AARP Public Policy Institute

Social Security Financing: Automatic Adjustments to Restore Solvency

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Pension Policy Center

Research Report

AARP

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Foreword

Social Security is the foundation of our retirement security system. About two-thirds of retirees depend on for most of their income and 20 percent of persons aged 65 and older depend on it for virtually all of their income. While the Social Security system is safe, it is not solvent in the long run. Beginning in 2041, revenues will be sufficient to pay only 78 percent of promised benefits. The deficit in Social Security over the next 75 years is equivalent to $4.3 trillion in present value. Increases in revenues or decreases in benefits equal to about 1.7 percent of taxable payroll will be needed to achieve long-term solvency.

Like the United States, many countries are facing social security solvency problems as longevity and the number of years that retirees collect benefits increase, as birthrates fall, and as the number of workers relative to retirees that they support falls. Some countries have adopted automatic mechanisms to improve solvency, rather than changing taxes or benefits in an ad hoc manner. These countries have enacted laws requiring that benefits be automatically reduced or taxes increased when certain triggering events such as deterioration in solvency or an increase in average life expectancy occur.

Automatic adjustment mechanisms eliminate the need for large program changes made in crisis mode. They may be more politically feasible than ad hoc changes, and they offer some certainty for workers and retirees, because it is known in advance how taxes and benefits will change if solvency deteriorates.

This paper by John Turner describes the various automatic stabilizing mechanisms and explains how they have been adopted in 12 different countries. It then touches briefly on the distributional consequences of these mechanisms, and how a longevity index might be adopted in the U.S. It appears likely that automatic adjustment mechanisms adopted in Sweden and Japan will succeed, whereas those adopted in Italy and Germany have already been overridden. Because these mechanisms are relatively new, it is not clear how well they will work in the long run. Nevertheless, the experience of these 12 countries provides useful insights on the potential design features of auto-stabilization mechanisms and what their effects might be if implemented in the U.S.

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EXECUTIVE SUMMARY

Social Security is not sustainable at current financing and benefit levels. The basic options are to cut benefits or raise taxes. An additional option is to invest part of the Social Security trust fund in equities. Recognizing the political problems with resolving social security insolvency through ad hoc reforms, a growing number of countries have established automatic adjustment mechanisms. With automatic adjustment mechanisms, pay-as-you-go social security systems can be structured to have sufficient financing in the long term.

This report examines the experience of 12 countries that have adopted automatic adjustment mechanisms. Automatic adjustments to social security can involve automatic increases in tax rates, automatic benefit cuts, or automatic changes in the early and normal retirement ages. Whether automatic adjustments involve tax rate increases, benefit cuts, or changes in retirement ages is a political decision, though one that may be influenced by the underlying economics, which is explored in this report.

Life expectancy indexing tax rates would result in increasing tax rates over time as life expectancy continues to rise. Life expectancy indexing benefits cuts benefits over time, resulting in a decline in replacement rates. Countries may eventually decide that life expectancy indexing of benefits results in too large a drop in the replacement rate. That said, the drop can be offset by workers who choose to work longer or by a policy encouraging longer work years, for example by raising the social security eligibility age.

In addition, policies can address the problems caused by life expectancy indexing benefits for low-income persons and persons who are unable to extend their working lives.

Countries have relatively little experience with life expectancy indexing of benefits, so it is not possible yet to assess the long-term effects of such policies. For indexing to work, it must be supported by a broad-based political commitment not to seek vote-winning modifications that undermine its effectiveness. In this regard, it appears likely that the automatic adjustment mechanisms will work in Sweden and Japan because of the consensus nature of their politics. Italy and Germany, however, have already overridden automatic adjustments. Thus, the international experience does not provide a clear lesson as to how this type of adjustment would work in the United States.

INTRODUCTION

Pay-as-you-go social security programs in the United States and some other countries are not sustainable at current financing and benefit levels. In the past, countries have made ad hoc adjustments to maintain the solvency of social security programs, requiring legislative intervention each time an adjustment to social security financing was needed. Ad hoc reforms have a high degree of political risk because their timing and magnitude are unknown. Their distributional consequences are unknown in advance, depending on whether benefits are cut, taxes raised, or both. Because of the political difficulty in legislating cutbacks in social security programs, ad hoc reforms can occur in a crisis, with little advance notice to workers and retirees as to the legislated changes (Turner 2007a).

Automatic adjustment mechanisms automatically change the social security program parameters depending on economic and demographic developments and the financing status of social security programs. For example, these policies decide in advance that if life expectancy increases, or the old-age dependency rate increases, or the rate of wage growth decreases, how the social security system will adjust to maintain adequate financing. Automatic adjustment mechanisms address the interrelated problems of social security sustainability, the political difficulty of making reforms that involve retrenchments, and the political risk associated with social security reforms.

Automatic adjustment mechanisms can eliminate the need for large program changes made in crisis mode. They can eliminate the risk of having insufficient financing given benefit levels. They do not eliminate all risk, however. Workers still face the risk that benefit levels may be reduced, taxes raised, or retirement ages moved back. And political risk may be reduced, but it is generally not eliminated, as politicians can always intercede and modify the changes that were designed to be automatic.

This report surveys high-income countries that have automatic adjustment mechanisms for social security. The report describes automatic adjustment mechanisms that achieve and maintain solvency. It considers the experience of countries that have these mechanisms. It concludes by considering how the U.S. Social Security system could use stabilizing mechanisms to improve solvency.

THE PROBLEM

Most traditional social security programs are financed on a pay-as-you-go basis. The annual inflow of contributions roughly equals the annual outflow of benefits. In addition, most systems maintain a reserve fund to smooth out fluctuations in contributions over the business cycle.

Changes in the ratio of beneficiaries to covered workers (the dependency ratio) play a key role in social security financing in pay-as-you-go systems. The ratio of beneficiaries to covered workers acts like a “price” for benefits, meaning the amount the average worker must pay in social security taxes to raise the average benefit level by one dollar (Turner 1984). For example, when there are 10 workers for every social security beneficiary, a dependency ratio of 0.10, it costs each worker $0.10 to provide one dollar of benefits to each beneficiary. By contrast, when there are two workers for every beneficiary, a dependency ratio of 0.50, it costs each worker $0.50 to provide a dollar of benefits. Thus,

as the dependency ratio rises with population aging, the "price" of providing social security benefits also increases.

Between 1970 and 2000, the growth rates in U.S. Social Security covered workers and beneficiaries were roughly equal, implying no change in the dependency ratio. However, between 2000 and 2030, according to the intermediate projection of the Social Security Administration actuaries, the number of beneficiaries will grow considerably faster than the number of covered workers (Table 1).

Table 1
Projected Percentage Change in Old-Age and Survivors Insurance (OASI) Covered Workers and Beneficiaries, Select Periods, 1970–2030

Year	OASI Covered Workers (thousands)	OASI Beneficiaries (thousands)
1970	92,788	22,618
2000	154,624	38,556
2030 (intermediate projection)	184,794	71,547
Percent Change		
1970–2000	66.6%	70.5%
2000–2030	55.0%	85.6%

Source: Author's calculations from U.S. Social Security Administration (2008b).

AUTOMATIC ADJUSTMENT MECHANISMS

Recognizing the political problems with resolving social security insolvency through ad hoc reforms, a growing number of countries have established automatic adjustment mechanisms. At least 12 countries have life expectancy indexing of benefits or automatic adjustments tied to an indicator of social security insolvency. Both types of reforms provide automatic adjustment mechanisms for sustaining the solvency of social security systems.

With life expectancy indexing of benefits, taxes, or the early or normal retirement age, increases in life expectancy automatically lead to cuts in benefits or increases in taxes or increases in the early or normal retirement age. However, the adjustment mechanisms used for indexing can vary.

The differences in automatic adjustment mechanisms can be categorized in four dimensions:

1. The frequency of the adjustment
2. The triggering event
3. Whether the trigger is a hard trigger or a soft trigger
4. The change that is triggered

First, some automatic adjustments test for the need for change and make any necessary changes annually; these adjustments are designed as part of the ongoing financing to maintain the solvency of a system. For example, life expectancy indexing of initial

benefits generally is done annually, as in Sweden, but Italy adjusts benefits less frequently.

