation is proposed to be revised and be indexed to inflation minus one percent given the realization that CPI usually overestimate the rise in the cost of living by 1-2 percents. So, if we choose to index benefit to CPI, then the true purchasing power of retired members will increase over time at a cost to the pension fund.

[10] For this baseline calculation, we use our assumptions base on a historical time series with real wage growth of 2.5 percent, real rate of return around 2.75 percents, and inflation rate of 2.5 percent as explained in Annex I. So, for the accumulated assets, the nominal return will be around 5.25 percent closed to recent returns over the last decades given the new inflation process under the new regime of inflation targeting.

The US Social Security Office as one of the operators of the largest old-age pension systems in the world also went through the same process. In early 1980s, when its pension fund almost went bankrupt with no money to pay its members, Mr. Ronald Reagan, the US President at the time, appointed Mr. Alan Greeenspan as the Chairman of a bipartisan commission (later known as Greenspan Commission) to find recommendations on how to resolve the solvency problem of the US Pension system. In the subsequent years, more commissions of similar nature have been appointed to find the recommendation to keep the system solvent. Through these rescue efforts and the on-going attempts by the government to provide framework to analyze and monitor the health of the pension fund, the notion of sustainability of a pension funds is then been evolved and sharpened over time and has serve as the basis of how one measure soundness of a pension scheme.

Gokhale and Smetters's study on *"Measuring Social Security's Financial Problems"*, provides a useful discussion on sustainability and soundness of the pension scheme. They wrote:

> "whereas the concept of solvency has typically been used to determined whether the government can afford to pay benefits over the next 75 years, the concept of sustainability refers to the ability to pay benefits into the definite future. A Social Security reform that achieve solvency over a limited horizon but not sustainability will soon fail to even achieve solvency as the time widow moves to include future years. However, a reform that is projected to be sustainable is also projected to be solvent during future years.[11]

In other words, there are two level of measuring the soundness of the pension system, solvency and sustainability and solvency is less strict than sustainability.

In another important study on "Measuring Solvency of Social Security System" by Stephen Goss, the chief actuarial of the US Social Security office, also provide insightful discussion of the measures of solvency and sustainability. Solvency is defined as "the expectation that benefits will be payable in full when due" and is looked at from 2 angles:

(1) short-term (10-year) vis-à-vis long-term (75-year). Here, the most important test for the short-run solvency is that the trust fund is not exhausted over this ten-year period. However for the test for long-run solvency, the US Social Security Office used to rely on some measures such as the actuarial balance and the projection into perpetuity which since 1965 it has been relying on the projection over a horizon of 75 years. Its Advisory Council felt that "75-year period encompass essentially the entire future life span of all current workers and beneficiaries, even the youngest current workers, at the beginning of the 75-year period. And it is also provides a projection period long enough to illustrate the complete and mature effect of past amendments and potential future changes to the Social Security Act." [12] And for the long run sustainability, there are two conditions. The first condition is its ability to pay benefits over the next 75 years under the current laws given its reserve. And

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[11] Golhale and Smetters (2005, p.5).

[12] Goss (1999, p.19)

the other condition is whether the trust fund is projected to be increasing in size toward the end of the 75-year window.[13]

(2) open-group unfunded obligations vis-à-vis closed group unfunded obligation. Whereas the open-group unfunded obligation measures the contractual obligation of the pension plan under the current arrangement, the closed-group (to new members) unfunded obligation measures whether the ability of the system to pay out in full to the existing group of members. So, the open-group concept will help looking at the long-run sustainability of the pension scheme and the closed-group concept will ask whether the present arrangement is viable and how much intra-generational transfer is needed. And the latter concept will help us assess the generational fairness of the proposed reforms.

Given the inherent uncertainty in the projection into the future, additional methods are used to understand the likelihood and robustness of the forecasts, in particular the used of alternative scenarios, stochastic simulation, and sensitivity testing. [14]

Sustainability of our current pension scheme

Given these measures of solvency and sustainability, in this section we will proceed to assess the long-term sustainability and intra-generational fairness of the present system. We will provide some estimate of the sized of unfunded obligations of (1) the present pension scheme and (2) the present pension scheme with additional wage and benefit indexation as done in Figure 7.

To get the estimate for the size of the unfunded obligation at the present time of the pension fund, we used the membership and wages data provided by the SSO as well as information from the labor forces survey.[15] As illustrated in Figure 8. The top left diagram is the age profile of the social security member broken down by gender[16] and age cohort (every 5 years). The middle left diagram is the age distribution of the social security member which we have detail data by year of birth and by gender. So, by using these information together we can reconstruct the reasonable approximation of the age

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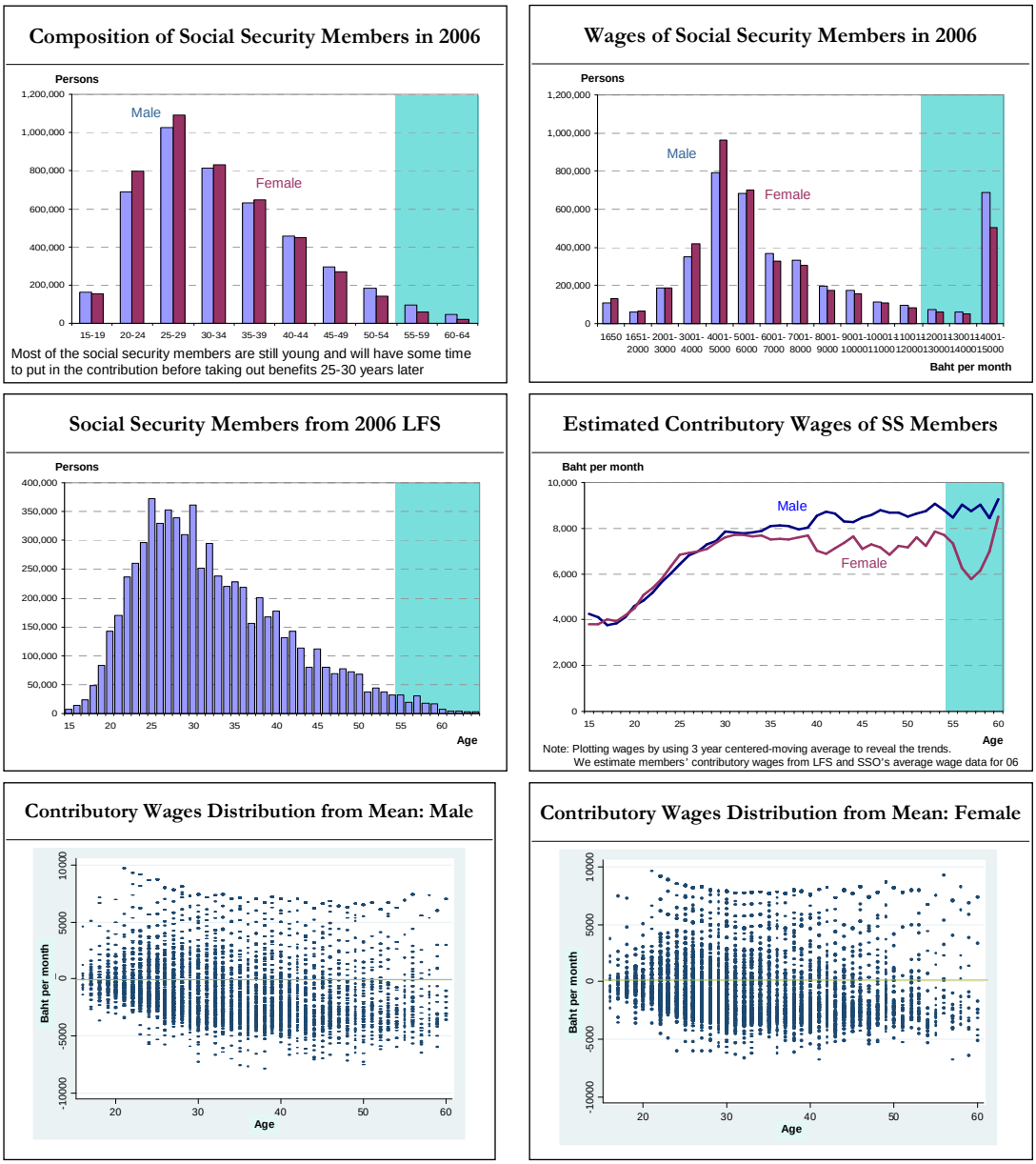
[13] Gokhale and Smetters (2005, p. 6). Interestingly, in several subsequent papers that look at the soundness of the US Social Security System, there are complaint about the proposed policy reform having the desired effect on restoring the actuarial balance to system over the 75-year but then later find out that once the 75-year window move further the deficit reemerge and more reforms are needed.

[14] Goss (1999, p.1) pointed out the important of having several measures of solvency by stressing that "defining solvency depends on one's view on the roles and design of the social security program. A range of measures of solvency has evolved to address a variety of concepts of solvency. The current assessment the [US] social security program as presently specified, will not be solvent over the long-range future has resulted from the application of these measures. Comprehensive amendments to the Social Security Act will be designed to satisfy these measures of solvency. Therefore, an understanding of these measures is useful for the upcoming discussion and development of the legislation."

[15] Here, it would be wonderful if we can get access to Social Security Office detailed data on its members which will have exact information (member by member) on the age, wage level, length of membership as well as the distribution of its membership over these variables. However, this is quite a detailed and private data that is not available to the general public. Fortunately, we have the 2006 labor force survey (quarter 2) by NSO which has an additional section on informal workers and that have a question concerning whether the interviewee is a member of the social security system or not. By using data on wages as well as ages of workers from this survey together with the overall data provided to the public by the SSO itself, we can get a reasonable estimated of these unavailable and private data of the SSO to be used in our simulation.

[16] Gender will be important since female have longer life expectancy than male and, as we saw in the previous section, will therefore be more costly to the system, *ceteris paribus*.

Figure 8: Social Security Members and their Wage Profiles by Gender



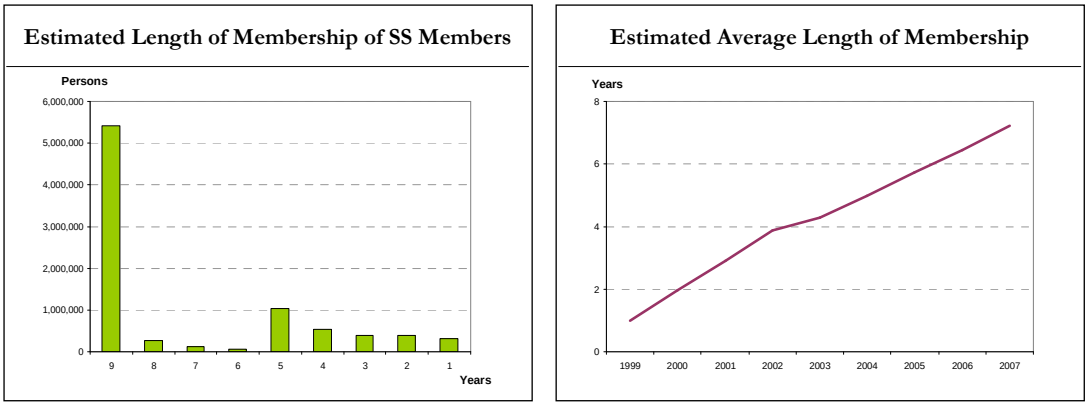
Source: SSO and NSO, 2006 LFS

distribution of the SSO member by year of birth and gender which will be used in our simulation. Similarly we can use the aggregate data on the wage distribution of the social security members provide by the SSO together with the detailed wages data from the 2006 labor force survey to get the approximation of the average contributory wages by member of a given year of birth and by gender as indicated by the middle right diagram. Here, we would like to point out that the wage of members begin around 4,000 baht per month for both gender and stays in that range until the age of 20 where the wages jump to around 4,400 baht per month. Then the wage rates continue to rise up to 7,700-7,800 baht per month around the age of 30 and by that time the average contributory wages (with a wage cap of 15,000 baht per month) of female workers stagnate around that range with a slight drown to 7,000 baht per month for most part of the female workers. However, for male workers, average contributory wages continue to rise up further 8,500 baht per month during the age of 40-50 and then slowly rise to 9,000 baht per month as the age reach 55 years old. So, for workers in the middle age, there are clears gap

between the wages paid to male worker and female workers. Finally, if we look closer at the wage distribution around the mean of each age-group, we also find that for both genders, the contributory wage distribution for each age group is balance at the beginning of career and then skew downward as time passes by. And for female workers it skew downward a little bit earlier than male workers.

Finally as for the membership length (which will be important for the calculation of the replacement rate), the Social Security Office usually releases the number of existing members of that particular year in its Annual Report and Yearly Statistic Booklet. So, from that data, we can calculate and get an approximation of the distribution of the membership length of the social security member at the end of 2007. As shown in Figure 9, more than half of the members have been with the social security since the introduction of the pension fund and with sizable increase in the fifth year of its operation due to the expansion of coverage to establishment with less than 10 workers. And the average membership length of the whole system now at 7.2 years per member with the average rate of increase roughly 0.7 years annually over the last 9 years.

