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Building Automatic Solvency into U.S. Social Security: Insights from Sweden and Germany

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EXECUTIVE SUMARY

Although Social Security reform appears to be off of the national agenda for now, real funding problems remain for America's popular retirement program that policymakers need to address. The payroll taxes that support Social Security's "pay–as-you-go" system will begin to fall short of outlays in 2017 and will be sufficient to finance only 74 percent of scheduled annual benefits by 2041, when the Social Security trust fund is projected to be exhausted.

In recent years, both Germany and Sweden have been able to put in place innovative approaches to solving pressing financial crises in their pay-as-you-go pension systems. Sweden's experience suggests that U.S. policymakers consider setting the retirement age administratively, as determined by up-to-date life span data. And Germany's move to calculate retirement benefits partly on the basis of a "sustainability factor" is moderating the costs of demographic shifts which would otherwise push the system toward unaffordable levels of taxation.

Ideally, U.S. policymakers will reach a consensus on Social Security solvency reforms. Sweden and Germany have shown that it is possible and desirable to put in place provisions that can automatically self-correct underfunding of pay-as-you-go pension systems. The U.S. should put in place such provisions for Social Security, ensuring permanent solvency for the program.

Sweden's Notional Accounts and Automatic Balance Mechanism

In 1998, Sweden adopted a radical new approach to state-based pension provision, with several innovations. Many experts in the United States and elsewhere have been interested in Sweden's move toward mandatory individual accounts for retirement savings, with workers required to set-aside 2.5 percent of covered wages. For purposes of this brief, however, Sweden's novel approach to financing the much larger pay-as-you-go state pensions is of interest. The new Swedish pension system contains features that should achieve what the architects of the new system sought—guaranteed and permanent financial solvency at a fixed contribution rate of 16 percent of wages.

The first important element of the Swedish system is the conversion of the pension entitlement from a defined-benefit approach to a "notional defined contribution" (NDC) system. Under the NDC, workers' payroll tax contributions are treated like contributions into an investment fund even though the actual tax payments are used to finance benefits for current retirees. The contributions are tracked separately and credited with a presumed rate of return equal to growth in average wages in the economy. Thus, Swedish workers build up a notional "fund" which limits their annuity in retirement.

A critical, self-adjusting feature of this system is the annuity divisor—the factor used to convert the tracked "notional fund" into monthly pension payments. The divisor is updated for each annual cohort of retirees to reflect the most current estimates of life spans and mortality. Thus, as retirees are projected to live longer, the monthly annuity paid out from a fixed notional balance will automatically decline with successive cohorts unless the pensioners choose to begin taking their monthly annuities later in life than those who retired before them. The system, therefore, is protected against most of the cost of projected changes in life spans (unexpected life span increases for those in payment status are not captured by this adjustment).

Although correcting for longer life spans helps stabilize costs, it is not sufficient to assure solvency at a fixed contribution rate, as fertility and population growth, labor force participation patterns, and productivity growth all play important roles in long-term pay-as-you-go financing. As a result, Sweden also adopted what is called the "automatic balance mechanism." Each year, the government creates a balance sheet, with measured "assets" and "liabilities," to check for balance. If the calculation reveals an unfunded liability, the presumed interest rate applied to notional account balances and the indexing of annuities is reduced to offset the deficit.

Critical to this approach is the introduction of the concept of "assets" in a pay-as-you-go system. The Swedes developed a measure of system "assets" by multiplying pension contributions for the year in question by the so-called expected turnover duration. Turnover duration is a measure of the average amount of time, in years, that the pension system has until it must liquidate a pension obligation earned during the year in question and is calculated as the difference between the earnings-weighted average age of workers contributing to the system and the pension-weighted average age of those drawing annuities. Turnover duration thus reflects

factors that are critical to pay-as-you-go financing: fertility trends and population growth, wage patterns, labor force participation, retirement patterns, and mortality.

Currently, Sweden's expected turnover duration is 32.3 years—suggesting that the system can finance pension liabilities equal to about 32.3 times annual pension contributions. Or, put another way, there will be 32.3 years of annual contributions coming into the system before, on average, the pension obligations incurred this year must be paid out as benefits.