Second, the choice of triggering event has varied. Some adjustments are tied to the system's underlying economics and demographics, such as changes in life expectancy, the dependency ratio, or real wages. Others are tied to a measure of the insolvency of the system, and adjustments are made only if the system is judged not to be fully solvent over the long run.

Third, the trigger can be a "soft" trigger, meaning that the government is obligated to do something, but may chose among different measures. Alternatively, it can be a "hard" trigger, meaning that the adjustment is automatic (Penner and Steuerle 2007). In most countries adopting automatic adjustment mechanisms, the trigger is a hard trigger if the adjustment involves life expectancy indexing of benefits. However, triggers tied to a measure of insolvency are generally soft triggers, with some degree of political involvement in the process. Even in Sweden, discussed later, which has a hard trigger with respect to insolvency, the government maintains oversight, so the automatic adjustment may be overridden.

Fourth, the change that is triggered can be an adjustment in tax rates, in benefits, in retirement ages, or in some combination of these.

INDEXING FOR LIFE EXPECTANCY: SHIFTING RISK TO RETIREES

Starting in the late 1990s, a number of countries have reformed their social security systems to incorporate life expectancy indexing or other automatic adjustments. Life expectancy indexing is the policy of adjusting some parameter of social security, such as benefits, taxes, the early retirement age, or the normal retirement age, for changes in life expectancy. Life expectancy indexing shifts at least part of the financial costs and risks of longer life onto workers. This shifting of costs and risks recognizes that workers are the beneficiaries of longer life expectancy (Whitehouse 2007a).

Indexing Benefits

Defined contribution systems maintain life expectancy indexing of benefits when they annuitize benefits based on current life expectancy. This feature of defined contribution systems can be incorporated into social security benefit systems by life expectancy indexing of benefits.

Life expectancy indexing of benefits reduces annual benefits to offset the increase in lifetime benefits that accompanies an increase in life expectancy. With life expectancy indexing of benefits, retirees are still protected from their individual (idiosyncratic) life expectancy risk because they receive benefits as long as they live. Individual or idiosyncratic life expectancy risk is the risk that individuals will live longer than the average for their cohort.

Life expectancy indexing of benefits gradually lowers the replacement rate—the ratio of earnings in the period before retirement to benefits received at retirement. When replacement rates are measured at a fixed age, life expectancy indexing results in reduced benefits relative to earnings. Thus, over time, the generosity of the social security system, measured by the level of annual benefits received by retirees relative to their pre-retirement earnings, is reduced.

With increased life expectancy, working longer is a desirable policy outcome for people who are able and willing to do so. For anyone who chooses to do so, the reduction in social security benefits that results from automatic adjustments could be offset by working longer.

Countries have used several approaches to index benefits for changes in life expectancy. One way adjusts for the percentage increase in life expectancy. For example, if life expectancy increases by 1 percent, benefits would be reduced by 1 percent. Portugal and Japan use this method.

A more commonly used method adjusts for the percentage increase in the present value of benefits caused by the increase in life expectancy. For example, if an increase in life expectancy raises the expected present value of benefits at retirement by 1 percent, benefits would be reduced by 1 percent. With the interest discounting of future benefits (due to the time value of money), an increase in life expectancy by 1 percent raises the expected present value of benefits by less than 1 percent because the increased benefits are received years in the future. For that reason, this form of indexing results in a smaller reduction of benefits for a given increase in life expectancy than the first way and just offsets the effect of the increase in life expectancy on solvency.

Indexing Retirement Ages

In addition, retirement ages can be indexed. Life expectancy indexing of the normal retirement age for full benefits and the early retirement age (eligibility age) has two dimensions:

1. The level of benefits received at the new retirement age.

2. The increase in early or normal retirement age.

The first dimension of retirement age indexing is the level of benefits received at the new age. The level or amount of benefits can be the same as that payable at the former age. For example, if the age were raised from 62 to 63, the benefits formerly receivable at 62 would be receivable at 63. With this approach, indexing the earliest retirement age in the U.S. Social Security system would reduce benefit costs because the same level of annual benefits would be received, but for fewer years.

Alternatively, the level of benefits can reflect the adjustment for postponed retirement. The benefits receivable at 63 would be the same as the benefits receivable at 63 under the former eligibility age. This method of indexing the earliest retirement age would have little effect on benefit costs in the United States because the increased benefits with postponed retirement offset the effect of the reduced number of years that benefits would be received.

The second dimension of indexing retirement ages is the increase of the eligibility age or normal retirement age. The age could increase one year for every year increase in life expectancy, or it could increase at a rate that would maintain a constant ratio of retirement years to working years. Alternatively, it could be set to maintain a constant ratio of beneficiaries to workers (dependency ratio) (Gebhardtsbauer 1998).

The different ways in which the eligibility age or the normal retirement age can be indexed to life expectancy have different effects on social security financing. With

indexing to maintain a constant life expectancy at the retirement age, the costs of the social security system will decline over time because the ratio of beneficiaries to workers will tend to decline (Gebhardtsbauer 1998).

With life expectancy indexing to maintain a constant ratio of retirement years to working years, because the length of the retirement period increases over time, the expected present value of benefits rises with increases in life expectancy. However, keeping the ratio of the retirement period to the working period constant and setting the benefit level so that the benefits at the new age equal those receivable at the old age insulates the social security system from adverse financial effects due to increasing life expectancy. If maintaining a constant ratio of work years to retirement years also maintains a constant ratio of workers to retirees, there would be no change in the old-age dependency ratio, and the system's solvency would be unaffected by changes in life expectancy. However, life expectancy indexing this way is not sufficient to maintain a constant payroll tax rate when the retirement of an exceptionally large age cohort looms, such as the baby boom generation.

Some countries have adjustment mechanisms that, instead of being tied to improvements in life expectancy, are directly tied to the projected insolvency of their social security systems. These countries include Canada and Japan.

COUNTRY EXPERIENCE WITH AUTOMATIC ADJUSTMENT MECHANISMS

This section surveys the experience of high-income countries that have automatic adjustment mechanisms. The countries that have these mechanisms can be divided into groups with similar types of reforms. First, traditional pay-as-you-go systems that have instituted life expectancy indexing of benefits are considered. Second, countries that have Notional Defined Contribution (NDC) systems, explained later, that have life expectancy indexing of benefits are discussed. Third, countries that use life expectancy indexing of the earliest age at which social security benefits can be received are reviewed. Fourth, countries with automatic adjustment mechanisms that are tied to solvency are considered. Sweden is included in this fourth group, although it also fits into the second group. Fifth, countries are considered that automatically adjust other parameters of their social security systems, such as the number of years for full benefits.

LIFE EXPECTANCY INDEXING IN TRADITIONAL PAY-AS-YOU-GO SOCIAL SECURITY PROGRAMS

Life expectancy indexing of benefits can be incorporated within the framework of a traditional pay-as-you-go social security system, such as the U.S. system. A couple of countries with that type of system have done so.

Portugal

In 2006, Portugal passed legislation that indexes its social security benefits for improvements in life expectancy. The legislation took effect in 2008. The reduction of benefits is based directly on the percentage change in life expectancy, rather than on the percentage change in the expected value of pension benefits arising due to the improvement in life expectancy (Whitehouse 2007b).

Finland

In 2003, Finland passed a law to incorporate increases in life expectancy in the calculation of social security benefits. The law takes effect in 2010. As in other countries adopting life expectancy indexing, the life expectancy adjustment will use unisex mortality tables, thus ignoring gender differences in life expectancy.

Because of year-to-year fluctuations, countries using life expectancy indexing generally average mortality rates over a period of several years, which has the effect of smoothing out the yearly fluctuations. Finland will use mortality tables based on past mortality data averaged over a five-year period to adjust initial pension benefits at age 62. Thus, in the first year, the average life expectancy at age 62 for the years 2004–2008 will be compared to the average for the years 2003–2007.

