



Automatic Adjustments Within Entitlement Programs: A Look at the Swedish Pension Reform Model

By James C. Capretta

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The United States has significant fiscal challenges due to population aging. While the finances of all advanced economies are under pressure from similar demographic trends, some countries have responded more aggressively and creatively to the problem than have US political leaders. In 1998, Sweden enacted a reform of its public pension system that combines a defined-contribution approach with a traditional pay-as-you-go financing structure. The new system includes better work incentives and is more transparent to participants. It is also permanently solvent due to provisions that automatically adjust payouts based on shifting demographic and economic factors. No pension system is entirely problem-free or can be replicated easily in a different political context. Nonetheless, US policymakers should examine the Swedish model and consider what they could do to make Social Security more personalized and self-correcting, too.

The United States is running large and growing federal budget deficits that are pushing debt up to levels well above the norm in the postwar era. The Congressional Budget Office projects the federal government will begin running deficits exceeding 5 percent of gross domestic product (GDP) each year beginning in 2021 (Hall 2018). By 2047, federal debt will reach 150 percent of GDP (Congressional Budget Office 2017).

The primary cause of the government's current and long-term fiscal gap is the rapid growth in spending on major entitlement programs, which has been occurring for many years and will accelerate over the next two decades as the baby-boom generation grows older. The effects of population aging on federal finances can be seen in projections of Social Security tax revenue and benefit payments. The Board of Trustees overseeing the program's financial status

reported in 2017 that, under current law, the Social Security trust funds have a projected unfunded liability over the next 75 years of \$12.5 trillion (Social Security Board of Trustees 2017).

The growing fiscal stress caused by rapidly rising entitlement expenditures has been well-documented, yet US political leaders have failed to take significant action to address the problem. In addition to wanting to avoid the obvious political risks associated with scaling back promised benefits, many policymakers seem genuinely unsure about how to proceed with reform.

They might benefit from examining what other countries have done to address their aging-related fiscal challenges. In Europe, Japan, and elsewhere, the shift toward an older demographic profile has been and will be much more pronounced than in the US. Many of these countries, out of necessity,

have already moved aggressively to reform their pension systems to lessen the fiscal burdens of their aging populations (although few of these countries could be said to have fully solved the problem because of the severity of the challenge).

A particularly interesting and creative example of pension reform was enacted two decades ago in Sweden. This reform stabilized the Swedish system's finances, even as it largely retained the pay-as-you-go structure of the system it replaced. When imbalances emerge due to shifting economic and demographic circumstances, the reformed Swedish system automatically implements adjustments that bring the program back into financial balance, without the need of further intervention by the parliament.

Sweden demonstrates that it is possible to build into that system a mechanism that makes adjustments automatic, which dramatically reduces the risk that a country will drift into a fiscal crisis because of unresolvable political stalemates.

Programs with commitments spanning generations, such as Social Security in the US, will necessarily require modification as demographic and economic conditions change. It is difficult to get necessary adjustments through Congress because of the sensitivity of the subject and deep political divisions about the basic direction for reform. Sweden demonstrates that, if a country can agree on an overall framework, it is possible to build into that system a mechanism that makes adjustments automatic, which dramatically reduces the risk that a country will drift into a fiscal crisis because of unresolvable political stalemates (Capretta 2006).

In addition to stimulating ideas for pension reform, Sweden's system is interesting because its specific design provides insights into the realities of pay-as-you-go systems more generally. Those insights are helpful in thinking through what needs to be done to make pay-as-you-go pension programs financially

stable and resilient in the many country-specific contexts in which they exist.

The Political Conditions That Made Reform Possible

Sweden's public pension system began in 1914 with a pay-as-you-go flat benefit provided to all persons age 67 and older (the "folkpension," or FP) (Swedish Ministry of Health and Social Affairs 2000). In 1960, the government added an earnings-related pay-as-you-go scheme—called the ATP—similar to programs put in place in most of the industrialized West. The ATP provided a benefit set to replace 60 percent of the average of a worker's highest 15 years of earnings, up to a ceiling. (Workers were required to have 30 years of earnings to get full benefits.)

The system was financed mainly with a payroll tax on employers of close to 19 percent of wages, with additional funding from the government's general revenues paying for a portion of the FP. Although the system was financed mainly on a pay-as-you-go basis, the government chose to build up rather substantial reserves in the program—a buffer fund—to help finance benefits with investment returns and protect against significant demographic shifts (Sundén 2000).