Figure 9: Estimated Membership Length



Source: SSO, Author's Calculation

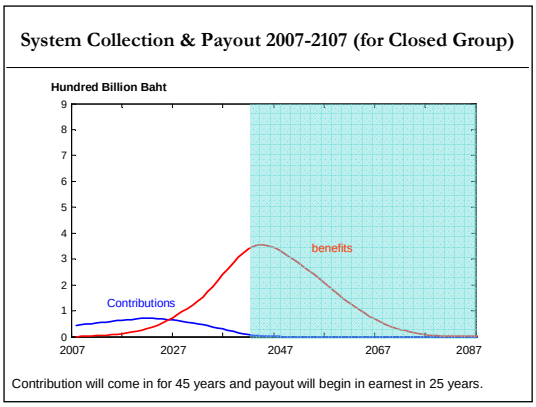
Measuring close-group unfunded obligation

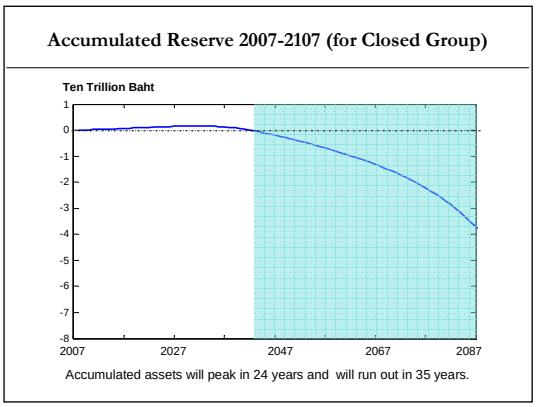
With this detail data, we now in a good position to estimate the closed group unfunded obligation of the existing arrangement of the social security. As done before, we will calculate the accumulated path for two cases: without and with indexation based on the assumption as appeared in Annex I.

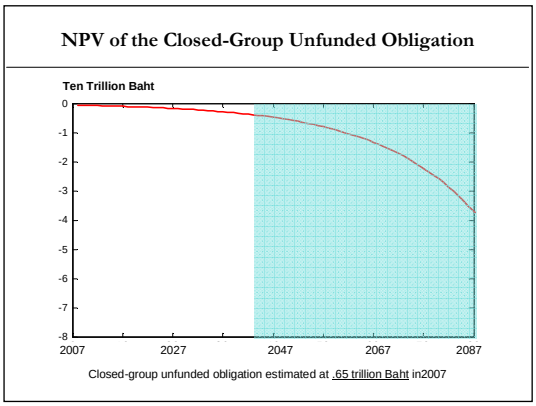
In Figure 10, we provide the projection for the contribution collection, benefit payout, and reserve accumulation for the existing group of members in the year 2006. As it turns out, in both cases, the closed-group unfunded obligations are in deficits. Without indexation and the retirement age at 55, the unfunded obligation is estimated to be around .55 trillion in current baht. When net of the reserve already accumulated thus far in the past 9 years of roughly .3 trillion baht, then the net unfunded obligation will be around .25 trillion baht. Should the Social Security Office decides to adjust the wage and benefit indexation and allow the retirement age to move up to 60 years old to fight old age poverty, then the closed-group unfunded obligation is estimated to be around 1 trillion baht. And with the existing reserve of 300 billion, then the net closed-group unfunded obligation will be around .7 trillion for the existing social security members.

Figure 10: Projection Results for Closed-Group Simulation

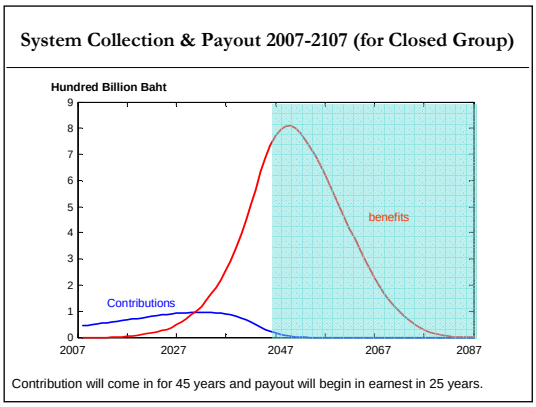
Without indexation

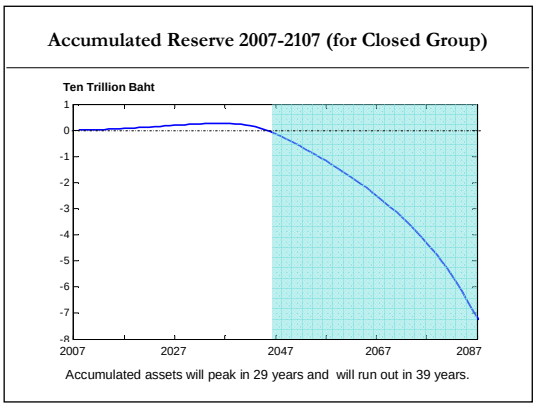


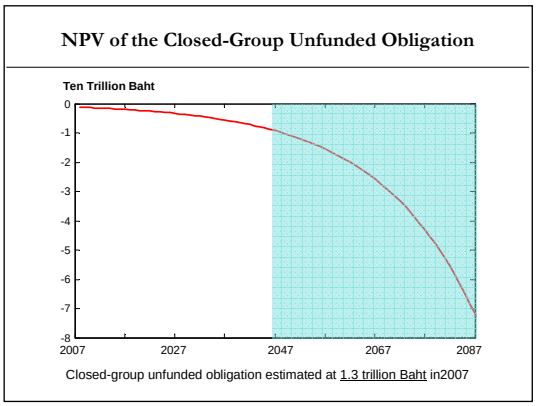




With indexation and Retirement at 60







Source: Authors' Calculation[17]

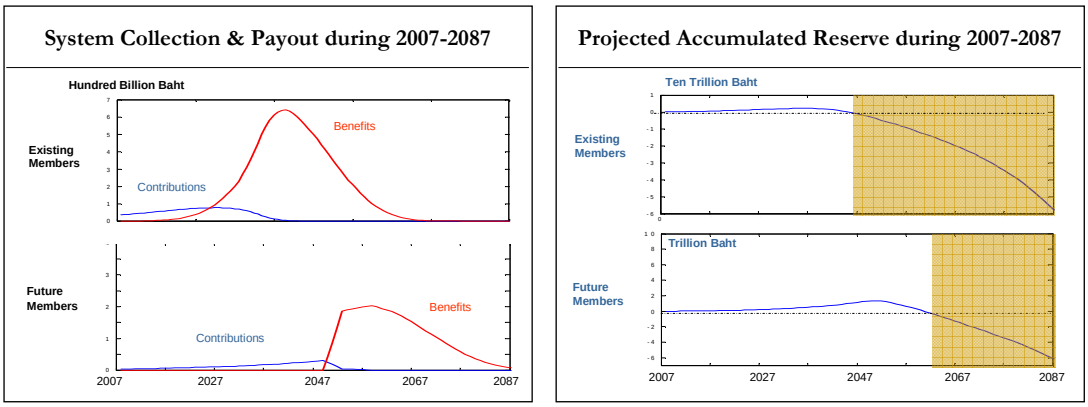
Measuring Open-Group Unfunded Obligations

Now let us turn to the second measure of solvency, the open-group unfunded obligation, which asks whether the system will be viable in the long run. To understand this measure of solvency and estimate the level of unfunded obligation, let us consider hypothetical cases of adding new members into the pension system for the next ten years to the system with new members roughly 400,000 member for each year during the next decade (dividing equally between male and female members, and this will yield roughly

[17] Note that Figure 10 does not include the existing reserve of 300 billion baht into the middle diagrams since these diagram are meant to illustrate the financing of the pension fund from new collections and payouts from today onward.

2,000,000 members per 5 years cohort providing the coverage similar to the 25-29 years cohorts of the current members.)

Figure 11: Projection Results for New Members (one Additional Decade)



Sources: Authors' Calculation

What will happen in this case? To facilitate the comparison between the closed-group and open group results, we include the former diagrams for closed-group simulation on the top part of the figures. While the collection and payout for the group of new members is illustrated in the bottom. Given their younger ages, the collection and the payout for the new members will peak after those of the old member. And what is interesting is if we look at the diagram on the right, we will find that as the accumulated reserve of the existing members being used up and the government is at risk of having to negate their promise or having to transfer the resource from the general government to help this group of elderly people, the newly accumulated reserve by the new member com to the rescue and help financing the payout for the former generation and help delay the time when of the exhaustion of the reserve.

But then as time passes by, the new reserve is exhausted by the old generation and then the reserve turns negative and then both the old and new generations no longer have their nest egg any longer especially when the new generation going to retire. This raise very important question about fairness and also ask the question of what went wrong?

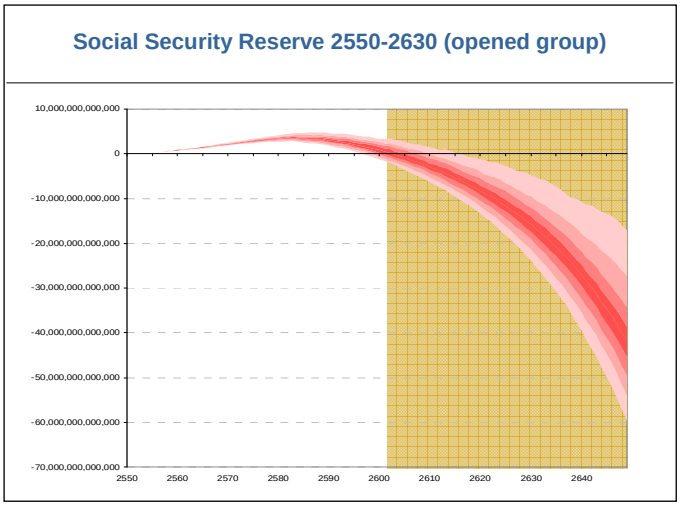
The source of the problems comes from the fact that the government is being too generous and promise too high level of a payout given the existing level of collection. So, the benefits for the older generation though look like they being funded and reserve is being accumulated is in fact being only partially or not marginally funded compare to the intended obligations. So, over time as money being hand out, the losses materialize and become the legacy for the coming generation. And with the overlapping structure of their account and centralization of their management it is very easy to take money from the new members and give to the old members and hope that the newcomers will be able to get pay by the generation afterward. As a consequence the system even though start by accumulating very fast reserve can then turn to become a pay-as-you-go system and reduce the function of accumulating new savings for the retirement of the poor to be the intergeneration transfer mechanism. If we are lucky then the next generation will be able to pay for us[18] but then it can easily escalated and become a *Ponzi* game that early comer

[18] even though they can do that since it is a zero sum game, then they must be loosing out in these operation

get the most and late comers are the one who have to pick up the tap. If this is the case then, it must be dealt with as soon as possible before the too generous payouts starting to go out and the debt start piling up for those who come later. Interestingly, all of this can happen while the reserve of the pension fund is increasing. So, it is even more difficult to change the course of action before the implicit debt is being too high and too visible.

If we calculated the open-group unfunded obligation for our system under (1) the assumption that the coverage of the social security in the population will at least stay at the present level of 40 percent in the coming cohort in the next 50 years as occurs for the present 25-30 years old cohort and (2) the population projection of the United Nation then we will find that the net present value of the open-group unfunded obligation for our pension fund is around and trillion baht for the case of with and without indexation.

Figure 12: Stochastic Simulation of the Reserve Level for the Open-group



Source: Author's calculation

All of this raises the question of what the government should do and what necessary reforms to our social security system concerning this pension fund operation? To answer that and to get the right policy frameworks to systematically solve these problems of restoring the soundness to our pension fund and dealing with the pending problem of elderly poverty, we have to look at the micro-data to find the facts concerning our elderly population as well as their current short-coming. So, the next section will be devoted to the analysis of the micro-data before we return to the question on appropriate pension system reforms in the final section.

III. Micro-data Analysis of Elderly Poverty for Policy Recommendation

Although the reform of the social security is imperative to prevent the unprecedented increasing elderly population from poverty, such reform is by no means a one-size-fits-all process, for the situations of elderly are different among various countries. Hence, the examination of micro-data is necessary to thoroughly understand Thailand's elderly situation, which would lead to suitable policy formation that would guarantee the solvency of social security while enhancing the effectiveness of the system to reach those in need.