The life expectancy adjustment for an individual's benefits depends on the person's year of birth. A person's benefits at retirement will be adjusted for unisex life expectancy at age 62 for their birth cohort, without regard to their age at retirement. Thus, persons retiring at ages 62 and 63 but born in the same year would have the same percentage reduction in their annual benefits.

Life expectancy indexing in Finland is done so that increases in life expectancy do not raise the expected present value of lifetime social security benefits. The indexing is based on the amount that an increase in life expectancy would increase the expected present value of benefits.[1] Disability pensions are also adjusted this way (Alho, Lassila, and Valkoner 2006; Lindell 2003). By 2040, after 30 years of life-expectancy indexing, the level of benefits is expected to be reduced to 88.6 percent of their level without that indexing, or a reduction of less than 0.4 percent per year (Whitehouse 2007a).

Norway

In 2006, the Norwegian government passed a reform that will institute unisex life-expectancy indexing of benefits at retirement. The system begins in 2010.

NDC PLANS

NDC plans[2] establish an individual account for each worker. The worker's contributions are credited to the account, as are notional interest earnings on the account. However, the system is financed on a pay-as-you-go basis. A collectively managed trust fund is maintained to cover periods when payroll tax payments are temporarily low. The trust fund thus has the role of filling in gaps when contributions are low due to an economic downturn. The trust fund also is designed to help pay for the retirement of the baby boom generation. Without such a trust fund, the retirement of the baby boom generation would

[1] A 2 percent discount rate is used to calculate the annuity value.

[2] The NDC systems are similar in some ways to the French and German point systems, and thus some analysts have argued against their being characterized as a new approach.

result in a large reduction in benefits. A fairly sizable trust fund may be needed to compensate for the anticipated drain on the system from the baby boom retirements.

NDC plans are similar to defined contribution plans in that both define benefits in terms of an account balance. In defined contribution plans, however, the worker bears the financial market risk associated with the underlying assets in which the plans are invested. In NDC plans, the crediting rate on workers' account balances is established in advance at a fixed rate or is tied to an index, typically related to the growth in wages. [3]

Sweden implemented its NDC plan in 1999. Italy, Poland, and Latvia also have NDC plans (Holzmann and Palmer 2006). Azerbaijan and Turkmenistan have announced that they will implement these plans.

NDC plans typically index benefits at retirement for changes in life expectancy at the benefit entitlement age. Life expectancy indexing in NDC plans is a natural outcome of the structure of these plans because they accrue benefits in the form of an individual account balance. The account balance is then converted to an annuity using current life expectancy, just as is done in defined contribution plans.

Italy

Italy has established an NDC system that calculates benefits taking into account unisex life expectancy, including the probability of paying benefits to survivors (Franco and Sartor 2006). The adjustment mechanism initially was established so that every 10 years the factor used to calculate benefits would be adjusted for increases in life expectancy. This adjustment is not fully automatic, however; it requires legislative approval.

Italy's experience with this system provides lessons on the political risk associated with automatic adjustment mechanisms. When the first adjustment was to take place in 2005, the government was unwilling to make the unpopular adjustment. The infrequent adjustment period meant that the adjustment would be larger than if adjustments were made more frequently. The government then changed the rule, eliminating adjustments until 2010, with adjustments every three years thereafter.

The experience of Italy indicates that when politicians maintain oversight of the adjustment process, the adjustments may be less likely to occur. Nonetheless, it is not possible to fully shield the automatic adjustments from the political process. Any automatic rule may be overridden by the political process.[4]

In 2008, Italian Democratic Party leader Walter Veltroni proposed that future social security benefits would be indexed to changes in a sustainability index. The sustainability index would be measured as the ratio of the annual wage bill to total annual social

[3] NDC plans are similar to cash balance plans in the United States in the way they accrue benefits. However, cash balance plans are funded while NDC plans are unfunded.

[4] Future work could investigate which rules would be less likely to be subject to override.

security pension expenditures (Fornero 2008). Thus, it is possible that further changes will occur before an actual adjustment is made.

Poland

Poland uses unisex life expectancy at age 62 to convert the NDC account balance to an annuity. Poland picked age 62 because that age is between the eligibility ages of 60 for women and 65 for men (Chłoń-Domińczak and Góra 2006).

INDEXING THE ELIGIBILITY AGE FOR IMPROVEMENTS IN LIFE EXPECTANCY

United Kingdom

A British pension commission, known as the Turner Commission,[5] proposed life-expectancy indexing of the earliest age at which workers are eligible to receive social security benefits (Pensions Commission 2005). That age in 2008 is 65 for men and 60 for women, but rising to 65 for women by 2020. The British proposal would index the eligibility age so that the ratio of working years to retirement years would be constant. It would announce any increase in the eligibility age 15 years in advance. Thus, for the current age of 65 for men, no one age 50 or older would be affected. Based on the projection of life expectancy improvements, such indexing would result in an age of 68 in 2050. The Pensions Commission (2005) argues that this type of indexing would be fair across generations because every generation would spend roughly the same proportion of adult life in retirement.

With this proposal, the eligibility age does not increase one-to-one with increases in life expectancy. Rather, if the ratio of retirement years to working years is one to two, then for every three years' increase in life expectancy, the eligibility age would increase by two years to maintain the ratio of one retirement year for every two working years.

The Turner Commission proposal was transformed in Parliament. The law Parliament enacted will raise the eligibility age in three steps. The eligibility age first increases between April 2024 and April 2026 from 65 to 66, followed by a phase-in from April 2034 to 2036 of the increase from 66 to 67, and a phase-in from April 2044 to 2046 of the increase from 67 to 68 (Watson Wyatt Worldwide 2007). This reform is not indexing because the increases are not linked to actual increases in life expectancy. However, it could be called quasi-indexing because the increases are linked to projected increases in life expectancy. This approach gives workers at least fifteen years' advance notice of the exact date at which they can collect benefits.

Denmark

As of 2008, Denmark is the only country to enact legislation to index the eligibility age to increases in life expectancy. This change takes effect with a long delay. Denmark provides two old-age social security benefits. The early retirement pension benefit requires the recipient to have worked a certain number of years in Denmark. Denmark

[5] The commission was chaired by Adair Turner, now Lord Turner.

will raise the eligibility age for that benefit by six months each year from 2019 to 2022 so that the early retirement eligibility age increases from 60 to 62.

The second old-age benefit program is a universal old-age pension that is available based on a person's years of residence in Denmark. It has no work history requirement. The eligibility age for its universal old-age pension will also rise by six months each year from 2024 to 2027 so that the universal pension eligibility age increases from 65 to 67. From then, increases in the eligibility age for both benefits programs will be tied to increases in life expectancy. Any increase in retirement age must be announced five years in advance. By 2045, the eligibility age is expected to reach 68.3 years (Whitehouse 2007b). The goal is for the early retirement age to be raised so that life expectancy from that age, measured at age 60, will be 19.5 years. Thus, the Danish reform does not split the increased life expectancy between the working years and retirement years but fully raises the eligibility age for increases in life expectancy.

COUNTRIES WITH AUTOMATIC ADJUSTMENT MECHANISMS TIED TO SOLVENCY

Sweden

Sweden is a leader in the movement toward automatic adjustments of social security. For that reason its system is explained in greater detail than for other countries that have followed its lead. In 1994, the Swedish Parliament passed legislation establishing the principles of the reform, with implementing legislation passed starting in 1998 that established an NDC system, alongside a mandatory, fully funded individual account plan (the PPM). The legislation for the automatic balancing mechanism in the NDC plan was passed in 2001. That system is financed by a combined employer-employee tax rate of 16 percent of wages (Table 2). Each worker has a notional account to which contributions are credited. The accumulated account balance is credited each year with a rate of return equal to the growth rate of average wages.[6] In addition, 2.5 percent of wages up to a ceiling is paid to the individual account plan, called the premium pension.

[6] This aspect of the Swedish system is similar to the U.S. Social Security system, where benefits are indexed to the growth rate in average wages. However, a difference is that the U.S. system can increase tax rates without having that change raise benefit entitlements, which the Swedish system cannot do.