Longer measured turnover duration thus implies a system that can finance more pay-as-you-go benefits, and vice versa. If, for instance, fertility continues to trend downward, the turnover duration will eventually reflect this trend. The weighted average age of workers will creep upward, shortening the turnover duration and reducing the value of the system's assets. As this occurs, notional balances will earn a reduced rate of return, in effect offsetting the reduction in revenue to the system from fewer workers.

The new Swedish pension system has shifted the financial risk of changing economic and demographic factors from the government to current and future pensioners. Based on mid-range demographic and economic assumptions, the government projects that the life span adjustment will cut average monthly benefits for those continuing to retire at age 65 by 14 percent by 2055—which is equivalent to a delay in their retirement of 26 months. With the adjustment for longevity in place, the government expects the automatic balance mechanism to be triggered only "a few times" over the next 15 years, thus modestly cutting the rate of return applied to the notional accounts.

However, the projection assumptions—slightly higher fertility and immigration rates than the country is experiencing today, as well as permanent 2 percent real wage growth—may prove overly optimistic. Under more pessimistic assumptions, the automatic balance mechanism is triggered more or less continuously from 2008 onward, driving down the replacement rates for retirees for several decades. But, as intended, the system would remain financially solvent at the 16 percent payroll tax rate.

Germany's Sustainability Factor

Germans are proud of their state pension system, which dates to Bismarck and has served as a model around the world. Even by European standards, the German system is well known for its generosity, with high replacement rates and early retirement features.

Over the last fifteen years, however, the German system has been in a period of retrenchment, as costs have soared due to longer life spans and revenue has stagnated from low fertility rates. Before the system was reformed in 2001 and 2004, projections indicated that the payroll tax rate needed to finance German pensions would increase substantially, from today's 19.5 percent to more than 28 percent of payroll in 2040.

Former Chancellor Gerhard Schröder sought to stabilize the payroll contribution rate for pensions at no more than 20 percent before 2020 and 22 percent before 2030. A first effort in 2001 made progress toward this goal but was based on overly

optimistic economic and demographic assumptions. Soon after enactment, it became clear that more reform was necessary.

In November 2002, Schröder asked Professor Bert Rürup to head a commission which would make further pension reform recommendations. The Rürup commission proposed linking annual pension indexing, in part, to changes in the ratio of pensioners to workers supporting the system—the so-called "sustainability factor." All German pensions—for new retirees and long-time pensioners—are tied to the same basic pension value component, which, in turn, is indexed to annual wage growth. Adjusting this pension value component by the sustainability factor will have a powerful stabilizing impact on the pension system because it will lower pension payouts for all German retirees as the pensioner-to-worker ratio increases over time. The German parliament passed legislation linking pension indexing to the sustainability factor in March 2004.

Unlike Sweden, state pension reform in Germany is more of an on-going process than a completed task. Under current projections, the Rürup sustainability factor, which is weighted somewhat to put some of the burden of sustainability on wage earners rather than pensioners, has reduced the projected payroll tax necessary to finance German pensions from 28 percent in 2040 to just under 24 percent. Clearly, more reform will be needed to keep costs manageable, and there is on-going discussion about the need for an increase in the retirement age. Nonetheless, the sustainability factor adjustment, now in place, will moderate any further demographic shifts, which would otherwise push the system toward unaffordable levels of taxation. It is also a lever that can be used to further downsize the system when Germany's political leadership decides to readdress pension reform.

Uncertainty in Long-Term U.S. Social Security Estimates

While there is little doubt that Social Security faces a large financial imbalance in the decades ahead, there is some uncertainty regarding the size of the problem.

The Social Security Administration's Office of the Actuary (OACT) has recently begun providing useful estimates of the probability range for the so-called actuarial deficit. This measure is the difference between the present value of projected Social Security revenue and spending over a 75-year period, divided by the present value of total wages upon which the payroll tax could be applied during the same period. As presented in the 2005 Trustees' Report, the actuarial deficit over the next 75 years is estimated at 1.92 percent of taxable payroll, under intermediate assumptions. This deficit can be interpreted to mean that the 75-year financing gap could be closed by immediately raising the payroll tax by about 1.9 percentage points (above the 12.4 percent tax rate in current law).