In understanding the problem of elderly poverty, the four pillars of financial supports for elderly, namely their own income, past savings, immediate families, and transfer from government, must be carefully examined, for they serve as the foundations that ensure the adequacy of income in old age. Because the fourth pillar, the transfer from government, is analyzed in the second section, this section will focus on the first three pillars. Examining elderly's own income would identify the percentage of elderly who are at risk of poverty as well as their basic characteristics. The exploration of elderly's past savings would determine the portion of elderly who could not sustain in the long run after retirement. Analyzing elderly's immediate families would provide more understanding on the prospect of family support of elderly. These three findings would thus contribute as guidelines of directing the social security reform to prevent elderly poverty

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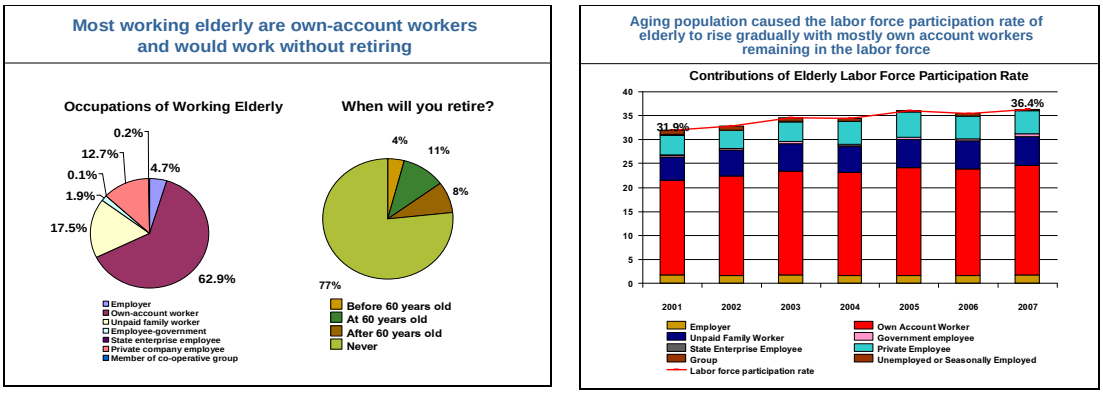
1. Elderly and Their Own Income

Unlike developed countries that exhibit a downward trend in retirement ages, about half of Thai elderly do not retire early. However, the micro-data reflected that a continuous work throughout retirement does not yield income that enables a comfortable living in old age, meaning that sufficient support for elderly cannot be provided by this first pillar. Instead, a large proportion of elderly earn insufficient income, and the case is even more so for elderly women. Therefore, it is necessary that social security after the reform should still serve as an income re-distribution mechanism for this portion of poor elderly.

The National Statistical Office's Socio-economic Survey 2006 indicated that 49% of Thai elderly are economically active, most of which work as own-account workers in the agricultural sector and has driven up the elderly labor force participation rate from

Figure 13: The Work Status and Labor Force Participation of Elderly

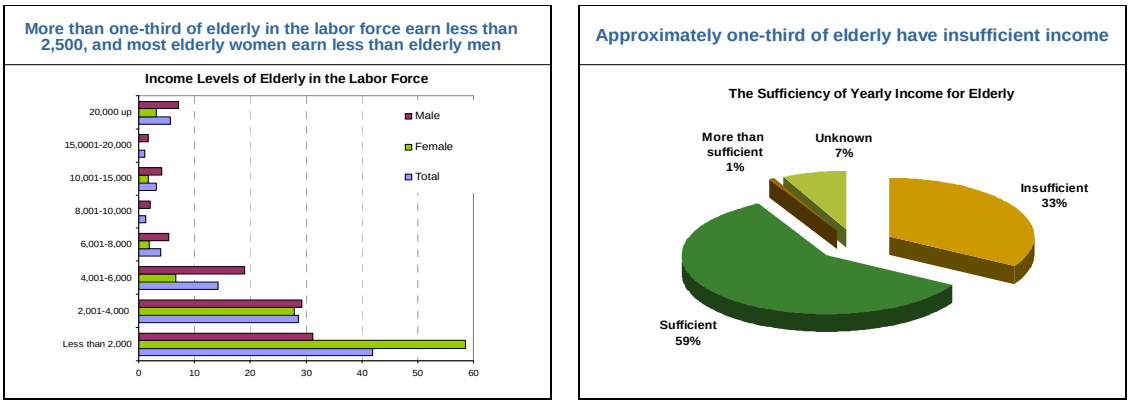


Sources: NSO, SES 2006 and LFS 2007

31.9% in 2001 to 36.4% in 2006. In addition, the latest household survey signaled that the trend of working in retirement would prevail in the future, as illustrated by 77% of households stating that they would work without retiring. Thus, the problem involving income for Thai elderly does not stem from the shorter working period in old age.

Nevertheless, working through retirement age fails to provide Thai elderly sufficient amount of income that enables independent living. Approximately 38% of the elderly workforce earns less than 2,500 baht per month, the rate below the basic minimum wage of 3,146 baht per month (143 baht per day). The situation is far worse for female elderly, with 55% of female workforce yield monthly income of less than 2,500 baht per month. Such low monthly income for elderly could serve as one of the underlying reasons that one-third of the elderly population stated that their income is insufficient.

Figure 14: Elderly Income and Opinion about Income Sufficiency



Sources: LFS 2007 and Survey of Elderly in Thailand 2002

In addition to the failure of working through retirement age in providing sufficient income for old age, there is another worrisome finding. Elderly who work in old age are the ones that are poorer than those who chose to retire. The 2006 Socio-economic survey revealed that working elderly have lower monthly income, total assets, and wealth than economically inactive elderly. Hence, inactive elderly can afford to save less since they have more wealth to rely on than working elderly. From this finding, it can be interpreted that the lower income and wealth accumulation has driven elderly to work in their old age.

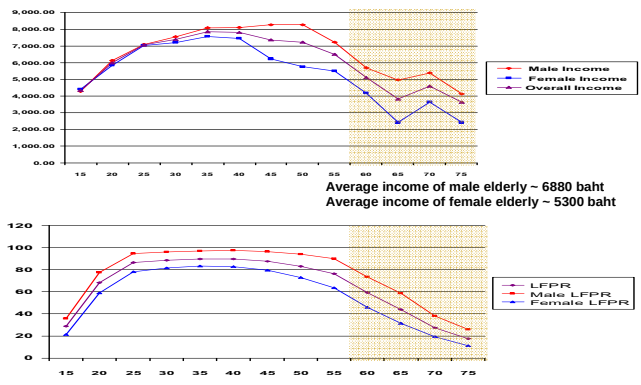
Table 5: Difference in Financial Status of Economically Active and Inactive Elderly

Main Characteristics	Average Elderly	Work Status	
		Active	Inactive
1. Monthly Flows (Baht)			
- Income	14,600	14,100	15,100
- Expenditure	11,200	10,500	11,900
- Savings	5,249	5,579	4,930
- Savings Rate (Percent)	9.18	8.37	9.97
2. Balance Sheet (Baht)			
- Total Assets	1,095,000	1,064,000	1,125,000
- Total Liability	68,200	74,900	61,700
- Wealth	1,027,000	989,000	1,063,300

Source: NSO, SES 2006 (Authors' Calculation)

Because Thailand's social security system at present covers private employees, it is also worth taking a closer look at the workforce in this sector. In contrast to the own-account elderly workforce that refuse to retire, the labor force participation rate of private employees drops sharply after the age of 55. The average monthly income also shows the same movement. Still, the conditions for female private employees are worse than those of males. Not only do females leave the workforce earlier, but their average wage also declines faster after the age of 55, in spite of the minimal difference in average wage of males and females before the retirement age. Taking into account the longer life expectancy of the growing female elderly population, it is necessary to support female private employees since they have relatively lower earnings to use over the longer period of life after retirement.

Figure 15: The Average Wage by Age and Labor Force Participation of Private Employees



Source: LFS 2007

The insufficiency of elderly income has motivated the analysis of old age poverty, which indicates the proportion of elderly that require the most urgent support. In this analysis, two measures of poverty are used. The first is the 2002 national poverty line (922 baht per person per month), which is the official poverty line used by the Office of National Economic and Social Development Board. However, another benchmark above the official poverty line needs to be taken into account to distinguish elderly that are at high risks of falling under poverty from those who are safe from destitute. Therefore, another poverty measure used in this analysis is twice the poverty line (1844 baht per month), which serves as a minimum level of income that enables elderly to live comfortably without the risk of poverty.

Table 3: The Percentage of Elderly under Poverty by the Two Measures

Measures of Poverty	Overall Elderly	Male	Female	Urban	Rural	Age 60-69	Age 70-79	Age 80+
Official Poverty Line	19.68	17.56	21.30	11.87	22.41	15.88	23.91	26.16
Twice the Official Poverty Line	31.36	29.64	32.66	19.39	35.54	28.10	35.14	36.51

Source: NSO, SES 2004 (author's calculation)

The two measures of poverty yield similar results. Using the official poverty line reveals that 19.7% of the overall elderly population is under poverty and using twice the poverty line shows that 31.4% of elderly are at high risk of poverty. Both measures

obtain the higher percentage of female elderly poverty than male and almost twice as high elderly poverty in the non-municipal areas as in urban areas. In addition, the two measures portrays an acceleration of elderly poverty from age 60-69 to age 70-79 before the percentage of elderly rises slightly in age 80 and beyond.

The logistic regression provides further insights to the characteristics of elderly would do not have sufficient income to live comfortably. Using twice the poverty line as a dummy variable, the regression results support the brief data observations. In deed, female elderly suffer a higher probability of living in a poor condition, which could be due to the lower revenue in old age. Age increase also contributes to the rise in probability of living uncomfortably in old age, and elderly living outside Bangkok, particularly those living in the North, have a higher chance of poor old age than those living in Bangkok. In addition to confirming the significance of gender, age, and residence of elderly, the regression reveals addition information about other factors that influence the chance of poor old age. Elderly living alone obtain a higher probability of uncomfortable old age than those living with their families and others, which could result from the lack of both financial and non-financial supports. In terms of household's socio-economic classes, elderly whose families are laborers and workers will suffer the highest chance of poor old age comparing to those whose families are professionals. However, education can serve as the way out of poverty, as mirrored by the decline in the probability of poor old age as the years of schooling rises. This also indicates that elderly with higher education will have a lower chance of living in poor condition after retirement.

Table 4: Logistic Regression Estimates for Probability of Poor Old Age for Sample Group of age 50 Years Old and Above

Socioeconomic Survey (2004)

Variables	Marginal Effect	Base Unit	Survey Sample Mean Estimate
1. Individual Characteristic			
- Ages	0.004***	-	66.3
- Female	0.022**	Male	0.56
- Years of Education	-0013***	-	6.80
- Living Alone	0.011***	Living with family and other	0.07
2. Location / Environments			
- Living in Central	0.149***	Bangkok	0.29
- Living in North	0.260***	"	0.25
- Living in Northeast	0.255***	"	0.26
- Living in South	0.165***	"	0.14
6. Other factors: **Profession of the family**			
- Entrepreneur	-0.011	Professional	0.21
- Farm (own)	0.044***	"	0.15
- Farm (rent)	0.057**	"	0.01
- Laborer	0.213***	"	0.05
- Other employee (clerical, construction workers, etc.)	0.117***	"	0.18
- Inactive	0.079***	"	0.26
Number of observation: 20,701			
Number of Jangwat: 76; Pseudo R^2 = 0.063			

Note: ***,** and * denote 1, 5, and 10% Significance levels, with heteroskedasticity-robust standard errors controlling for survey sample design

The examination of micro-data reveals that the first pillar, elderly's own income, cannot serve as a main financial support in old age. Nearly 20% of Thai elderly are under absolute poverty and almost one-third of them are at high risk of poverty. The incident of elderly poverty is more severe in the case of women who, comparing to men, leave the labor force earlier and earn less income to spend in the longer life in old age. Thus, despite the urgency of restoring the system's solvency, the reform of social security should not fail to consider the sufficiency of the benefits to alleviate old age poverty.

2. Elderly and their Past Savings

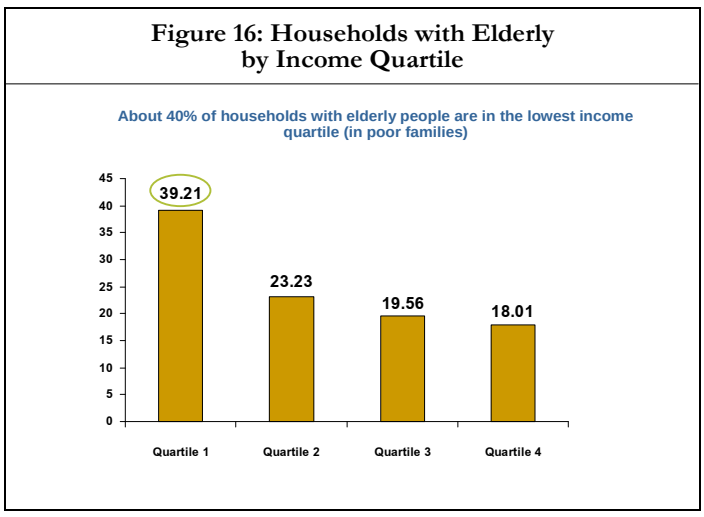
The second pillar is past savings, which determines the ability of elderly to sustain on their accumulated wealth after retirement. While elderly must live for at least 10 years if they retire at 60 years old, more than half of them could use their wealth to finance their retirement for only 5 years. The long run sufficiency of wealth, particularly in the later years of retirement, would serve as a guideline in determining the payment method of social security, whose support would become more important after wealth depletion.

The 2006 Household's Socio-economic Survey is used to analyze the past savings of elderly households to examine the ability of those households to support their elderly. This analysis measures savings both in terms of flow and stock. The flow of savings is indicated by household's monthly savings, which is the total monthly revenue (both in cash and imputed) minus non-durable consumptions. The stock of savings is measured using household's wealth, which is the difference between household's assets and liabilities.