Table 2
Sweden: Changes in Contributions and Benefits

System Parameter	Value
Contributions: Employer-Employee Tax Rate	
Rate in 2008	16%
Future rate	16%
Benefits: Replacement Rate (average worker)	
Rate in 2008	53%
Future rate (2050)	40%

Source: Swedish Ministry of Health and Social Affairs (2005)

Note: The replacement rate includes both the NDC pension and the mandatory individual account pension.

Each year, due to the life expectancy indexing of benefits, the initial benefits received by new beneficiaries are adjusted downward as a new birth cohort reaches the eligibility age of 61 (Table 3). The life expectancy indexing of the system started in 1995, before the NDC system actually began. It is expected that by approximately 2032, after nearly 40 years of indexing, workers would need to postpone retirement by two years and seven months to avoid receiving lower benefits. Thus, people formerly retiring at age 65 would need to retire at age 67 and 7 months to receive the same level of benefits as without the benefit reduction.

Table 3
Sweden: Life Expectancy Indexing of Benefits

(1) Birth Cohort	(2) Reaches Age 65 in	(3) Life Expectancy at Age 65	(4) Retirement Age Required to Neutralize the Effect on Benefits of Increased Life Expectancy	(5) Implying an Expected Length of Retirement (col 3 minus col 4)
1930	1995	82 y 5 m	65 y 0 m	17 y 5 m
1940	2005	83 y 7 m	65 y 9 m	17 y 10 m
1950	2015	84 y 10 m	66 y 7 m	18 y 3 m
1960	2025	85 y 7 m	67 y 2 m	18 y 5 m
1970	2035	86 y 3 m	67 y 7 m	18 y 8 m

Source: Swedish Social Insurance Agency (2007)

Life expectancy indexing of benefits is done by an adjustment that reflects improvements in life expectancy at age 65. No further adjustments to retirees' benefits are made for improvements in mortality after age 65. Mortality experience is averaged over the previous five years to avoid year-to-year fluctuations that do not reflect longer-term trends.

The Swedish system uses period mortality tables, which are mortality tables based on the experience of the cross section of older persons, not projecting future mortality improvements. For example, period tables would be based on the mortality experience of the population alive in the year 2000, rather than the expected experience of people age 61 in that year, projecting into the future. For each cohort, the annuity divisor adjustment—the amount by which the worker's accumulated balance is divided to determine the worker's initial benefit—is established at age 65, with a provisional adjustment made for retirements starting at age 61, which is the eligibility age.

In establishing adjustment mechanisms, a fundamental question is whether any of the adjustment will be borne by current retirees. Generally, U.S. reform proposals exempt current retirees and workers nearing retirement age on the grounds that people in those age groups have limited ability to change their work and savings plans to adjust to reforms. Sweden has not adopted that principle.

In Sweden, if the growth rate of real per capita wages is constant at 1.6 percent per year, the social security annuity is adjusted solely by changes in the Consumer Price Index (CPI). That is the same method for indexing benefit payments in the U.S. Social Security system. If the annual growth rate of real per capita wage income in Sweden falls below 1.6 percent, the cost of living adjustment is less than the increase in the CPI, and if the growth rate of real per capita wage income exceeds 1.6 percent, the adjustment is greater than the CPI. For example, if the annual growth rate in real per capita wages were 1.5 percent, the increase in benefits in payment would be the rate of growth of the CPI minus 0.1 percent.

Real per capita wage growth in Sweden has averaged about 2 percent over long periods (Palmer 2000). Because this average rate exceeds the rate of 1.6 percent in the adjustment formula, over time this indexing is expected to be more generous than price indexing based on the growth in the CPI. Thus, Swedish pensioners share with workers in the fluctuations in the Swedish economy and in the long-term growth of the economy. However, in an economic recession, such as preceded the passage of the reform legislation, indexed benefits of Swedish pensioners will be reduced below the level provided by price indexing.

Life expectancy indexing and the adjustment of benefits in payment for changes in productivity may not be adequate to assure solvency. Sweden has built into its system a mechanism called the automatic balancing mechanism. This adjustment mechanism has two goals: to set the contribution rate so that there will be no need to raise it in the future, and to automatically restore financial balance to the social security system without the intervention of politicians. The automatic balancing mechanism is used when the system reaches a critical point with respect to future solvency. As of 2008, it has not been used, although the measure of the system's solvency has come close to the point where automatic balancing mechanism adjustments would be required.

To determine whether it needs to implement the automatic balancing mechanism, each year the Swedish government measures the assets and liabilities of the social security system. The assets in the system are measured as the assets in the associated trust fund, called a buffer fund, plus the estimated present value of future contributions. If the liabilities for future benefits exceed the assets, adjustments are made to reduce the liabilities for future benefits. Specifically, the adjustment mechanism reduces the rate of

return used to calculate accruals in the notional balances below the rate of growth of average real wages.[7] It also reduces by the same amount the indexing rate for benefits in payment. For example, if a shortfall of assets to liabilities of 5 percent develops, the current benefit accruals of workers and the benefits in payment would be reduced by 5 percent.

These adjustments would lower the future benefits of workers by cutting the rate of accrual of benefits, and would lower the current benefits of retirees by reducing the indexation of their benefits. When the system is in good financial condition, workers can be assured that these cuts will not occur in the near future. However, if the system is near the point where adjustments may be made, as is currently the situation, workers face uncertainty as to whether cuts will occur within the next few years. The level of contributions is not affected. This mechanism shares the burden of the adjustment across generations. However, if cuts are made and the trigger later is switched off because conditions have again become more favorable, those who were active during the adjustment phase will not be affected at all. The value of their accumulated pension rights will be restored. The pensioners affected by the balancing mechanism, on the contrary, will not receive any compensation for what they lost during the period when the balancing mechanism was active.

The logic of the system dictates the adjustment occurs through accrual and benefit reductions. If the payroll tax rate were increased, that would increase the contributions credited to the individual accounts, which would increase future benefit liabilities, and thus would not help restore solvency.[8]

In the Swedish system, retirement income is affected considerably by the growth rate of wages, as that affects the NDC system. It is affected relatively little by changes in capital

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[7] The actual procedure for calculating the present value of future contributions is somewhat different. The expected turnover distribution is calculated as the difference between the expected average pension-weighted age of benefit receipt, which is 76, and the expected average income-weighted age of payroll tax payments, which is 43. The difference between those two ages is 33. Total assets are measured as the buffer fund plus 33 times annual contributions.

[8] The NDC system has few actual assets because it is funded on a pay-as-you-go basis with a reserve fund that is small relative to liabilities. To calculate assets for the purposes of the automatic balancing mechanism, the annual contributions received by the system are multiplied by what is called the expected turnover duration. The expected turnover duration is the average length of time, measured in years, until the system must pay out benefits to liquidate the liability created in the current year. It can be shown that if the population structure of the system is stationary, the present value of benefits accrued during a year equals the contributions during the year times the turnover duration. (Japan has evaluated this method of determining the future liabilities of its system and decided that it would not work for their country because it has a declining work force, rather than a stable population structure [Sakamoto 2005].)

This value of assets is compared to the present value at the end of the fiscal year of the liabilities for future benefit payments. If assets exceed or equal liabilities, no adjustment is made. If assets are less than liabilities, the rate of return credited to the notional account balances is reduced, and the indexing of current benefits is reduced. To smooth out temporary variations, the calculation is done on the basis of a three-year moving average of the ratio of assets to liabilities (Kőnberg, Palmer, and Sundén 2005). Similar to the U.S. Social Security system, Sweden calculates three projections: a base case, an optimistic case, and a pessimistic case. It uses the base case for determining whether an adjustment is needed and the other two cases to determine the range of possible future outcomes. The Swedish system appears to be working. So far, the annual adjustments have been sufficient to keep the system in balance.

markets because the funded part of the Swedish retirement income system is relatively small (Bolander 2007). The NDC system is financed by a tax rate of 16 percent, while the mandatory funded individual accounts are funded by a tax rate of 2.5 percent. Few traditional social security systems, however, incorporate capital market risk in a major way because they do not invest in financial markets.