In the 1980s and early 1990s, Swedish officials became increasingly concerned that the system needed significant reform. Projections showed that rapid increases in the number of beneficiaries and slower growth in the workforce (due to low fertility rates) would erode the program's reserves and require pushing the payroll tax rate up to 24 percent of covered wages by 2015. In addition, the ATP's benefit formula distorted work incentives. Swedes could get full benefits after 30 years of work, and the amounts they earned for 15 of those years would not factor into their pension calculations (Sundén 2004).

In 1991, Sweden fell into a deep recession after a long period of economic mediocrity, and the Social Democratic Party, which had dominated politics in Sweden since 1932, lost substantial seats in the parliament. A four-party center-right minority coalition took over control of the government and promptly made pension reform a priority.

The government appointed a pension working group with representatives from the four parties in government and the Social Democrats. This

multiparty working group of the center-right and center-left was instrumental to the success of pension reform in Sweden. In 1994, just before an election put the Social Democrats back into government, the parliament put into law the principles of a pension reform plan recommended by the working group. In 1998, the parliament enacted the implementing legislation that set in motion the transition to the new system (Sundén 2000).

Defined Contributions in a Pay-As-You-Go Financing System

The lengthy reform process in Sweden produced a compromise plan with interesting features. The center-right parties wanted to move to a system of privatized and fully funded individual accounts. That approach was opposed by the Social Democratic Party and labor unions, both of which wanted to retain a publicly run, pay-as-you-go model with defined-benefit characteristics.

The political parties participating in the reform process ultimately agreed to transition to a new system that combines features of a personalized, defined-contribution plan with a pay-as-you-go structure—a so-called notional defined-contribution (NDC) system. Sweden's reform sparked significant interest and commentary by pension experts and economists. The NDC model in various forms has now been implemented in numerous countries, including Italy and Poland.

The key provisions of the reformed Swedish pension system are:

A Fixed Contribution Rate That Serves as a Permanent Budget Constraint. A primary objective of the pension working group in Sweden was to build a new system that would be solvent permanently within a fixed overall contribution rate. The government did not want to succumb to the fate that had afflicted many other countries, which is that their tax rates to finance public pensions were scheduled to rise to very high levels (often above 20 percent of payroll) to compensate for the deteriorating demographic factors driving their pay-as-you-go liabilities.

The Swedes chose instead to establish the non-negotiable first principle that the new system had to be financially sustainable permanently within a

fixed contribution rate of 18.5 percent of taxable wages. This rate is just below the tax rate used to finance the previous defined-benefit system. Establishing that principle was crucial because it dictated much of the rest of the system's design.

The employer share of the pension system tax is 10.21 percent of wages, while workers pay 7 percent of their wages, below a ceiling (equivalent to about \$63,000 in 2016). The employer tax is applied to all wages including amounts earned above the ceiling set for the pension system. The revenue from applying the employer tax to wages above the ceiling goes to the government's general fund, not the pension system. Although the total tax rate is 17.21 percent, the Swedish government calls this an 18.5 percent contribution rate toward pensions. They define the total tax rate by dividing total taxes paid into the system by wages net of the workers' share of the payroll tax (Swedish Pensions Agency 2017).

The Premium Pension. A portion of the 18.5 percent contribution rate—2.5 percent of wages—is devoted to fully funded individual accounts. By devoting this part of the pension contribution rate to funded accounts, Sweden has established a mandatory pension savings rate of 2.5 percent of wages for all workers.

Workers control how their premium pension contributions are invested by selecting from among 844 different investment options (Swedish Pensions Agency 2017). The government has established a default investment fund for workers who fail to make a selection. Workers' accounts are credited with investment returns and charged administrative fees. The balances in these accounts are converted into annuity payments at retirement.

The Income Pension. The other 16.0 percentage points of the pension contribution rate are devoted to financing the so-called income pension ("Inkomstpension"). Income pensions are, for the most part, paid for with contributions from current workers. In other words, it is largely a pay-as-you-go system. But pension benefits are calculated based on notional accounts, which are credited with 16.0 percent of workers' creditable wages. A worker's notional account builds a balance during the years when he has earnings, which is then used to calculate an annuity when he reaches retirement age.