Households with elderly save less than overall households, with the approximate monthly savings of 5,800 baht per month, which is less than 6,400 baht for average households. Furthermore, households with elderly have the higher-than-average proportion of those with low or no savings. Such phenomenon is common since old age is the period to dis-save. However, households with elderly have higher level of assets and lower liabilities than overall households, resulting in the higher average wealth. This could be due to the longer period of asset accumulation, particularly real estate.

Although a brief comparison of households with elderly and average households shows no significant problems, taking a closer look at households with elderly would illustrate more intense signals of savings insufficiency. When classifying households into

Figure 16: Households with Elderly by Income Quartile

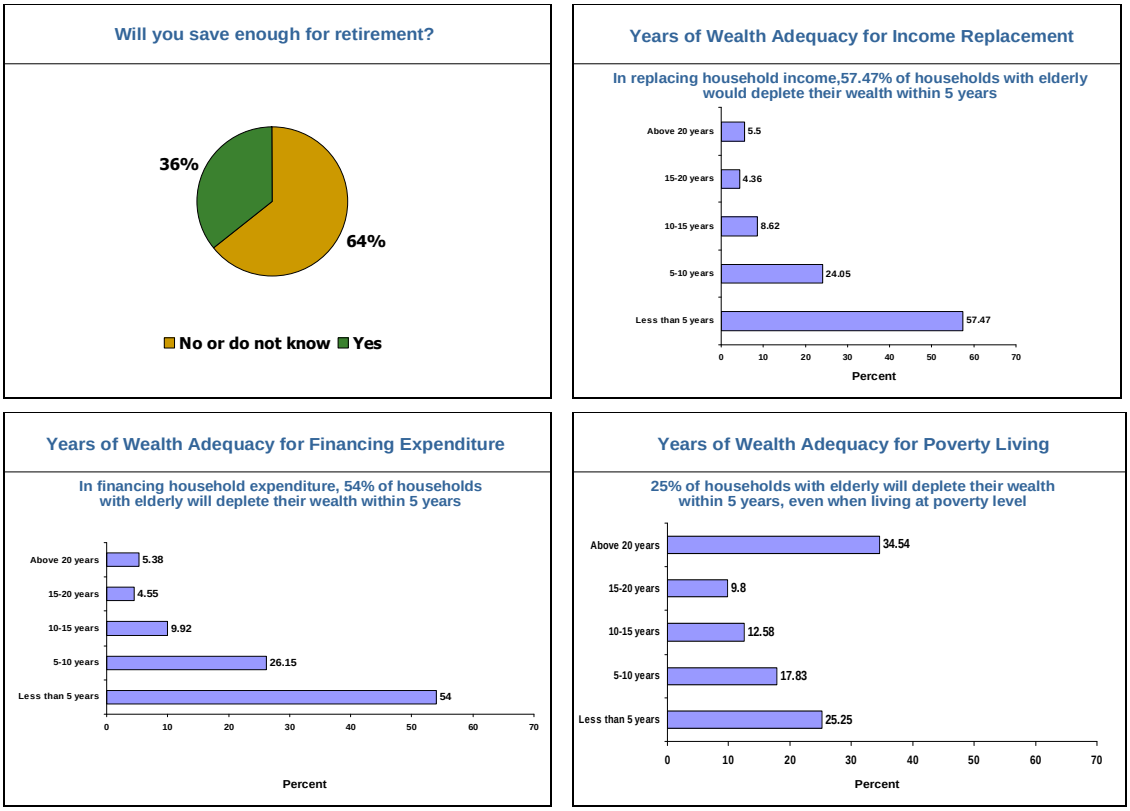


Source: NSO, SES 2006

four income quartiles, it is discovered that 39.21 percent of elderly households are concentrated in the lowest income group, whose average savings is negative and average wealth is half the average wealth of overall households. This result implies that almost 40% of elderly belong to poor households that are not capable of supporting them.

Savings for retirement will be further analyzed both in terms of opinion and actual adequacy to observe whether elderly households have sound perception about the adequacy of their long term savings. The opinion towards savings adequacy will be measured using the question in the 2006 Socio-economic Survey (SES 2006) that asked whether households will save enough for retirement. The actual adequacy of long term savings for retirement will be determined using three measures that will portray the number of years that household members, particularly elderly, could sustain on their wealth in the absence of revenues. The first measure is wealth over household's annual income, which determines the amount of years that household wealth can replace income. However, the first measure could be misleading when analyzing the difference of households in each income quartile, because the divisor would be lower for the lower income quartile and thus households with lower income would appear to take longer to deplete all its wealth. This requires the use of the second measure, wealth over the poverty-line income of all household members, which would give a common standard for comparing different households and eliminate the direct effect of income in determining wealth adequacy. The third measure is wealth over household's yearly expenditure, which indicates how well the accumulated wealth would smoothen finance all the expenses after retirement.

Figure 17: The Results of the Four Measures of Wealth Adequacy



Source: NSO, SES 2006 (Author's Calculation)

The opinion of households with elderly towards long term savings appears to coincide with actual measures of savings adequacy. The majority (64%) of elderly households think that they will not save enough for retirement, which is parallel to the worrisome results of all the three actual measures. Approximately 57% of elderly households will use all their wealth within 5 years if wealth is in place of yearly income, and 54% will deplete their wealth within 5 years if wealth is used to finance household expenditure. This means that more than half of households can support their elderly for only 5 years, while these elderly would have approximately 20 years to spend after retirement. Moreover, when using wealth over yearly poverty income to measure wealth adequacy, 25% of households can live on their wealth for only 5 years, implying that one-fourth of household with elderly cannot sustain on their wealth in the long run even when living at poverty level.

In addition to identifying the percentage of elderly households with insufficient long term savings, further data examination illustrates the linkage between households' wealth adequacy (when divided by yearly expenditure) and the following characteristics; (1) the gender of household heads, (2) the level of education, (3) the adequacy of monthly flows, (4) the strength of household balance sheet, and (5) financial literacy and planning.

Table 5: Difference in Characteristics of Elderly Households with Inadequate Wealth and Households with Adequate Wealth

Main Characteristics	Elderly Households	Wealth Sufficiency	
		Insufficient	Sufficient
1. Household head			
- Percent of Male Household Head	61.9%	53.7%	67.3%
- Percent of Female Household Head	38.1%	42.7%	32.7%
2. Levels of Graduation (Percent)			
- Primary Education	6.7%	6.8%	6.6%
- Lower Secondary Education	4.4%	3.5%	5.4%
- Higher Secondary Education	2.3%	1.5%	1.3%
- Vocational Education	1.0%	1.1%	0.9%
- University Education	4.6%	3.6%	5.8%
3. Household's Monthly Flows (Baht)			
- Income	16,100	14,100	18,400
- Expenditure	12,500	12,800	12,200
- Savings	5,800	4,000	7,900
- Savings Rate (Percent)	11.2%	7.9%	15.1%
4. Household's Balance Sheet (Baht)			
- Total Assets	1,159,000	428,000	2,015,000
- Total Liability	89,000	99,900	76,500
- Wealth	1,070,000	328,000	1,938,000
5. Financial Literacy and Savings Attitude			
- Financial Literacy (0-3)	0.95	0.87	1.03
- Percent of Household with Financial Plans	68.4%	61.2%	76.9%
- Percent of Household without Financial Plans	31.6%	38.8%	23.1%
6. Financial Access			
- Percentage of Households with deposits	74.54%	70.13%	79.71%

Source: NSO, SES 2006 (Authors' Calculation)

From the above table, it can be seen that elderly households with inadequate wealth have the higher percentage of female household head, which means that households with female heads are more likely to obtain insufficient long run wealth. The lower wages of female, particularly in old age, may attribute to this finding. As one could

expect, elderly households with inadequate wealth have lower income and savings as well as weaker household balance sheet than those with adequate wealth. The difference in average income could partly stem from the difference in education level, as depicted by the lower proportion of university attainment of elderly households with inadequate wealth.

In addition to the education level, financial literacy, financial planning, and financial access also play an important role in determining the long term wealth sufficiency. The SES 2006 has addressed households' financial literacy by asking three questions related to types of loans, credit bureau, and interest burden. The level of financial literacy is measured by the numbers of questions that are correctly answered and would range from 0-3. The survey further asked whether households have planned about savings for retirement, which will be used to determine the proportion of households with financial planning. The results reveal that elderly households with inadequate wealth have the lower level of financial literacy than elderly household with adequate wealth and average elderly households. The proportion of households with financial planning is also lower for elderly households with inadequate wealth. This implies that elderly households with inadequate wealth to use in the long run are the ones that are less financially literate and are less cautious about planning for retirement. Also, elderly households with inadequate wealth have less financial access than those with sufficient wealth, as depicted by the lower percentage of households with deposits. This suggests that lower access to financial services contribute to the lower wealth accumulation.

The results of the micro-data pinpointed the weakness of the second pillar of elderly support. Past savings, both in terms of monthly flows and wealth, is insufficient for a large portion of elderly, especially those in poor households. The low income and education level as well as financial illiteracy and lack of financial planning and access are the main contributors of such insufficiency. To safe this portion of elderly, social security should continue to provide monthly benefit payment instead of the lump sum payment, even if the latter incurs a small risk of loss for the system. That way would ensure that elderly would have constant stream of income even if their wealth are depleted.

3. Elderly and their Immediate Family

In the face of insufficient income or past savings, the bondage of Thai families has served as the final cushion for elderly. Thus, this third pillar is by far the strongest source of support for Thai elderly. However, demographic change would inevitably increase the burden of immediate families and hence call for additional support from social security.

While the importance of family transfer in supporting elderly is lower than savings or government transfer in developed countries, immediate family has been the most prominent source of support for Thai elderly. The 2002 Survey of Elderly in Thailand showed that offspring contributes to the overall elderly support by 77.2%, which is the largest contribution of support compared to other sources. Work, savings, and pension contribute to elderly support by only 38%, 17.1% and 4.1%, respectively. Although the contribution of offspring in 2002 is less than 84.5% in 1994, it is still the major source that elderly rely on the most. The survey further illustrated the reliance on offspring is heavier for female elderly and elderly in the non-municipal area. Such

Table 6: The Percentage of Elderly Support by Sources of Income

Sources of Income	Total		2002 Only					
			Sex		Age		Area	
	1994	2002	Male	Female	60-69	70+	Urban	Rural
Pension	4.1	4.3	6.9	2.1	4.7	3.7	9.7	1.9
Gov Allowance	0.5	3.0	2.7	3.3	1.7	5.2	1.8	3.6
Savings/interest	17.1	18.0	19.7	16.5	18.9	16.5	27.9	13.5
Work	38.0	37.7	48.9	28.2	50.2	16.7	27.9	42.1
Offspring	84.5	77.2	72.8	80.9	73.3	83.9	71.2	79.9
Spouse	21.4	17.4	16.5	18.1	22.9	8.2	15.8	18.1
Siblings	6.9	3.5	2.6	4.2	3.3	3.8	3.1	3.7
Relatives	8.0	5.3	3.9	6.5	4.0	7.5	5.2	5.4
Other	3.3	2.6	2.2	3.0	2.2	3.3	3.0	2.5

Source: The Survey of Elderly in Thailand 2002

reliance also increases with age, indicating that elderly would rely more on their offspring as they get older.

Not only do offspring serve as the vital financial support, but they also are the main providers of food, clothing, and material needs for elderly. Furthermore, the financial reliance of elderly on their offspring is negatively correlated to the socio-economic status of elderly. The reliance on offspring for elderly in the lowest socio-economic status is 82.3%, which is 31% higher than the offspring reliance for elderly in the highest socio-economic status that equals to 62.6%. From the survey results, it is clear that immediate family, offspring in particular, has always provided major supports and care for Thai elderly, preventing them from reaching poverty in old age.

Table 7: Types of Elderly Support and Main Providers

Types of Support	Main Providers			
	Independent	Spouses	Offspring	Others
Financial Needs	17.7	7.1	71.2	4.0
Food	23.2	19.3	52.2	5.3
Clothes	41.8	6.2	48.7	3.3
Material Items	44.4	8.8	44.1	3.1

Source: The Survey of Elderly in Thailand 2002

Table 8: Sources of Elderly Support by Socio-Economic Status

Source of Income	Socio-Economic Status				
	Lowest	Med. Low	Medium	Med. High	High
Work	40.8	38.6	38.1	35.9	33.4
Pension	0.3	0.9	3.2	5.5	14.8
Gov Allowance	5.0	3.1	2.5	1.9	2.0
Savings/interest	6.0	12.4	18.7	25.3	34.1
Offspring	82.3	82.8	78.8	76.0	62.6

Source: The Survey of Elderly in Thailand 2002

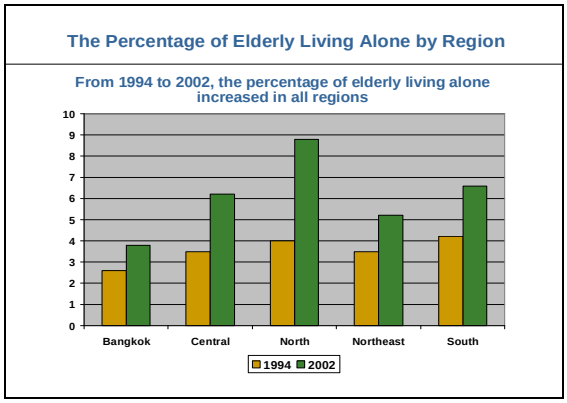
Nonetheless, the change in family structure has shattered the bondage between elderly and their offspring. The transformation from extended family to nuclear family as well as labor migration from rural areas to urban areas is reflected by the decrease in the percentage of elderly living with their offspring from 73.6% in 1994 to 65.7% in 2002. Such reduction is accompanied with the doubling in the overall proportion of elderly living alone and the hike in the proportion of elderly living alone in all regions. Like the situation of income, the living arrangement situation is also worse for female elderly, as shown by the fact that 7.8% of female elderly are living alone whereas the proportion of male elderly living alone is only 4.5%. This group of elderly pointed out that the main problems in living alone are the lack of care and financial insufficiency, indicating that change in living arrangement will hamper offspring's support for elderly.