A criticism of the Swedish system is that the replacement rate it provides is falling over time. That criticism is addressed for low-wage workers in Sweden by the provision of a minimum benefit. At some point, however, Sweden may need to raise its early retirement age, which is relatively low at 61. Raising the early retirement age would allow Sweden to raise the replacement rate because higher benefits would be received, but for fewer years.

After limited experience with the NDC system, the Swedish system appears to be well accepted by the Swedish public, with relatively little public criticism. The lack of criticism may be because the replacement rate is declining slowly, and the public may have limited awareness of the long-run decline in the replacement rate. Also, acceptance of the system could diminish if the automatic adjustment mechanism is used to reduce accruals and the price indexing of benefits.

Germany

Unlike Sweden, Germany does not index social security benefits for life expectancy. It, however, has changed the calculation of benefits to incorporate life expectancy as one aspect of a more complex adjustment mechanism. The adjustment mechanism is called the sustainability factor. The sustainability factor, introduced in 2004 and taking effect in 2005, attempts to achieve sustainability by limiting the growth rate of average benefits (Table 4). The sustainability factor incorporates not only life expectancy changes but all demographic factors that affect the dependency ratio (Toft 2007).

The sustainability factor is based on a measure of the dependency ratio (Bőrsch-Supan and Wilke 2006).[9] It includes the effects of changes in migration, birth rates, labor force participation rates, and retirement rates. It is used to index benefits, but part of the adjustment to solvency also raises the social security payroll tax rate.

[9] More precisely, to adjust for contributors with very low contributions and beneficiaries with very low benefits, the sustainability factor is tied to an "equivalized" measure of contributors to pensioners. With this measure, two low-wage contributors might equal one equivalized contributor. The dependency ratio includes unemployed persons in the denominator.

Table 4
Germany: Changes in Contributions and Benefits

System Parameter	Value
Contributions: Employer-Employee Tax Rate	
Rate in 2008	19.5%
Future rate (2030)	22%
Benefits: Replacement Rate (average worker)	
Rate in 2008	70%
Future rate	64%

Source: Toft (2007)

Initial benefits for a retiree are determined by multiplying the benefits received under the benefit formula of the previous year by the sustainability factor. The sustainability factor is based on the percentage change in the dependency ratio.[10]

A safety clause, however, states that the sustainability factor and other changes in the calculation of benefits cannot reduce nominal pensions. Without this clause, nominal benefits could be reduced during a period of low earnings growth or declining earnings. The safety clause took effect immediately, limiting the effect of the sustainability factor in 2005 and 2006 (Toft 2007).

The sustainability factor has reduced the projected payroll tax rate necessary to finance the system in 2040 from 28 percent to 24 percent (Capretta 2006). Germany's goal is to keep the payroll tax rate no higher than 20 percent by 2020 and 22 percent by 2030 (Penner and Steuerle 2007). The sustainability factor does not fully correct for causes of insolvency, which would result in no future increases in the payroll tax rate being needed. The sustainability factor is weighted so that it offsets just one-quarter of the percentage increase in the system's dependency ratio, rather than the full increase. The difference is made up by the projected increase in payroll taxes.

Germany uses a point system for calculating social security benefits. In that system, contributing for one year at the average wage earns a worker one point. At retirement, benefits are based on the total number of points multiplied by a factor measuring the

[10] With the sustainability factor A, the benefit formula is multiplied by the following factor

$A = 1 + \alpha(1 - R)$

where R is the ratio of the dependency rate in year t-2 (i.e., two years earlier) to the dependency rate in year t-3, and is thus a number greater than 1 because of the increasing dependency ratio over time. The parameter α has been set in the German reform at 0.25. If it had been set at zero, there would be no sustainability factor adjustment. If it had been set at one, the impact of changes in the dependency rate would fall entirely on benefits, with no increase in the payroll tax rate. It was set at 0.25 because that adjustment factor would result in future payroll taxes rising to no more than 20 percent in 2020 and 22 percent in 2030, based on current projections (Toft 2007). The term $\alpha(1 - R)$ (where α is greater than zero) is negative (but greater than –1), making the sustainability factor A have a positive value that is less than 1.

An example clarifies how this operates. If the dependency rate is growing at 2 percent a year, which is more rapidly than the U.S. dependency rate is projected to grow between 2000 and 2030 (table 1), R would equal 1.02, $\alpha(1 - R)$ would equal –0.005, and A would equal 0.995. This means that benefits would grow at 0.5 percent less than the growth rate of average wages.

value of a point. The sustainability factor affects the value of a point, so it affects both current and future retirees. Thus, the benefits of retirees are affected by the adjustment.

Recent political developments in Germany call into question the functioning of the sustainability factor. Probably because of an upcoming general election in 2009, in May 2008 the government decided to delay the changes required by the sustainability factor that year and also in 2009 (Reuters 2008; U.S. Social Security Administration 2008a). The government decided to increase benefits in payment by more than would be permitted under the sustainability factor. However, because the increase is less than the inflation rate, some groups have criticized the increase as too little. That said, employers and the German central bank have criticized the breaking of the sustainability factor because that will necessitate higher payroll taxes in the future than otherwise.[11]

Japan

Japan has studied the reforms in Sweden and Germany and developed its own system of automatic adjustments that incorporates features from both countries. Japan calls its approach modified indexation.

Japan's social security program has had to deal with increasing life expectancy at older ages that is among the highest in the world. In addition, it has faced a continuing decline in the birth rate to below the rate that would be sufficient to maintain the population at its current level. Because of the low birth rate and limited immigration, Japan's population and workforce are declining.

Even though Japan passed major social security reform legislation in 2000, greater-than-expected improvement in life expectancy, plus greater-than-expected decline in the birth rate, caused the need for further reform in 2004. Because of the political cost to politicians of the repeated process of unpopular social security reforms, Japanese politicians wanted an automatic mechanism that would return the system to solvency without their continued intervention (Sakamoto 2005).

In Japan, Sweden, and Germany, the desire to not raise the payroll tax rate above a set level motivated the introduction of the automatic adjustment. Japan decided to introduce the adjustment in part because younger workers were concerned about the possibility of high contribution rates, which they viewed as unfair to their generation.

In reform legislation passed in 2004, Japan incorporated a demographic factor into the calculation of social security benefits (Sakamoto 2008; Takayama 2006). The social

[11] The cost-of-living increase for benefits in payment for 2008 was 1.1 percent, which compares to a scheduled increase under the automatic stabilizer of 0.46 percent. The increase for 2009 is 2 percent. Without the benefit increases, the current payroll tax rate of 19.9 percent was scheduled to be decreased to 19.1 percent in 2011. The benefit increases caused that contribution rate decrease to be postponed to 2012 (U.S. Social Security Administration 2008a). A claw-back has been introduced as a further adjustment, so that adjustments required by the sustainability factor that were not made will be postponed to the future (Toft 2007). The net effect of these changes will be a decline in the replacement rate received by German retirees.

security adjustment reduces the indexing of initial benefits and benefits in subsequent years.

The Japanese government is gradually increasing the payroll tax rate for its social security program, called the Employees' Pension Insurance Scheme, to 18.3 percent in 2017, at which point the payroll tax is considered to be fixed (Table 5). In the absence of the 2004 reforms, the payroll tax rate was projected to increase to 25.9 percent. It was 13.58 percent in 2004 and is scheduled to rise by 0.354 percent annually until 2017.

With these increases in the payroll tax rate, it is estimated under the best-case scenario that the modified indexation will continue until 2023, when indexation will return to that used in 2004.[12] In the Japanese social security system, initial benefits grow at the rate of growth of disposable income. Under the automatic adjustment mechanism, the indexing of initial benefits at retirement is reduced until financial solvency is restored.

The reduction factor takes into account the decline in the Japanese workforce and the increase in life expectancy. The factor equals the rate of decline in the Japanese workforce participating in social security programs plus the rate of increase in life expectancy at age 65.

Japanese policy experts noted that the growth rate of the beneficiary population also affected solvency. Taking a long-term perspective, that was not incorporated into the calculation because the growth rate of the beneficiary population would eventually reflect the growth rate of the workforce (Sakamoto 2005).