However, producing this point estimate for Social Security's 75-year actuarial deficit required a large number of input assumptions, including point estimates for fertility, mortality rates, and productivity growth. Each of these variables is highly uncertain within a range. The total fertility rate, for instance, has fallen precipitously, from 3.61 in 1960 to 2.06 in 2000. OACT assumes that the total fertility rate, in the intermediate case, will stay at about 1.95 children per woman in the long run. Even a small deviation from this intermediate assumption would significantly alter the long-term financial outlook. OACT estimates that every 0.10 increase in the long-term

total fertility rate decreases the 75-year actuarial deficit by 0.11 percent of taxable payroll, and vice versa.

To help quantify the uncertainty in long-run projections, the 2005 Trustees' Report includes a section that summarizes an alternative, probability-based projection approach. The "stochastic modeling" technique tabulates results from a large number of combinations of random input variables. From these tabulations, it is possible to build confidence intervals around a median output path and thus give a range, rather than a point estimate, of Social Security's financial status.

OACT reports that that there is an 80 percent probability that the 75-year actuarial deficit for the Social Security trust funds will be between 0.99 percent of taxable payroll and 3.15 percent. Similarly, there is an 80 percent probability that the current, present value 75-year funding shortfall (using the open group method) is between $1.9 trillion and $7 trillion.

More reliance on automatic adjustments in entitlement programs can help address the problems raised by uncertainty in projections. Instead of hitting a point estimate for solvency, policymakers could build automatic adjustment provisions into Social Security that gradually alter key program parameters based on firmer data in the years ahead. Under this system, politicians can correctly claim to satisfy both the optimists who assume the input assumptions are too dire and the pessimists who worry that the projections will be worse than anticipated. Either way, if the policy adopted has the ability to adjust flexibly to whatever key demographic and economic trends actually occur, the program can remain perpetually solvent.

Building Automatic Solvency into U.S. Social Security

To design a specific proposal for Social Security, it is important to note its differences from the Swedish and German state pension models. Sweden's NDC system ties annuity payments much more directly to contributions while Social Security is a defined-benefit program, with benefits tied to the number of years of credited earnings and a progressive rate of return structure. While also a defined-benefit program, the German formula does not provide as much income redistribution as U.S. Social Security.

Yet, Social Security shares one fundamental characteristic with both the Swedish and German systems—it is financed on a pay-as-you-go basis. As such, the long-term financing of Social Security is driven by the same basic demographic and economic factors that drive the Swedish and German programs.

Capturing all of the important factors in an intricate, self-adjusting model—as is the case in Sweden—is attractive but perhaps unrealistic, as Americans are reluctant to alter Social Security's defined-benefit structure. It is more conceivable that U.S. policymakers would insert two new automatic adjustment factors into the existing Social Security structure, based roughly on a mix of the Swedish and German models, with the aim of reducing financial swings associated with demographic factors that differ from those assumed in the intermediate financial projections.

Longevity Indexing. When Social Security began, male retirees at the age of 65 could expect to receive Social Security benefits for an average of about twelve years. Today, men at the age of 65 will receive benefits for an average of sixteen years.

And by 2050, the average male retiree is expected to live about 19 years after reaching age 65. A similar trend is underway for women.

Private insurers selling annuities carefully calibrate the monthly payments they are willing to provide for a fixed premium based on up-to-date mortality data because it is critical to keeping annuity costs in line with the purchase price. Social Security, however, will finance longer and longer retirement periods for each new generation of retirees—even though the different cohorts will all pay the same payroll tax rate when working. Given the slower labor force growth expected in the future, this is not a sustainable situation.

Eugene Steuerle and Rudolph Penner suggest starting the process of automatic adjustments in Social Security by setting the normal retirement age administratively, as determined by up-to-date life span data. This would mimic the approach taken in Sweden in the annuity divisor calculation. Congress could give administrative authority to the Social Security Administration to set the age based on establishing a uniform number of retirement years, with actuarially fair reductions for early and delayed retirement. Once enacted, this approach would remove "raising the retirement age" from on-going political consideration, which ought to be attractive to political leaders.