Figure 18: The Living Arrangements of Elderly and the Percentage of Elderly Living Alone

Percent Distribution of Thai Elderly by Living Arrangements

The decrease in the proportion of elderly living with offspring indicates the weaker family connection

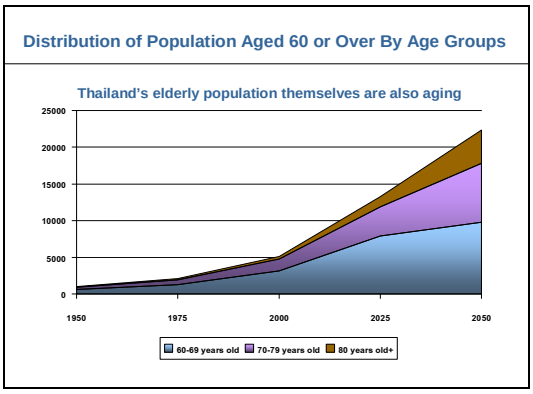
Living Arrangements	1994	2002
Alone	3.6	6.5
With spouse only	11.6	14.0
With offspring	73.6	65.7
Other arrangements	11.2	13.8

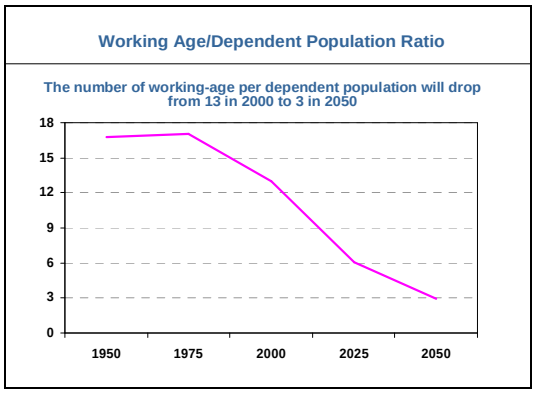


Source: The Survey of Elderly in Thailand 2002

Following the change in family structure, the demographic change will exacerbate the situation of elderly. The longer life expectancy and the lower fertility rate will bring about two phenomena. The first phenomenon is the aging within the old-age population itself. The fact that elderly life expectancy is longer will result in the higher proportion of elderly in age 70-79 and age 80 and above. This can be translated into the increase in average age of elderly that will accompany the rise in the number of elderly population. The second phenomenon is the reduction in the ratio of working age to dependent population. The number of working age-per elderly will decline from 13 in 2000 to 3 in

Figure 19: The Projected Aging Situation of Thailand





Source: The United Nations

2050. These two phenomena indicate that there will be less working age people to support elderly people who will live longer and need more care in the future. If this situation is unsolved, more elderly would be left unsupported.

Although the third pillar, elderly's immediate families, remains the major support for elderly, the worsening family connection as well as the upcoming demographic change will weaken this third pillar. Without prompt and sufficient support from the social security system, this would threaten both the financial and non-financial security of elderly in a few decades to come.

In conclusion, despite the urgency of social security reform, such reform cannot be done by solely considering the system's financial survival, for it will prevent the system from serving its purpose of alleviating elderly poverty. Although the analysis of micro-data indicates the weaknesses of the three pillars of elderly support and calls for the reform of social security system to remain the strong fourth pillar, it suggests that there is only a little room for some measures, such as benefit reduction, contribution increase, or lump sum payment that could negatively affect poor elderly. Therefore, the policy recommendation for social security reform should suggest measures that ensure the system's sustainability without losing its redistributive role. In addition, other policies to strengthen other sources of support for elderly, such as the minimization of income inequality, the promotion of education and financial literacy as well as financial access, and tax reduction for parent support, should also be implemented and continued parallel to social security reform.

IV. Necessary Reforms to our Social Security System

For the last three sections, the messages are clear. First, our population structure is aging rapidly with greater numbers of people living beyond 60 years old. Second, older people are at risk of becoming poor and having no adequate income to support themselves in their old ages. Third, our existing pension scheme will not be sustainable in the long run and will not be able to serve the government as the policy instrument to fight against the problem of elderly poverty. Third, the three important traditional pillars of financial support of the elderly, namely own income, own savings, own family have some limitations. Fourth, the problems of elderly poverty are not evenly distributed among the population. And finally, all of these point to an important conclusion that we have to seriously reform our social security system.

Social Security Reforms in other countries

Over the last 30 years, the subject of social security reforms have been extensively researched and widely discussed by academics, the social security authorities, practical policymakers, as well as by politicians. Given these well researched papers such as …., we will not go down to all detailed but provide the main important reading of these discussions.

First, the attempt to reforms social security system ranges from traditional and within the existing framework approach and the proposal of a new design. The *traditional* approaches mostly involved proposing a package of policy adjustment to get the financing of the pension scheme under control again. Within such packages, there are measures such as:

- Benefit reduction Although being highly-unpopular politically, since the main sources of insolvency comes from being too generous with the payouts to pensioners, many reform package incorporates some type of benefit reductions (which for the members is equivalent to the government is not able to keep the original promises). The reduction can come directly as the reduction of the coefficient in the benefit formula or disguise under some sophisticated alteration such as the changing of the way that the pension calculates the average base-wage for the benefit payout by lengthening the period under calculation to those period earlier in the life time of the members. More sophisticated adjustment also include changing in the benefit indexation rules from indexing to nominal wage growth to inflation (since wage usually grow faster than inflation due to productivity growth and by indexing to the nominal wage, the standard of living or the pensioners will actually be increasing as they getting older). Recently, the discussion also involve around changing the current indexation from a transparent and easy to understand linkages to headline inflation to headline inflation minus one percent rule (due to the argument and conclusion from many researches that consumer price index through its construction usually overestimate the cost of living increase by 1-2 percent.)

- Payroll tax increase In many cases, insolvency problem come from the fact that workers contribute too little compare to the benefits they expect to receive in the future Many packages also include some form of a proposed increase in the contribution level from the direct increase in the tax level. More sophisticated proposals include the enlargement of the coverage of the definition of wages to income which also include bonus and fringe-benefits or the increase of the wage cap to allow the social security system to be able to bring in more inflows of funding for the present period.

- Retirement Age Recently, given that one of the main sources of imbalances between the inflows and outflows comes from the lengthening of the life expectancy of the members due to improvement in the health of the general public due to better health care system, many social security system also try to increase the normal age or retirement to reflect the rise in the longevity. Many now increase the retirement age up to 65 years to ensure that the length of time that workers stay in the system and contribute to the pension stay in an appropriate balance with the length of time that workers are expecting to enjoy the benefits. Other sophisticated proposal includes the indexation of benefits and payouts to the length of life expectancy (without actually increase the retirement age) as in the case of Diamond and … (1999) and the addition of incentives to discourage early retirement by imposing a sizable reduction to the level of benefit received by those workers who decided to retire early and providing more benefits to those who decide to take work longer and take their pension later. So, measures in these groups reflect the fundamental operation of the defined benefit systems that longevity risk is entirely being transferred from members to the government and then the governments then have to find a way to bear this risk without overly burden themselves. And the obvious answer is to find the reason to reallocate and share the longevity risks with the member.

- Higher Investment Returns In many pension funds around the world, the return that they have been getting from investing accumulated assets are usually lower than those being received by their private counterparts. These partly come from the lower risk appetite that inhibit the range of instruments being undertaken or from the inefficient governance system. So, several reform proposals include the changing of the governance structure of the Social Security to ensure that it will be professionally administrated as well as reducing the government involvement in the management of the funds. This will limit the political interferences and limit the misused and inappropriate investment of the pension funds reserves into sub-return investment securities.

For the *less traditional* or *structural reform* approach (or more innovative approach), the proposal no longer revolving around the basic financing issues of getting the inflows and outflows to be more balances, but also include some innovative element such as:

- Moving from being defined-benefits to defined contribution. This is also another way of dealing with the longevity risk. Proposals in this areas ranges from the *privatization* of the public pension funds as in the case of Chile (which will make sure that the payout are fully funded by the members and the government is no longer the bearers of the longevity risks). Additional proposals include the introduction of *private accounts* alongside with the existing defined-benefit system as in the case of the US where members can crave out part of their social security contribution to a saving account under their names, allow greater investment choices, and upon their retirement entitled to receive the full benefits from saving and return within this particular account with their pension they will be receive from the pension system. In some countries, this can be done with the increase in the level of the payroll tax. Finally, in the case of Sweden, the proposal is to introduce a *Notional Defined Contribution* system where the workers will receive the benefits based on what they have contributed into the system with appropriate returns on these investments. Here, the system still function as pay-as-you-go system with the payout money come from the current generations being transferred to retired elderly. But the longevity risk is shifted back to the members.

Here we would like to point out that one additional important issue that also shaped the social security reforms that is the redistribution aspect of these reforms. Given that the problems and incidents of elderly poverty often are not being distributed equally among the general public with greater concentration on the elderly female, especially those who are widowed. Many social security system as they proceed with their reforms, part of their policy package also introduce additional redistributive measures to address this deficiency.

4.1 Implications for the Reform of the Social Security Program in Thailand

These reforms which have been undertaken by other country offer valuable insights, as we move to restore solvency and move forward with the reforms of our existing pension system.

For the case of Thailand, there are four important considerations that should shape our reform: (1) our final objective, (2) our existing arrangements of the pension

scheme, (3) effectiveness of each of these reforms measures, and most importantly (4) our problems as identified by the micro-data.

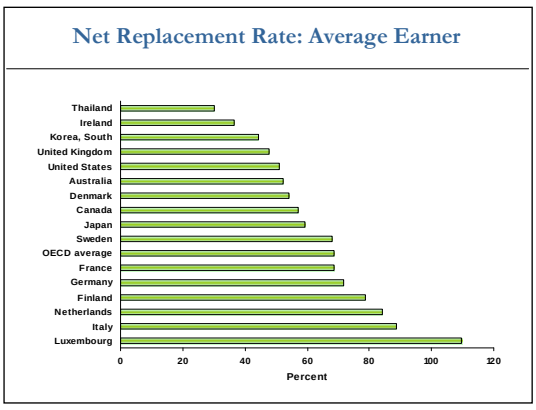
Here, it is quite important to keep a clear sight on what the government would like to achieve with the introduction and operation of the public pension funds. The foremost importance objective is to fight against elderly poverty and it should also be the case for Thailand as well. Given that there will be more elderly people as dictated by the demographic trends and the findings from micro-data that our elderly population currently have limited private support for their livings in their old age which is expected to be weakening over the years, especially with regards to the support from the immediate family, the government has limited choices. Unless some form of adequate financial support is being given by the government, these rapidly rising numbers of elderly people will become both economic and social problems. The burden is then on the government to provide some kind of risk-sharing mechanism and probably a redistributive system that focus help on those in need. So, the question is how this package of social insurance should be structured to ensure its solvency and ensure its effectiveness in achieving its objectives in fighting elderly poverty.

Reform Packages of the Thailand Social Security Office

The Social Security Office of Thailand is well aware that its existing pension fund is projected to be insolvent in around 40 years later. It also concerns that its member will not received adequate money for their retirement given that the program is recently introduced with the first group of members will be receiving roughly 15 percent replacement rate. (And for its long-term member who become member at the age of 25, he or she will receive roughly 30 percent replacement rate after 30 years of memberships which is still below the standard recommended by the International Labor Organization at 40 percent replacement rate after 30 years of membership.

As a consequence, the Social Security Office is currently proposing to adjust the current benefit formula from 15 percent replacement rate for the first fifteen years of membership and 1 percent addition for each additional 12 months of membership to 20 percent replacement rate for the first fifteen years and 1.5 percent addition for each additional 12 months. So, now a worker who starts working at the age of 20-25 years old will have a replacement rate of 50-57.5 percent, closer to the OECD average of 68.7 percent.