The income pension is a form of a defined-contribution pension. The pensions workers get in retirement are tied directly to the amount of contributions they make to the system. The more they work, the more contributions they make toward their income pension accounts. There is no age limit above which they can no longer make contributions. This design provides improved incentives for work compared to the ATP.

The income pension replaced the defined-benefit ATP system, with a transition. Workers born between 1938 and 1953 get a portion of their retirement benefits calculated under the old ATP formula, and a portion is based on the new system. All workers born after 1953 will get their benefits paid entirely under the new system. The first benefits paid using the income pension accounts were made in 2003.

The new income pension system creates a direct link between aggregate pension liabilities and contributions, which makes it much easier to build a system that will balance over time. This design is different from the defined-benefit models in effect in most other countries, including in the Social Security system in the US. The liabilities of a defined-benefit system can grow at rates greatly exceeding contributions because the formulas used to calculate benefits for workers are not tied directly to their contributions into the system. With the income pension, the system incurs a liability equal to a worker's pension contribution. The only uncertainty is the rate of return earned on that contribution.

The Income Index and Adjusting the Rate of Return in the Notional Accounts. In the income pension, the defined contributions credited to workers are notional, so there is no actual rate of return on invested assets that can be credited to workers' accounts. Instead, the government applies a uniform, presumed rate of return—called the income index—to the notional balances in these accounts, tied in the first instance to growth in per capita wages.

To keep the system in balance, this rate of return is subject to adjustment, to correct for shifts in demographic and economic factors that affect what rate of return can be paid within the fixed budget constraint of a 16.0 percent contribution rate. The adjustments are triggered when an assessment of the system's finances, called the balance ratio, indicates an imbalance. (The details of how the balance ratio

works are discussed in more detail below.) Since workers began getting credited pension contributions under the new system, the average annual rate of return within the income pension has been 3.0 percent, while premium pension accounts have earned an average annual rate of return of 6.7 percent (Swedish Pensions Agency 2017), albeit by taking greater investment risk.

Many defined-benefit pay-as-you-go systems, including Social Security, are facing large unfunded liabilities in part because these systems are not calibrated to adjust benefit payouts to account for longer life spans.

The Annuity Divisor. At retirement, the government converts the balance in a worker's income pension account into an annuity using an estimate of the average remaining life span for all workers born in the same birth year—called the annuity divisor. The divisor is calculated presuming the annuity will earn a real rate of return on balances in the account of 1.6 percent during a person's retirement years. The annuity divisor is used to calculate what a retiree's annuity will be at different ages of initial retirement. For instance, the Swedish government estimates that life expectancy at age 65 is 84 for persons born in 1940 and 85 years and five months for persons born in 1955. The longer average life span of those born in 1955 gets factored into the calculation of the annuity divisor that applies when that cohort of retirees applies for benefits.

Because younger retirees are expected to live longer than their older counterparts, they will get a smaller monthly annuity than older retirees if they retire at the same age with the same income pension balances. The annuity divisor thus automatically counters the effect of longer life spans on the finances of the pension system. Many defined-benefit pay-as-you-go systems, including Social Security, are facing large unfunded liabilities in part

because these systems are not calibrated to adjust benefit payouts to account for longer life spans.

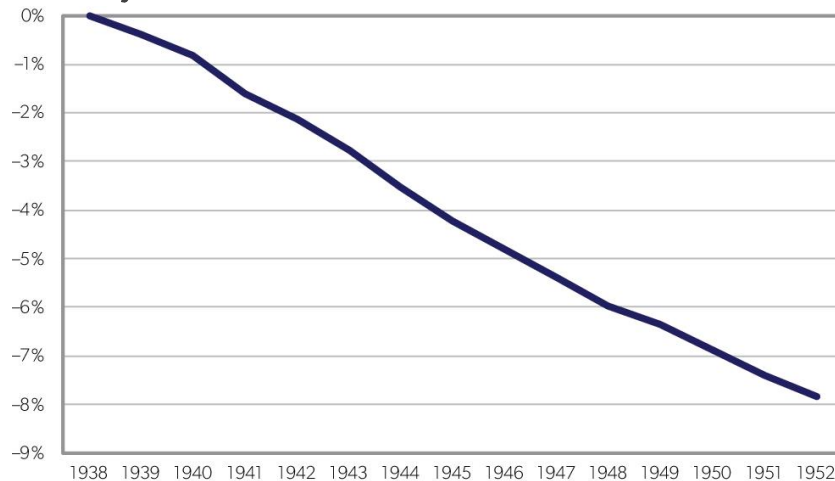
Figure 1 shows the percentage reduction in monthly pension payouts by birth cohort from the annuity divisor, assuming retirement at age 65. Swedes may choose to retire at any point beginning at age 61, but the longer they wait to retire, the higher their monthly annuities will be because the annuity divisor decreases automatically with every month that retirement is delayed. Further, the contributions to the pension system a worker makes by delaying retirement will also raise the value of his or her pension.