Table 5
Japan: Changes in Contributions and Benefits

System Parameter	Value
Contributions: Employer-Employee Tax Rate	
Rate in 2008	14.64%
Future rate (2017)	18.3%
Benefits: Replacement Rate (average worker)	
Rate in 2008	59%
Future rate (2023)	50%

Source: Sakamoto 2008; Takayama 2006

For the benefit calculation, the projected rate of increase in life expectancy at age 65 is fixed in the law at 0.3 percent per year, or approximately three weeks a year, based on the 2002 projection over the period 2000 to 2025. Thus, this indexation can be categorized as quasi-indexing. It was fixed in advance to avoid year-to-year fluctuations in the benefit adjustment and to set the benefit adjustment so that it would be known in advance.

[12] Japan decided not to follow the Swedish approach that involves calculating the turnover ratio because in the context of the Japanese social security system it is difficult to calculate that measure. This difficulty arises because of the variety of types of linked benefits, including disability benefits, provided by the Japanese system.

It is expected that the demographic factor will reduce the indexation rate for benefits at retirement by 0.9 percentage points per year on average, compared to the previous method. By reducing the growth rate of benefits to less than the growth rate in real wages, this change is projected to reduce the average replacement rate from 59 percent in 2008 to 50 percent by 2023.

The adjustment factor, however, is not applied if it would result in a decline in nominal benefits. If the CPI declines in a year (which has happened in Japan) or if per capita disposable income declines, benefits are maintained at their nominal value, rather than reflecting the effects of indexing.

If the replacement rate were to fall much more rapidly than expected, and fell to 50 percent or lower, the adjustment mechanism would be stopped, and the policy would be reviewed. Thus, the law contains a provision to override the automatic stabilizer. This provision is known as the minimum benefit provision.

Canada

Canada uses an approach to automatic adjustments that differs from Sweden, Germany, and Japan. Canada introduced its automatic adjustment mechanism in 1997.

The Canada Pension Plan (CPP) is the main social security program for Canada, except for the province of Québec, which maintains a similar but separate plan, the Québec Pension Plan. These plans operate on top of a flat benefit. The CPP is a hybrid between a pay-as-you-go system and a fully funded system. It is partially funded, but unlike the U.S. Social Security system, it is not projected to run out of money. Benefits are designed to replace 25 percent of the worker's average wages into the future, and thus grow over time for successive cohorts at the growth rate of average wages (Table 6).

Table 6
Canada: Changes in Contributions and Benefits

System Parameter	Value
Contributions: Employer-Employee Tax Rate	
Rate in 2008	9.9%
Future rate	9.9%
Benefits: Replacement Rate (average worker)	
Rate in 2008	25%
Future rate	25%

Source: Canada Pension Plan (2007)

The payroll tax rate is projected to be sufficiently higher than the pay-as-you-go rate for a number of years so the fund will continue to grow over time. The CPP is financed with a combined employee-employer tax rate of 9.9 percent. Its fund is invested partially in the stock market. The system is designed so that the fund will be adequate to pay for the retirement benefits of the Canadian baby boomers and the aging of the population, so there should be no need for further contribution rate increases or benefit cuts. However, if financial markets are weak for a prolonged period or if life expectancy increases considerably more rapidly than anticipated, or if another economic or demographic variable affecting funding turns out to be much more adverse to funding than expected, an adjustment may be needed.

Every three years, the system's chief actuary evaluates the CPP's financial sustainability. If the chief actuary determines that the system is not financially sustainable in the long run, legislation requires an automatic adjustment (Canada Pension Plan 2007). However, the automatic adjustment takes effect only if the Canadian provincial finance ministers cannot first decide on an adjustment of their own—an outcome that is considered unlikely.

The automatic adjustment freezes benefit indexation for three years, eliminating cost-of-living increases during that period. In addition, the automatic adjustment increases the contribution rate over that three-year period by an amount equal to half of the adjustment needed to reach the new long-term contribution rate required to restore solvency. That rate is maintained until the next triennial evaluation. Thus, the changes are borne both through an increase in contributions and a reduction in benefits (Brown 2008). If changes in long-run assumptions raise the projected steady-state contribution rate required to maintain a constant ratio of assets to expenditures, the contribution rate will be increased permanently.

It is noteworthy that the Canadian social security system has been designed so that there is little need for the adjustment mechanism. By moving toward partial funding, the system is designed to maintain both a constant payroll tax rate across age cohorts and a constant replacement rate, which is a degree of long run stability that few social security systems have achieved.

INDEXING YEARS OF CONTRIBUTIONS REQUIRED FOR A FULL BENEFIT

France

In 2008, French workers need 40 years of contributions to receive full social security benefits. Starting in 2009, that number increases by one calendar quarter per year until it reaches 41 years in 2012. This change will reduce benefits by about 2.5 percent for people working 40 years. Thereafter, through 2020, the contribution period for full benefits will increase as needed to keep the ratio of the contribution period to the average retirement period equal to its ratio in 2003, which is approximately two to one.[13] The ratio is measured as the expected duration of retirement divided by the number of years required for a full pension for work starting at age 20.

This adjustment mechanism effectively results in a reduction in benefits that is tied to increases in life expectancy. The French government retains the right to forgo these adjustments if labor market conditions do not make if feasible for workers to work the extra years.

[13] The projection for life expectancy at age 60 in 2012 is 21.8 years, which is 53 percent of the 40-year working period starting at age 20 (Whitehouse 2007a).

COMPARING THE OPTIONS: THE PROS AND CONS

Life expectancy indexing of benefits results in a falling replacement rate over time when measured at a fixed retirement age. For this reason, social security will provide a less adequate benefit over time as traditionally measured by the replacement rate concept. Working longer can offset this effect by raising a person's benefits.

Any system with a declining replacement rate, such as the Swedish system, eventually will reach the point where the replacement rate is politically unacceptable, and reform will be necessary. Thus, a system that achieves solvency with a declining replacement rate does not prevent the need for future reforms. The outcome of such reforms is subject to the usual political risks as to timing and distributional consequences.

In this respect, Scherman (2007) is highly critical of the decline in replacement rates that will result from the Swedish reform. He argues that the early retirement age should be raised to offset the decline, and that the payroll tax rate should not be considered permanently fixed. Furthermore, he advocates a reinstitution of a "normal pension age" to clarify to the general public what retirement age is needed to obtain a "decent" pension. Moreover, he calls for an in-depth discussion of how the labor market reacts to the need for offering employment opportunities at an advanced age.

Life expectancy indexing of benefits preserves the option of receiving social security benefits at an early age. That said, some people who retire at the early retirement age probably would be financially better off if they postponed retirement to a higher age when they would receive higher benefits. For another group of people, however, postponing retirement may pose a hardship because they are unable to work the extra months.

People generally will receive higher annual social security benefits if the early retirement age is indexed than if pension benefits are indexed because pensioners will receive the benefits starting at a later age and for fewer years.

Indexing the eligibility age has the feature of encouraging people to work longer. However, not everyone is able to do so. People with long careers of physically demanding jobs and people in poor health may not be able to postpone their retirement. Options could be provided to meet the needs of these people. For example, the eligibility age could be maintained at its current level for people with long careers or for people with low lifetime average earnings. The eligibility requirements for disability benefits could be eased for people above a certain age but below the social security eligibility age.

Indexing can also be compared to quasi-indexing. With quasi-indexing, instead of keying policy changes to actual changes in life expectancy, they could be keyed to projected changes in life expectancy. An argument in favor of indexing is that if life expectancy improves more slowly than anticipated, the system automatically adjusts to the new reality and smaller reductions in benefits are made. However, indexing creates uncertainty as to when changes in social security will occur and how large they will be. The uncertainty can be substantial during periods when life expectancy is increasing rapidly. With quasi-indexing, a schedule of changes is announced in advance, so that, for example, people would know far in advance the early retirement age or the benefit reduction that would be relevant for their birth cohort.