Figure 20: Cross-Countries Net Replacement and Contribution Rates



Contribution Rates for Countries around the World

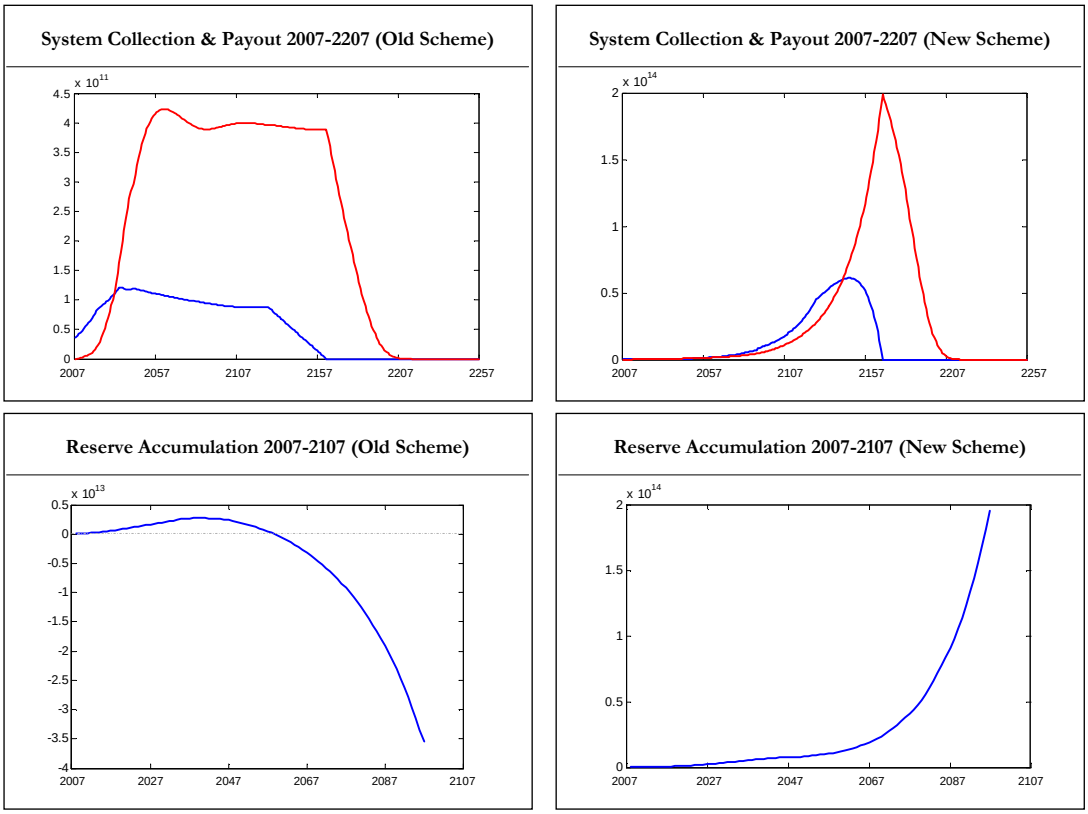
Country	Old age, disability, and survivors		
	Insured Person	Employer	Total
Singapore	20	13	33
Netherlands	19.15	6.38	25.53
Malaysia	11.5	12.5	24
Sweden	7	11.91	18.91
Vietnam	5	10	15
Japan	7.32	7.32	14.64
The USA	6.2	6.2	12.4
Chile	10	0	10
Canada	4.95	4.95	9.9
Australia	0	9	9
Korea, south	4.5	4.5	9
Thailand	**3.44**	**3.44**	**6.88**

Source: Edward Whitehouse, 2005

To help financing the payouts, the social security office proposes to have an incremental step-increase in the payroll tax from its current level of 3 percent on the workers and 3 percent on employers, by 1.6 percent each every ten years, beginning from the year 2020 onward for the next 6 decades thereby bringing the final tax to 31.6 percent of which 15.8 percent borne by the members and the other 15.8 percent on the employers. This then pushes Thailand from being a country with one of the lowest contribution rates to be a country with one of the highest level of total contribution in the world with Singapore with its central provident fund charging 33 percents. In term of workers' contribution, it will also be one of the highest following the Netherlands and Singapore. In fact, it is important to note that America with its quite successful social security programs (in term of benefits and reach) only require 6.2 percent payroll tax for employee.[19]

We can then calculate the total impacts of the new pension scheme on its actuarial balance, its contribution, its payouts, its accumulate path of reserve[20] as well as the internal rate of returns that each cohort is receiving from participating as members of the pension funds for the next 200 years. Note that given the increase in the pay role tax of roughly 5.3 times the original tax rates, new scheme will help increase the inflows of fund into the system by 5.3 times while the benefits outflow will increase by only 40-45 percents for most of the workers. This will consequently help restore the imbalances between the inflows and outflows and will be more than enough to cover the previous short fall. As a result, the financing of the pension fund under the new scheme will be more than adequate and resulting in the fund now having growing reserve over time.

Figure 21: Key Variables Evolution under the Two Pension Schemes



[19] For the table in this figure, we compare the total contribution rates for the old ages as well as disabilities and survivors, so for the old age portion is only 6 percents. Other measures such as the increase in the coverage of income from wages to include other benefits are also being considered by the Social Security Office.

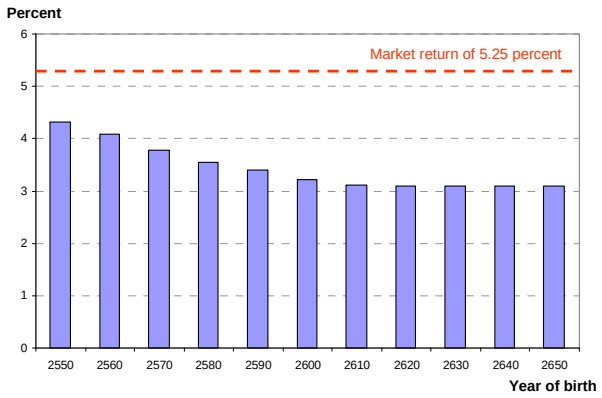
[20] This is done under the assumption on the population trends as described in Annex I.

However, there are three important issues concerning this proposal of the Social Security Office: (1) effectiveness of the new scheme in achieving its goal of fighting poverty for each member, (2) fairness to the future generation and (3) distortion of the increase in the payroll tax. Concerning the first point, it is quite important for us to reflect on what the new scheme proposal means for each individual member. Since the system will be accumulating more and more reserve over time, and being able to pay off the legacy debt that has been accumulating for the first 40 years of its operations, the new generation will have to pay in more than what they will be getting out from the system. So, in a ways the system is now serving as the social insurance mechanism against the longevity risks and no longer function as a subsidy to help finance the retirement for the elderly.

This brings us to the second point, fairness. Figure 22 indicates that the internal rate of return for each cohort of members is declining over cohorts under the new scheme, up until those cohort who born in 2620. This reflects the fact that the proposed step-increase in the pay roll tax occurs through time during the next 60 years, and those who born earlier pay less tax while getting the same benefit formula as the later generation.

However, it is also important to point out that for those who born in the year 2550 despite having the highest level of internal rate of returns of all cohorts in Figure 22, but the return still below what one would get in the prevailing market with the risk free nominal rate of return equal to 5.25 percents (in the assumption). It is this very difference that help repay the legacy debt that incurs in the early years of the pension fund and propels the increase in the accumulated reserve in the later period. So, if the objective is to help people fight against poverty during their retirement years, then everyone has to pay the premium to get the insurance and everyone is paying to the pension more than what the whole cohort would save money in the account and then sharing the risk of longevity among the member by buying the annuity from insurance company. Furthermore, the difference between across the generation points to the issues of intra-generational equity where the future generation is partly subsidizing the former generation in providing them what they put in to the pension system.

Figure 22: Internal Rate of Returns for each Cohort



Source: Authors' calculation

There are also some concerns over the issues of distortion from the increase taxation, which level costs increase quadraticly with each rise in the level of tax. This is due to the attempt by individual that have to spend in their activities to avoid tax. [21] So, if the payroll tax increase is of a small magnitude, then the distortion will usually be small but with such a large increase, then the tax distortion and the deadweight loss will be quite high and will have much implication on the appropriateness of raising such a high tax in the first place.

Thus, it may not be an optimal solution for the authority to put most of the emphasis on getting the finance of the pensions over and above other issue under consideration, especially the consequence of intra-generational issues and distortion such policy costs to the system.

4.2 Principles to Guide the Design of the Sustainable Pension Scheme

So, what should then be the guiding principles in the designing of the appropriate pension scheme? For the case of Thailand, in light of the findings from analysis down on the aggregate level and from the micro-data, there are at least 5 main principles:

Principle I Since the main sources of the problem comes from the fact that the program is too generous then it is important to first reduce its generosity otherwise then the current generation will get the windfall at the expense of the future generation as the legacy debt will be building up over time and will have to be repay by the next generation. So, these mean that there will have to be a combination of either the benefit reduction or tax increases or both.

Principle II Given that our main objective in establishing the pension fund is to use it as the main tools in fighting the problem of elderly poverty that is expected to rise in the coming decades; that our current and future group of elderly have limited mean to smooth their consumption with low level of literacy and some constraints on the savings ability; and that the current level of benefits given out by our current pension scheme is not too high as evidence by the low net replacement rate of average earner as shown in Figure 20, then

a. There should not be a reduction in the benefit formula that will result in the reduction in the net replacement rate of the social security members. Otherwise, the elderly population who will be relying on this support from the government will not be able to support their life with these limited pension incomes. In other words, we will be saving our pension system by giving up on trying to fight the problem of elderly poverty which is the main objective that we strive for with the introduction of the pension funds.

b. If there should be some form of benefit reductions, then we have to think in term of indirect mean of reducing benefits such as the increases in the eligible retirement age (that will not effect the size of income receive each year but the period itself). Such policy change will in effect help rebalancing the inflow and outflows of funds. And

[21] Martin Feldstien (1999)

by changing the retirement age to the changing in the longevity level then the system will have some automatic stabilizer to help the government manage the longevity risk better by partially share it with the retirees.

Principle III The design have to pay close attention to the issue of inter-generational transfers and have to try not to benefit any generation especially the present generation and let the coming generation to bear the full cost of it unnecessary. Not only, this make the adjustment to be more severe than it should be but at from the macro economic pointy of view, the there will also be an impacts on the level of national savings sine the system will move further away from pre-funded system to pay as you go system.

Principle IV In designing the reform packages we have to think about the issues of intra-generation transfer as well. Given that micro-data indicates that problem of poverty is highly concentrated in some certain groups of elderly, then as we reshape our policies then it also will provide us with the opportunity to refocus the resources and address the problem at where it most needs for instance the problem of female elderly poverty, especially those that are divorce or staying alone.

Principle V Finally, since the government will have to bear the ultimate costs (either in the form of having to pay for the difference in the shortfalls or in term of rising social problem from increasing incident of elderly poverty, should the pension reforms fails. Then the government may also consider contributing more annually in a regular sum to public pension fund. This sum should not be thought of as the subsidy to enhance the benefit payout but more as a remedy of the existing legacy debt or the existing funding discrepancy so that we can help limit the amount of inter-generational transfer that would have occur in absence of the government transfer.

4.3 Sensitivity analysis

Here it is instructive that we provide the sensitivity analysis of the financial health of our pension fund, as measured by its net present value or the present actuarial balance, to various policy levers that will be under consideration as we try to reduce the level of generosity of our pension scheme. Here the policy levers to consider are the usual one. These include the benefit rate, the contribution rate, the age of retirement as well as the rate of return on investment. Figure 23 provides the illustration of what would a policy change would do to the time profile of contribution, payout of a representative worker and ultimately to the net present value of the system, which is reported in the Table 9.[22]

As you can see in the figure, changing the policy levers change the time path of the accumulated assets at the pension fund as expected with more benefit payout lead to quicker exhaustion of the accumulated assets and higher contribution, delayed retirement and better investment returns allowing the accumulated assets to be larger in size and thereby allowing longer time before the workers exhausted his notional accumulated assets at the pension funds.

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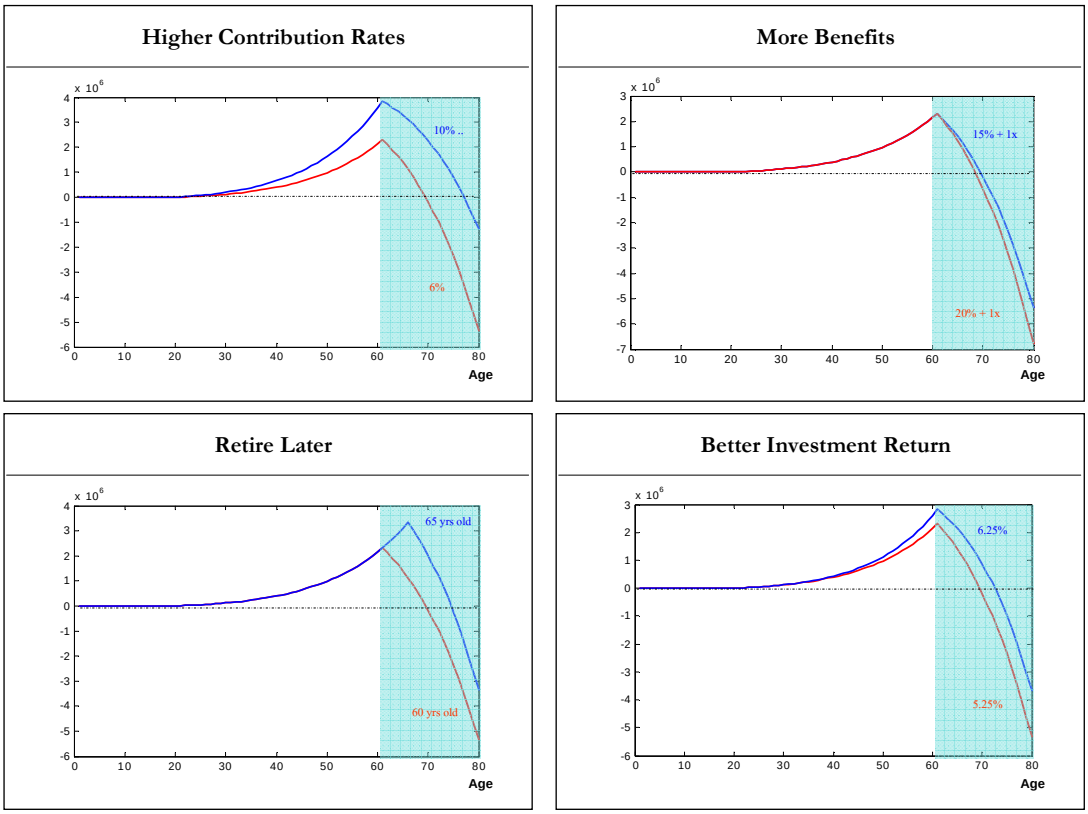
[22] Simulation in Figure 23 are based on the case of an individual entering to labor market at the age of 20 and earn 4,000 baht per month and with indexed pension scheme with the retirement age of 60. And in Table 9, NPV is based on the same setup for a representative cohort, for existing group of social security members (closed group unfunded obligations), and for the open group of members (open-group unfunded obligation), respectively.