The normal retirement age is already scheduled to increase from age 65 to age 67 by 2027, but it needs to go to age 68 to keep the number of years in retirement consistent with current levels and keep pace with expected declines in mortality. To improve Social Security solvency, a more aggressive approach may be necessary. The Congressional Budget Office estimates that moving the normal retirement age up to age 70 over the next fifty years—thus reducing the targeted time in full retirement to the levels experienced by persons retiring in the 1970s—would cut Social Security spending substantially, by about 12 percent when fully implemented.

Dependency Ratio Adjustment Factor. In Sweden, the concept of "turnover duration" captures the on-going demographic shifts reflected in workforce size and the pensioner population and combines it with economic data captured in the current size of the tax base. Germany has taken a less comprehensive approach, using actual data on the dependency ratio alone to adjust annual indexing of pensions.

Although the Swedish approach has advantages, it may be more difficult to establish broad consensus in the United States on how to measure Social Security's "assets" and "liabilities." On the other hand, most Social Security experts will agree on the importance of the old-age dependency ratio in long-term financing of the program.

Thus, it may be easier for the United States to adopt an adjustment factor similar to Germany's "sustainability factor," each year measuring the change in the ratio of beneficiaries to workers contributing payroll taxes. As this ratio increases in the years ahead, a weighted adjustment factor could be applied to the initial benefit formula, slightly reducing the benefits payable to a defined group of new retirees. For instance, today the old-age dependency ratio is .21. This ratio is expected to reach .38 in 2050. The dependency ratio adjustment factor would convert this shift into a uniform percentage reduction in the initial, full benefit retirement formula. To minimize annual fluctuations, the factor could be calibrated based on a ten-year moving average. Once in payment status, the adjustment factor would no longer

apply and beneficiaries would get full inflation protection with annual cost-of-living increases.

Conclusion

Sweden and Germany have shown that it is possible and desirable to put in place provisions that can automatically self-correct underfunding of pay-as-you-go pension systems. Once adopted, these adjustment mechanisms can also help insulate political leaders from constantly revisiting controversial program amendments.

Ideally, U.S. policymakers will reach a consensus on Social Security solvency reforms. If that occurs, the automatic adjustments suggested in this brief could be used as enforcement mechanisms, aimed at correcting any deviation from the expected solvency path.

On the other hand, politicians may find it easier to adopt automatic triggering mechanisms to restore solvency as opposed to adopting actual benefit cuts or tax increases. For instance, proposals to raise the Social Security retirement age are highly unpopular and thus very difficult for Congress to pass. While not easy, it may be more palatable for Congress to adopt a mechanistic provision that guarantees to future generations of retirees the same number of years, on average, in Social Security benefits as the current generation—automatically. If that is the case, automatic mechanisms could become the vehicles for restoring Social Security solvency rather than back-stops for other reform measures.

For Further Reading

Axel H. Börsch-Supan, Annette Reil-Held, and Christina B. Wilke, "How to Make a Defined Benefit System Sustainable: The 'Sustainability Factor' in the German Benefit Indexation Formula," *Mannheim Institute for the Economics of Aging* (October 2003)

Congressional Budget Office, "Quantifying Uncertainty in the Analysis of Long-Term Social Security Projections" *Background Paper* (November 2005)

Ole Settergren, "The Automatic Balance Mechanism of the Swedish Pension System," *National Social Insurance Board* (Sweden) (August 20, 2001)

Ole Settergren, "New Use of an Old Italian Invention: The Double Entry Bookkeeping Used to Monitor and Secure Financial Stability of the New Swedish Pay-As-You-Go Pension Plan," Paper Presented at the International Workshop on The Balance Sheet of Social Security Pensions, Tokyo, Japan (November 2004)

The Swedish Pension System Annual Report 2004, National Social Insurance Board (Sweden) (2004)

Social Security Administration, Office of the Chief Actuary, "A Stochastic Model of the Long-Range Financial Status of the OASDI Program," *Actuarial Study No. 117* (September 2004)

The 2005 Annual Report of the Board of Trustees of the Federal Old Age and Survivors Insurance and the Federal Disability Insurance Trust Funds

C. Eugene Steuerle and Rudolph Penner, "Time to Take the Federal Budget Off of Auto-Pilot," *Investor's Business Daily* (Investors.com) (August 29, 2005)

The Urban Institute, "Social Security Reform in Nine European Countries: A Portrait of Reform" (February 2002)

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