DISTRIBUTIONAL CONSEQUENCES

The different options for social security reform have different consequences as to the distribution of resources across people with different characteristics. Distributional issues can be addressed across the income distribution within a given age cohort and across age cohorts. A reform that raised the eligibility age would have relatively less effect on workers who already were postponing retirement past the eligibility age. That group includes high-income workers who find considerable nonpecuniary, as well as pecuniary, rewards from their work. It also includes low-income workers who continue to work because they need the money.

While the adjustments in benefits resulting from indexing generally produce an across-the-board cut in benefits, their effect would differ across the income distribution. For example, a 5 percent cut in benefits due to life expectancy indexing of benefits would leave the distribution of benefits the same across income classes. However, it would affect the distribution of income because lower-income persons tend to rely more on social security benefits so their income would fall by a greater percentage than the income of higher-income persons.

Indexing the early retirement age may be more favorable to lower-income workers than indexing benefits, provided other changes are made to help lower-income people who are unable to extend their working lives. However, if benefits were indexed, those changes in other programs may not be made.

The different options for social security reform have different distributional consequences across age cohorts. Automatic adjustment mechanisms designed to maintain the solvency of social security tend to result in smaller changes made over a longer period of time and affect more age cohorts than changes made to restore solvency when insolvency is impending.

Life expectancy tends to vary across racial groups. That is not an issue in some countries where the populations are racially and ethnically homogeneous. Where there is racial diversity within the population, such as the United States, life expectancy indexing of the eligibility age raises the question whether this policy would be fair to all racial groups. The effects on different racial groups with different life expectancies and different risks of disability depend in part on whether disability benefits would also be subject to life expectancy indexing of benefits. If disability benefits were not also life expectancy indexed, groups that have a higher take-up rate for those benefits, such as blacks, would be treated relatively favorably since those benefits would not be reduced.

All countries with life expectancy indexing use unisex life expectancy rather than having different indexing for men and women or for other identifiable groups (such as race) with different mortality rates. If life expectancy improved at different rates for different demographic groups, or fell for some groups while rising for others, indexing that was based on the average for all groups might be unfair to some groups. Singh and Siahpush (2006) have documented a widening of the mortality gap by socioeconomic status. In this situation, less than full indexing might be desirable.

U.S. life expectancy has improved over the past four decades for both men and women. In 1960 a man age 65 had a life expectancy of 12.8 years, and that grew to 16.8 years in 2003. The comparable figures for women are 15.8 years and 19.8 years (National Center

for Health Statistics 2006). Thus, for both men and women, life expectancy at age 65 increased by four years, or about one year per decade.

Life expectancy has not improved at the same rate for different racial groups. Life expectancy at age 65 was similar for black and white males in 1950 and 1960 and into the 1970s. In 1975, black and white males at age 65 both had a life expectancy of 13.7 years. However, by 2005, black male life expectancy was 15.2 years, while that of white males was 17.2 years (National Center for Health Statistics 2007). Thus, life expectancy had improved 1.5 years for black males, but had improved 3.5 years for white males.

If life expectancy indexing were seen to adversely affect low-income groups, that effect could be offset by increasing the progressivity of social security benefits through changes in the benefit formula.

INDEXING OPTIONS FOR U.S. SOCIAL SECURITY

Life expectancy indexing of U.S. Social Security benefits could be structured several ways. Benefits received at age 62 could be reduced. That approach was proposed by the President's Commission to Strengthen Social Security (2001), which recommended that benefits be adjusted every 10 years. Another option would be to index the eligibility age and the Normal Retirement Age so that the eligibility age was a fixed number of years earlier than the Normal Retirement Age. This type of indexing would result in a smaller reduction in benefits than under life expectancy indexing of benefit amounts because the increase in the eligibility age would offset the benefit reduction. The legislated increases in the Normal Retirement age account in part for a projected decline in the Social Security replacement rate (Table 7).

Table 7
United States: Changes in Contributions and Benefits

System Parameter	Value
Contributions: Employer-Employee Tax Rate	
Rate in 2008	12.4%
Future rate	12.4%
Benefits: Replacement Rate (average worker)	
Rate in 2008	41%
Future rate (2030)	37%

Source: Munnell (2003)

Note: the replacement rate is projected to fall due to the increase in the Normal Retirement Age, which acts as a cut in benefits; due to an increased share of benefits being taxable; and due to increased contributions for Medicare, which are deducted from Social Security benefits.

Life expectancy indexing of U.S. Social Security benefits would be a major step toward resolving the program's future financial problems. The Congressional Budget Office (CBO) has estimated the effect of a reform that involved life expectancy indexing of initial Social Security benefits. This one change, put into effect in 2012, would eliminate 43 percent of Social Security's 75-year deficit, and would push back the date of insolvency by 7 years, or more than 50 years into the future (Congressional Budget Office 2005). An alternative estimate has indicated a smaller effect, with 27 percent of the deficit eliminated (Shelton 2008).

The two estimates differ in part because of the different ways that life expectancy indexing is applied. The CBO estimate adjusts for the percentage change in life expectancy at age 65, while the Shelton estimate adjusts for the percentage change in the present value of lifetime benefits due to the increase in life expectancy.[14] Life expectancy indexing of initial benefits at retirement by correcting for the change in the present value of benefits would reduce the Social Security benefits of new retirees by about 0.24 percent per year (Goss 2003).

In the U.S. Social Security system, initial benefits at retirement are designed to grow with the growth rate of real wages in the economy. The system achieves that result by indexing Social Security covered wages to age 60 by the growth rate of average wages.[15]

A number of countries have reformed their systems to slow the growth rate in average benefits below the growth rate in the U.S. Social Security system. In Sweden, initial benefits at retirement grow at the growth rate of average wages minus an adjustment for the increase in life expectancy. In Japan, the average benefit level grows at the growth rate of average wages less the growth rate in life expectancy.

The policies of one country may work differently when applied in another country. Countries differ in their degree of income inequality and degree of population heterogeneity with respect to life expectancy. For example, Sweden may have greater toleration than the United States for cutting the real value of social security benefits in payment because it has a low poverty rate for older persons. Using internationally comparative data, in Sweden 2.1 percent of the population age 65 and older has income below 40 percent of median income, compared with 15.0 percent in the United States (Luxembourg Income Study 2007).

CONCLUSION

Increasingly, countries are adopting automatic adjustment mechanisms for social security financing. These mechanisms attempt to deal with problems of sustainability and of political risk, although political risk remains in most systems due to oversight of the process by the government and the potential need for further reforms.

Countries have relatively little experience with life expectancy indexing of benefits, so it is not possible yet to assess the long-term effects of such policies. Countries may eventually decide that life expectancy indexing of benefits results in too large a drop in the replacement rate. That said, the drop can be offset by workers who choose to work longer or by a policy encouraging longer work years, for example by raising the social security eligibility age.

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[14] The difference may be also explained in part by the differences in the underlying models for calculating Social Security's financing, with the CBO model calculating a smaller long-term deficit than the approach used by the Social Security Administration actuaries.

[15] Once in payment, benefits are indexed to prices.

As of 2008, only one country—Denmark—has indexed the social security eligibility age. The United Kingdom considered such a proposal but adopted quasi-indexing instead, with the age rising according to a fixed schedule.

Automatic indexing done annually involves regular, incremental changes. This type of indexing becomes part of the regular functioning of the social security system. However, for indexing to work, it must be supported by a broad-based political commitment not to seek vote-winning modifications that undermine its effectiveness. In this regard, it appears likely that the automatic adjustment mechanisms will work in Sweden and Japan because of the consensus nature of their politics. Italy and Germany, however, have already overridden automatic adjustments. Thus, the international experience does not provide a clear lesson as to how this type of adjustment would work in the United States.

REFERENCES

Alho, Juha M., Jukka Lassila, and Tarmo Valkoner. 2006. Demographic uncertainty and evaluation of sustainability of pension systems. In *Pension reform: Issues and prospects for non-financial defined contribution (NDC) Schemes,* eds. Robert Holzmann and Edward Palmer, 95–112. Washington, DC: World Bank.

Bolander, Hans. 2007. Inspecting the system: An interview with Stefan Fölster and Ylva Yngveson. In *The Orange Report: Annual Report of the Swedish Pension System 2006.* Stockholm.