Figure 23: Sensitivity Analysis of Important Policy Levers



Sources: Authors' calculation

What is more interesting is the information being reported in Table 9 below, which provides the changes in the actuarial balance or the net present value of the system as we adjusted some of the policy levers. Here, we consider three important cases: the actuarial balance of a representative cohort who enters the labor market at the age of 20 years old, the actuarial balance of the existing members or closed-group unfunded obligations, and the actuarial balance of the open system with additional members or open-group unfunded obligations.[23]

By juxtaposing the responses of the three cases to the change in the policy levers help revealed the strategy in reducing the current unfunded obligations within the system. First of all, the policy variable with the most impact is the increase in the investment return above the risk-free rate. While 1 percent permanent increase in the investment return over the risk free rate will help reduce the actuarial balance of a representative cohort (who becomes members of the pension funds at the age of 20) by almost 75 percent it only help reduce the closed group unfunded obligations by roughly 28 percent. This is due to the fact that the increase in the investment return will help the assets that being accumulated to grow faster. Consequently, the effect is more pronounce in the case of a representative cohort who enter the market at the age of 20 years old and have 40 years left in the membership for the interest rate to work its effect on the asset accumulation process. For the closed group many members have less time to retirement

[23] For the closed-group and open-group unfunded obligations, we already subtract the existing reserve fund for old age of roughly 300 billion baht from the figures.

Table 9: Effectiveness of each policy lever in reducing the NPV of the system

Policy Levers	Actuarial Balance or NPV		
	Representative Cohort (baht/person)	Closed-group obligations (billion baht)	Open-group obligations (billion baht)
Baseline	-32,471	-711	-2,112
1% increase in the replacement rate	-35,307	-769	-2,250
1% increase in investment return (above risk free rate)	-8,098	-513	-1,396
1% increase in the contribution rate	-18,972	-553	-1,660
1 year increase in the retirement age	-27,612	-649	-1,970
Percent Reduction of Actuarial Value of the Baseline Scenarios			
Baseline	100	100	100
1% increase in the replacement rate	+9%	+8%	+7%
1% increase in investment return (above risk free rate)	-75%	-28%	-34%
1% increase in the contribution rate	-42%	-22%	-21%
1 year increase in the retirement age	-15%	-9%	-7%

Sources: Authors' calculation

than that so that is why the effect is less pronounced. The second most important variable is the increase in the contribution rate with one percent translated into roughly 42, 22 and 21 percent reduction in the NPV of the representative cohorts, closed-group unfunded obligation, and open-group unfunded obligation, respectively. Whereas the one year rise in the official retirement age has the most limited impacts on the actuarial balance of the three groups.

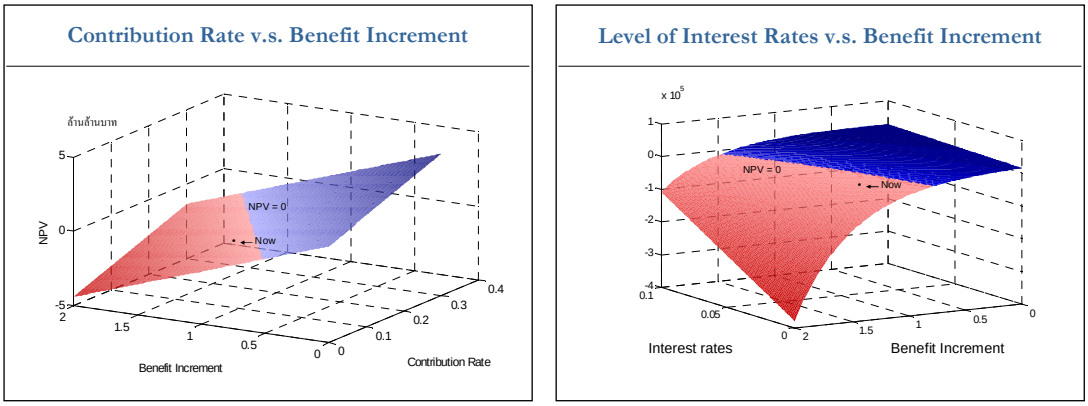
What is important is that the information in this particular table provides a quick tradeoff for the back-of-the-envelope calculation of all possible combination of policy levers that will help (1) restore sustainability and (2) achieve a certain policy target of the Social Security Office, thereby quite instrumental in the policy discussion and the debate. For example, let us suppose that the Social security office would like to increase the replacement rate from the present level of 40 percent for those who have been working for 40 year to 45 percent (toward the ILO recommended standard), or a 5 percent increase but keeping the overall actuarial balance of the system (i.e. open-group unfunded obligations) unaffected, then this can be achieve by increasing the retirement age for all by 5 years and then increasing the flat benefit for workers for the first 15 years to 20 percents. In addition if one would like to balance the actuarial balance of system at the same time then can be achieved by increasing the contribution rate by 5 percent which will result in a reduction of NPV value of the open-group system by 105%. And Sensitivity analysis in Figure 24 confirms that several trade-offs are linear with the exception of the change in the investment return.

Table 10: Quick Back-of-the-Enveloped Calculation for Policy Formulation

	Changes in NPV of the open system
Present position	100%
1) 5% increase in the replacement rate	= 5 x (+7) = +35%
2) 5 years increase in the official retirement age	= 5 x (-7) = - 35%
These two measures will leave the system roughly in balance.	~ 100%
3) 5% increase in the contribution rate	= 5 x (-21) = -105%
This final measure will help erase the system overall deficits.	-5%

Note: (+) and (-) indicates that actuarial balance of the system is in the deficits and surpluses, respectively

Figure 24: Trade-off between Policy Levers

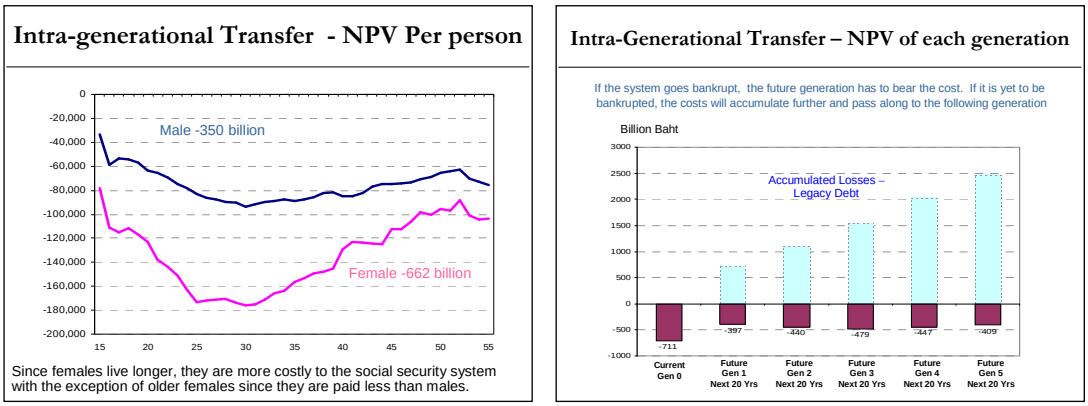


Sources: Authors' calculation

4.4 The Issues of Intra- and Inter-generational Transfer

Another important issue that one has to pay close attention to as one analyzes the actuarial balance of the system is the issue of intra-generational transfer. Given heterogeneities of the members of the social security system, in term of gender, longevity, wages, as well as age then under the same rule of common pension scheme there are some that gain more from participating in the pension funds, for instance, female usually live longer than male and thus will turn out to be more costly to the system, *ceteris paribus*. For example, we can break down and calculate the share of the NPV of each group of members under the pension system with wage and benefit indexation.

Figure 25: Intra- and Inter-Generational Transfers



Sources: Authors' calculation

Figure 25 provides the break down of the closed-unfunded obligation by gender and ages. Of the 1 billion baht closed-group unfunded obligations, male account for roughly one third and women account for the rest. Generally speaking from the point of view of the pension funds, female members are on average 1.9 times as costly as their male counterpart due to female longer life-expectancy. And interestingly, for older females, NPV per person is closer to male given that female wages are often stagnant after they reach the age of 40-45 years old. Also among female, there are also some variation among the NPV per person value which reflect some degree of intra–generational transfer, with women of the ages around 25-30 years old having the highest level of NPV per person and expect to gain the most by being the members of the pension scheme.

As for the right diagram of Figure 25, it provides the story for the intra-generational transfer as it occurs overtimes for the case of the open-group un-funded obligation under the wage and benefit indexation scheme as before. Here, the current generation enjoyed a good return from participating in the pension funds and then the system as a whole accumulated legacy debt and passes it along to the subsequent (overlapping) generations. Then the future generation 1 also enjoyed similar treatment and then the debt is being pas along to new generations after generations and getting bigger, so at the end, someone has to pay off this debt since this is a zero sum game. Suppose that it happen during the life time of Future generation 5, so this generation instead of enjoying as much benefits and windfalls as happened to former generations, they then have to pay back and clean up the situation and insolvency seize. So, this is how legacy debt (as Diamond et. al. called it) occurs. And this issue of intra-generational transfer will thus become another important consideration as we are attempting to redesign our pension scheme.

4.5 Reform Proposal

Let us now move on to the final topic, the necessary reforms to our social security system. From our view, there are three important issues that should be dealt with in the following timeframe: short-run medium-run and long-run.

1. The Redesign of our Pension Scheme

In the short run, it is quite important that we actively redesign our pension scheme. Our most urgent tasks are to (1) make sure that our pension scheme is no longer too generous in the sense that most members are getting too good a deal from becoming a member of the pension fund and (2) make sure that our pension scheme will become more and more effective as the instrument to fight against the problem of elderly poverty, especially in this period where we expect the threat of elderly poverty is on the rise.

To do this, we have to deal first with the problem of insolvency which comes from the fact that we are currently offering "too generous" a pension program. This means that fundamentally we have to look for the new combination of key policy variables (for which the most important policy levers are the contribution rate, the benefit rate, as well as the official retirement age) which will help restore balance to the system in the long run.

Although there are multiplicities of combinations of these three variables to bring the pension system toward solvency, there are some natural and logical choices:

1. The official retirement age. Currently the official retirement age is set at 55 years old. Nevertheless, the continued improvement in the longevity of the general population will put severe stress on this criterion for the members' eligibility for the monthly pension. With longer longevity, the portion of member life span that will be eligible for receiving benefit will increase. As a consequence, many social security systems around the world have been responding by increasing their official retirement age. Some countries and some pension reform proposal (for instance Diamond's et. al.) even go further by automatically linking the official retirement age or benefits and contributions with the expected life expectancy. This is quite important since the main

risk that being managed and insured is longevity, if the official retirement age cannot change then people who ultimately bear the risk then will have greater liability and this is the reason why many pension reforms have to be repeated regularly to ensure solvency of the system under the pressure of rising longevity.

For the case of Thailand, we should do the same and started by increasing the retirement age to 60 years old and later to 65 years old as the life expectancy level increase.[24]

Table 11: Official Retirement Age in Selected Countries

Country	Retirement Age	Life expectancy	
		Male	Female
Sweden	65	78.6	83
Japan	65	79.1	86.4
The USA	65	75.2	80.6
Canada	65	78.2	83.1
Australia	65 (men), 63 (women-until 2013)	68.4	75.1
Korea	60 (will be 65 by 2033)	67.5	81.9
Thailand	55	68.5	75

Sources: OECD

2. The benefit level. According to Figure 20, currently the Thailand have quite low replacement rate compare to other countries and our workers who have been working and members of the social security system for 30 years only received 30 percent replacement rate as compare to the ILO recommended 40 percent rate. Here, the first instinct is to trim down benefit in face of the threat of future insolvency. However, we have to go back to the first principle of why we establish the old-age pension in the first place that is to be the instrument for the government to fight against elderly poverty. So, if we reduce the benefit substantially we will surely help restore the balance and save the social security system but we will then having the problem of elderly poverty instead because the program fails its main objective.

So, it is important that we keep the benefit rate as is (there is no need to be as generous as in other countries given the fact that we are still developing countries with limited resource) or increase the base benefit from the current 15 percent for the first 15 years to 20 percent for the first 15 years. This together with the proposed rise in the retirement age to 60 and 65 years then workers who become member in their 20 will have 45-50 percent replacement rate.

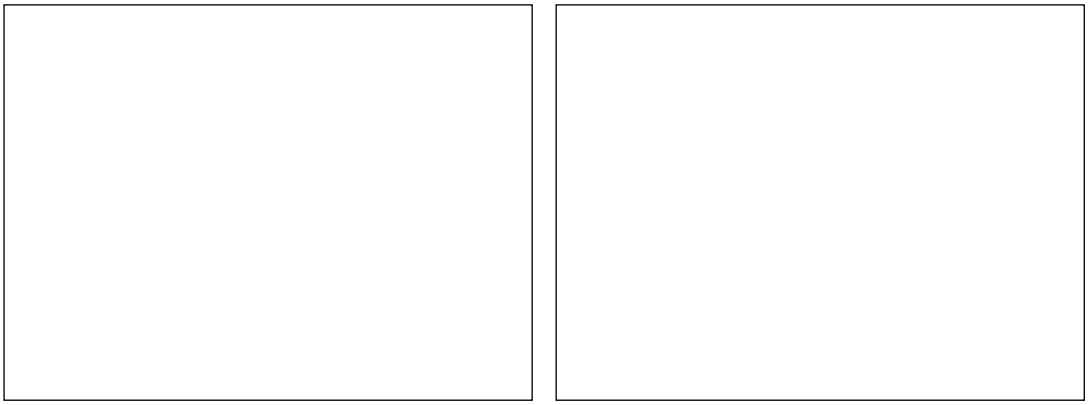
3. The contribution rate. Here, the contribution rate should be thought of as the adjustment variable to keep the overall system solvent given the demographic condition and the first two variables. Eventually as the retirement age is raised to 65 years and the base benefit is raised to 20 percent replacement rate for the first 15 years of working, the contribution rate have to increase to (1) accommodate and find additional financing for

[24] Here some might points out that the reason why we must have low official retirement age is because a good portion of our workers work in the industry that require physical strength such as those in the construction business. However, as the economy evolved overtime, the workers will move more and more toward the service industry and less strenuous works so there will be less physical limitation in the future. It is very important that we set this parameter right for the majority of the current and future members and then there are way to accommodate those who have to leave job early (i.e. changing the way we calculate the wage base to reflect the entire history or more of the worker' earning).

the payout as well as to (2) resolve the current problem of the pension scheme of being too generous. A quick back-of-the-enveloped calculation as done in Table 10 suggests that we should increase the contribution rate roughly 5-6 percent (or 2.5-3.0 percent each for workers and employers). Part of the increase (roughly one-third) will go to the financing of the additional benefit and the other part (roughly two-third) will help restore the original imbalance and reduce the present deficit that is expected.

The question is then when should we do this? These changes will not occur this year given that our economy is still in a weak stage with a good deal of pressure on employers and workers. So, we have to wait for the economy to turn better. But we should not wait too long, in many countries that engage in the process of social security reform succumb under the pressure of all the interested parties and end up proposed reform that will take effect 30-40 years from now so that it will not affected the current generation who is the most important political constituent of the government. But all of this, if the pension fund is already too generous will only add to the cost of the future generation who is not present today to defend themselves.

Figure 26: Contribution, Payout and Accumulated Assets under the New Scheme



Sources: Authors' calculation

So, in our case we should begin implemented these three changes as soon as possible by having an announcement of the future dates (that is not too far away in the future) that this change will be in effect. And for our case we also have a good window of opportunity during this following six years before the first paycheck of monthly pension will be sent out to member who will be eligible for the pension benefit. If we wait to make change after they received their first paycheck and the change will entail adjustment in what the benefit they will received then it will become very difficult process and politically charged.[25]

Before we move on to other aspects of the pension design, it is important to raise three issues. The first issue is on the investment return or more precisely how to raise the investment return. From Table 10, it is evident that 1% increase in the investment return over the risk free rate is the most effective means to reduce the existing negative actuarial balance of the system (for a cohort, closed-group, and open-group). So, the recent proposed change in the governance structure of the Social Security Office will be the first

[25] Usually change in the pension benefit will usually do with advance notice in order to allow the member time to adjust. For instance, if we want to reduce benefit, if we announce 20 years ahead then members will have time to save more on their own. But if we give such a short notice, there will not be enough time for members to adjust and will result in change of welfare of those affected members.

and foremost important step toward achieving greater return for the investment. Here, we recognize that better investment return will help relax all the trade-off that we have to made and it will means that we can raise contribution less than what we have to or we can payout more benefit than what we originally plan. However, given the current investment structure of the Social Security Office and its duty to be conservative, it will be difficult to increase this investment return substantially above the risk free rate and in fact if we decided to invest more in equity which generally give a better return than deposit, we have to put in allowance for the risk that we will be taking.[26] And the return that is already and properly adjusted for the risks involved will be significantly lower than before. So, we expect to see only some improvement in this investment return.

The second issue concerns the government role in the resolution of the existing negative actuarial balance of the system. It is important to point out that at the end someone has to pay for the deficit that already occurred (here in the form of low contribution rate taken in for the last 9 years compare to the benefits being promised). We can let the present and future members of the pension fund transfers this loss among themselves, but this will only then be passed along the future generation to be taken care off. But then there is the issue of fairness to the future generation and the issue of distortion that this will cause to the design of the pension scheme that will not only have to be designed to both support the promises to the members (which have to be fair) and to pay off the inherited debt from the previous generations. So, there might be a role for the general government to set aside some resource if needed to help cleaning up these existing losses in form of annual transfer from the government to the pension reserve. It does not have to be large each year, but have to be persistent to reduce the inherited debt over time.

The last and final issue is about our concern over the transition period. It is important to point out that the strategy recommended by some – that is to accelerate the coverage of the social security members to the rest of the workers as a way to help improving the financing of our pension fund – to be incorrect. If the program is still too generous, each member of the social security is indeed liability to the pension scheme. The more we have, the larger will be our losses. So, it is important that we solve the problem of insolvency first before focusing on bringing in more members. And, more importantly, the reform has to be done as soon as possible since many studies indicate that the cost of delaying the reform will result in a sharper and more severe adjustment later.

2. Other changes that need to be done in the medium run.

After we have taken care of the problem of long-term solvency of the system, we then have to come back to other details of the system. Here, as we have already mentioned several time, our pension scheme is still quite young and immature when compare with other system around the world with many details left unspecified. But this youngness of the system is an advantage since we can then choose the appropriate features for our system based on the experience of other countries around the world. For instance:

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[26] the historical return on the SET index as shown in the Annex I will bring this point home

1. Benefit indexation. The current thinking is to index the benefit to inflation minus 1 percent. This will keep the purchasing power of the retired-members (which will be determined by our choice on the benefit formula) constant over time so that we will not have the problem of elderly poverty emerge as longevity rise or as time passed by. It is also not too generous.

2. Wage indexation At least, we have to index to the wage growth to ensure that the composition of the member that we are serving will not shift and put too much pressure on the wage cap or wage floor.

For these two indexations, it will be best if we can specify an automatic rule within the system instead of an ad-hoc ruling by the board.

3. The calculation of the average wage. At the present we are using the average of the last 5 year of the contributory wages. This will introduce "gaming" in the sense of under report the wages earn in the early years and increase payment in the last five years before retirement. In some countries, the practice is to use the average of the life time income which can then be calculated from the history of the contributory wages of the members that we have in the computer record. Note that, by changing this particular rule, we will reduce the level of benefit that workers get (given that the wage in the last 5 years are the highest) so it should be done with the reconsideration on the benefit level to ensure that the change will not affect the well being of the retire members and will not resulted in the rise of elderly poverty.[27]

4. Focus on the needy. Given that the problem of elderly poverty concentrated in a particular group of elderly population, we should also try to find ways to help those members who are less well-off. As found in our micro-data analysis, these include elderly female, widow etc. So, we might then use the pension scheme as a tool to redistribute income from those who are well-off to those who are less well-off.

Other issues that should be considered in the redesign of the pension scheme include rules to provide incentive to delay retirement and discourage early retirement. We have to upgrade the way we assess and monitor the soundness of our pension system and make the process public. In the U.S., there is a President's appointed commission of experts to be independently responsible for the monitoring and reporting of the soundness of the US social security system on the ongoing basis and annually publish the report and its recommendations to the general public. This then helps raise awareness on this issue and increase the participation of the general public in the debates of how we should reform our social security system.

3. Reforms in the long run

After we finished in the redesign of the existing pension scheme and already make sure that it is well-designed, we then have to think about more of the structural reform that should be introduce in the long run.

Here the most important issue is between whether we should move toward the system of defined contribution and private account. Many countries after the Chilean

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[27] This particular change will also help those people who have to leave their job earlier due to the physical problem such as those in the construction industry.

Reforms have chosen to adopt this approach. We think that both defined-benefit and defined-contribution pension system can work well if it is well-designed. The first issue is how the longevity risk should be handled. Defined contribution system leaves that risk to each individual to manage while defined benefit system let the government assume that risk. So, if the government proactively manages this risk and partially share this risk with the members by providing the incentives for member to work longer, the system of defined benefit can work out quite well. The second point concerns how we handle the issue of being "overly generous" and the issue of pre-funding (that is, the system is not overly generous and does not rely on the pay-as-you-go funding as the main source of financing). Here, we have to put more emphasis on pre-funding of which if we collect enough benefits for the payouts then overtime the level of pre-funding of the system will steadily increase.

So, it is our personal opinion that we should keep the current defined-benefit system providing that it has been redesigned properly and then complement it later with the system of private account (which based on a defined contribution concept) as in the case of many other countries. This can be achieved in the form of a separate system of National Pension as recently proposed by the government or by a system of private account reside within the Social Security Office.

At the same time, we also have to address other important issues that will help the general public in term of their preparation for their retirement. This include the improvement of the general public's financial literacy, access to savings, the development of new financial instruments to help people manage the longevity risk on their own as well as the continue reform of our long term savings system.

V. Conclusion

Looking ahead, the issue of aging society and its impact on the economic, financial and social security systems will be with us for quite some time. And inevitably, these pending changes in demographic structure will put severe stress on our current social security structure and put our policymakers to a test of their ability to manage such challenge. Our paper points out that our social security system, especially old-age scheme in its present form will be at risk and will possibly be insolvent in the next 40-50 years with serious implications on the government fiscal position. Given that a large numbers of our elderly people have limited ability to support themselves, if the social security system is not strengthened in time for these coming aging of our population, then we will be in a difficult position with the problem of elderly poverty as a major social and economic problem to their immediate family, to the society and to the government.

So, the reform of the social security system is an urgent matter (where delay will only raise the cost of adjustment). This paper suggests steps to remedy this situation with three steps approach in the redesign of our social security system. There will, of course, be multiple paths to achieve the ultimate goal of long-term solvency, but we hope that our study will provide insights and understanding on this issue and begin a new round of public debate on this very important topic that will effect not only the livelihood of majority of our people and if not well-managed will have implications on those generation that will come long thereafter.

Annex I

In our simulation of the baseline and other projection, we look at past stochastic behavior – both mean and variance – of important economic and financial variables as our starting point. Time-series properties of most of these variables are used with the exception of those of the inflation process whose characteristics have significantly changed after the introduction of the inflation targeting regime in 2000. And for the case of real bond rate we also used the more recent period under inflation targeting as the starting point since the changing in the monetary framework will affect the inflation formation process and the risk premium of investors that constitute a sizable part of the bond yield.

In particular, in our baseline simulation, we assume that:

- long-term inflation of roughly 2.5 percent
- real wage growth of 2.5 percent
- real government bond yield of 2.75 percent.

Note that under this assumption, nominal risk free rate will be around 5.25 percent.

Table 12: Past Stochastic Properties of Importance Variables

Economic environment	AR factors over long horizon	Range and Volatility			
		25 Years		Inflation Targeting	
		Average	STD	Average	STD
Real variables					
1. Real GDP		5.9	5.1	5.0	1.4
2. Real wage growth (88-07)		2.3	5.6	0.0	1.1
3. Real return					
- Government Bond		4.9	2.6	2.8	1.7
- Deposit		4.2	3.8	-0.1	1.5
- Stock and dividends		15.3	45.8	13.2	50.2
4. Inflation		3.6	2.0	2.5	1.5
Nominal Variables					
1. Nominal GDP		9.7	5.6	7.6	2.1
2. Nominal wage growth (88-07)		6.3	6.3	2.4	1.9
3. Nominal return					
- Government Bond		8.5	2.7	5.2	0.9
- Deposit		7.8	4.3	2.3	1.1
- Stock and dividends		19.0	45.2	15.7	49.8

Sources: IFS and NSO (LFS)

As for the demographic changes, we rely on information and projection from various sources include the UN Population Division, WHO, the local authorities such as the NESDB and NSO as well as the assumptions used by ADB's and ILO's experts in their studies of Thai Pension system.

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