Bőrsch-Supan, Axel, and Christina B. Wilke. 2006. The German public pension system: How it will become an NDC system look-alike. In *Pension reform: Issues and prospects for non-financial defined contribution (NDC) schemes,* eds. Robert Holzmann and Edward Palmer, 573–610. Washington, DC: World Bank. http://siteresources.worldbank.org/INTPENSIONS/Resources/395443-1139338370854/Pension_ch22.pdf

Brown, Robert L. 2008. Reforms to Canadian social security, 1996–7. In *Lessons from pension reform in the Americas,* eds. Stephen J. Kay and Sinha Tapen, 242–256. Oxford, UK: Oxford University Press.

Canada Pension Plan. 2007, April. *Optimal funding of the Canada Pension Plan.* Actuarial Study no. 6. http://www.osfi-bsif.gc.ca/app/DocRepository/1/eng/oca/studies/Optimal_Funding_CPP_e.pdf

Capretta, James C. 2006, March. *Building automatic solvency into U.S. Social Security: Insights from Sweden and Germany.* Brookings Policy Brief No. 151**.** Washington, DC: Brookings Institution

Chłoń-Domińczak, Agnieszka, and Marek Góra. 2006. The NDC system in Poland: Assessment after five years. In *Pension reform: Issues and prospects for non-financial defined contribution (NDC) schemes,* eds. Robert Holzmann and Edward Palmer, 425–447. Washington, DC: World Bank.

Congressional Budget Office. 2005, May 25. *Projected effects of various provisions on Social Security's financial and distributional outcomes.* http://www.cbo.gov/ftpdocs/63xx/doc6377/Social_Security_Menu-CBO_baseline.pdf

Fornero, Elsa. 2008, March 26. "Pensions in the Italian electoral campaign." CERP. http://cerp.unito.it/focus/pensions_in_the_ital1/

Franco, Daniele, and Nicola Sartor. 2006. NDCs in Italy: Unsatisfactory present, uncertain future. In *Pension reform: Issues and prospects for non-financial defined contribution (NDC) schemes,* eds. Robert Holzmann and Edward Palmer, 467–492. Washington, DC: World Bank.

Gebhardtsbauer, Ron. 1998, February 26. "The future of Social Security for this Generation and the Next: Raising the retirement age." Testimony presented in hearings before the Social Security Subcommittee of the Committee on Ways and Means of the U.S. House of Representatives. http://www.actuary.org/pdf/socialsecurity/ss_future.pdf

Goss, Stephen C. 2003, October 8. "Estimates of financial effects for a proposal to restore solvency to the Social Security program—INFORMATION." Memorandum to Peter Diamond and Peter Orszag.

Holzmann, Robert, and Edward Palmer. 2006. The status of the NDC discussion: Introduction and overview. In *Pension reform: Issues and prospects for non-financial defined contribution (NDC) schemes,* eds. Robert Holzmann and Edward Palmer, 1–15. Washington, DC: World Bank.

Kőnberg, Bo, Edward Palmer, and Annika Sundén. 2005. *The NDC reform in Sweden: The 1994 legislation to present.* Washington, DC: World Bank.

Lindell, Christina. 2003. "Longevity Is increasing. What about retirement age?" Presented at the 4th International Research Conference on Social Security, ISSA, Antwerp, May 5–7.

Luxembourg Income Study. 2007. *LIS key figures.* http://www.lisproject.org/keyfigures.htm

Munnell, Alicia H. 2003, February. *The declining role of Social Security.* Just the Facts on Retirement Issues, No. 6. Boston: Center for Retirement Research at Boston College.

National Center for Health Statistics. 2006. *Trends in health and aging.* Hyattsville, MD: U.S. Department of Health and Human Services. http://www.cdc.gov/nchs/agingact/htm

———. 2007. *Health, United States, 2007.* Hyattsville, MD: U.S. Department of Health and Human Services. http://www.cdc.gov/nchs/data/hus/hus07.pdf#027

Palmer, Edward. 2000, June. *The Swedish pension reform model: Framework and issues.* Social Protection Discussion Paper No.0012. Washington, DC: World Bank. http://siteresources.worldbank.org/SOCIALPROTECTION/Resources/SP-Discussion-papers/Pensions-DP/0012.pdf.

Penner, Rudolph G., and C. Eugene Steuerle. 2007, August. *Stabilizing future fiscal policy: It's time to pull the trigger.* Washington, DC: Urban Institute. http://www.urban.org/UploadedPDF/411524_future_fiscal_policy.pdf

Pensions Commission. 2005. *A new pension settlement for the twenty-first century: The second report of the Pensions Commission.* http://www.pensionscommission.org.uk.

President's Commission to Strengthen Social Security. 2001. *Strengthening Social Security and creating financial wealth for all Americans: Report of the President's Commission.* http://mwww.ba.ssa.gov/history/reports/pcsss/reports.html

Reuters. 2008, April 8. "German pension increase draws fire from employers."

Sakamoto, Junichi. 2005, December. *Japan's pension reform.* Social Protection Discussion Paper No. 0541. Washington, DC: World Bank. http://siteresources.worldbank.org/SOCIALPROTECTION/Resources/SP-Discussion-papers/Pensions-DP/0541.pdf

———. 2008, February 1. *Roles of the social security pension schemes and the minimum benefit level under the automatic balancing mechanism.* NRI Papers No. 125: Nomura Research Institute. http://www.actuaries.org/Boston2008/Papers/IPM4_Sakamoto.pdf

Scherman, Karl Gustaf. 2007. "The Swedish NDC system—A critical assessment." Presented at the Second Colloquium of the Pension, Benefits and Social Security Section of the International Actuarial Association, Helsinki, Finland, May 21-23.

http://www.actuaries.org/PBSS/Colloquia/Helsinki/Papers/Scherman.pdf

Shelton, Alison. 2008, April. *Reform options for Social Security.* Washington, DC: AARP Public Policy Institute. http://assets.aarp.org/rgcenter/econ/i3_reform.pdf

Singh, G. K., and V. Siahpush, V. 2006. Widening socio-economic inequalities in U.S. life expectancies, 1980–2000. *International Journal of Epidemiology* 9 (May): 969-979. http://ije.oxfordjournals.org/cgi/content/full/35/4/969.

Swedish Ministry of Health and Social Affairs. 2005, July. *National strategy report on pensions.* Stockholm: Swedish Ministry of Health and Social Affairs.

———. 2007. *Orange report: Annual report of the Swedish pension system 2007.* http://www.fk.se/filer/publikationer/pdf/or07-e.pdf

Takayama, Noriyuki. 2006. Reforming social security in Japan: Is NDC the answer? In *Pension reform: Issues and prospects for non-financial defined contribution (NDC) schemes,* eds. Robert Holzmann and Edward Palmer, 639–647. Washington, DC: World Bank.

Toft, Christian. 2007, March 30. *The transformation of the German public pension system and the future pension benefit level*: University of Kassel.

Turner, John A. 1984. Population age structure and the size of Social Security. *Southern Economic Journal* 50 (April): 1131–1146.

———. 2007a. Social security pensionable age in OECD countries: 1949–2035. *International Social Security Review* 60 (1): 81–99.

———. 2007b. "Autopilot: Self-adjusting mechanisms for sustainable retirement Systems." Society of Actuaries. http://www.actuaries.org/Boston2008/Papers/IPT5_Turner.pdf

U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. 2008a, May. *International Update*.

http://www.socialsecurity.gov/policy/docs/progdesc/intl_update/2008-05/2008-05.pdf

———. 2008b, June 11. *The 2008 OASDI trustees report.*

http://www.ssa.gov/OACT/TR/TR08/trTOC.html

Watson Wyatt Worldwide. 2007, January. "United Kingdom: Pensions bill published." http://www.watsonwyatt.com//news/media/UK2.pdf

Whitehouse, Edward. 2007a, October. *Life-expectancy risk and pensions: Who bears the burden?* OECD Social, Employment and Migration Working Papers No. 60. Paris: Organization for Economic Cooperation and Development.

———. 2007b. *Pensions panorama: Retirement income systems in 53 countries.* Washington, DC: World Bank.

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