Because of the annuity divisor, a worker born in 1952 will get a monthly benefit that is nearly 8 percent less than someone born in 1938, assuming identical balances in their income pension accounts. Of course, on average, workers born in 1952 would live longer and thus collect monthly benefits for more months than those born in 1938. Further, they would generally have higher lifetime earnings and thus have higher balances in their notional accounts from which to draw their annuities.

Guaranteed Pensions. Before enactment of the new pension system, Sweden maintained a floor of protection for Swedish elderly through a means-tested pension program that worked in combination with the FP to support individuals with low lifetime earnings. The country's political leaders chose to retain the concept of a minimum pension and expand it in their reform plan. They created a new guaranteed pension for longtime Swedish residents age 65 and older. Residents who live in Sweden for at least 40 years after the age of 25 are eligible for the full guaranteed pension, set at the equivalent of \$11,500 for a single person in 2016. (Married couples get slightly less than twice the rate of individuals.) The guaranteed pension amounts are indexed to grow with consumer inflation.

The full guaranteed pension benefit is paid only to individuals who have no other income, including from an income or premium pension. For individuals

Figure 1. Reduction in Monthly Pension Benefits Due to the Annuity Divisor by Birth Year



Note: The reductions are relative to the benefits payable to retirees born in 1938 and assume benefits commence at age 65 with uniform balances income pension accounts.
Source: Swedish Pensions Agency (2017).

who did work, and thus have some income from the pension system, the guaranteed pension is phased out commensurate with the size of monthly pension annuities. The guaranteed pension is fully phased out for people with incomes above a certain threshold, set at the equivalent of \$16,500 in 2016 for single retirees.

The guaranteed pension is financed from general taxation, not the 18.5 percent income and premium pension contribution rate, and it replaced the FP and a previous, smaller means-tested income support program for the elderly. The introduction of the guaranteed pension in the 1998 reform plan formalized the separation of the earnings-related and redistributive functions of the new pension system (Bosworth and Weaver 2011). Workers build earnings-related pension benefits strictly in proportion to their wages and contributions. The income and premium pensions are, in this sense, defined-contribution plans. At the same time, the guaranteed pension provides substantial additional support to retirees who had low earnings while working and thus low pensions in retirement. The cost of providing this additional support is financed by all Swedish taxpayers.

Paying for the guaranteed pensions outside of the 18.5 percent pension contribution rate helped pave the way for the Swedish reform because it meant the system's redistributive aspects were not subject to the same budget constraint as income and premium pensions. This proved to be important in 2010 and

2011 when income pensions were cut according to the rules of the budget constraint. Low-income retirees were protected from these cuts by the guaranteed pension, which filled in the income lost from reduced earnings-related pension payouts. The added costs for guaranteed pensions occurred regardless of the budget constraint, which forced reductions in the earnings-related pension system. (The mechanics of the budget constraint are discussed in more detail below.)

Buffer Funds. Sweden’s pre-reform system was largely pay-as-you-go, but the country did create substantial buffer funds, owned and invested by the government, to help ease the financial strain of population aging. The goal was to build reserves during the years when the postwar baby-boom generation was working that could be drawn down when those workers reached retirement. Those “buffer funds” were retained in the reformed system, and the earnings on the invested capital is expected to be crucial to financing the system over the coming years. As shown in Figure 2, the buffer funds are rather sizable, with reserves equal to 30 percent of Swedish GDP in 2016.

The Swedish government has split the buffer fund reserves into five separate investment portfolios, with separate management teams and investment plans. This approach was put in place to spread risk and minimize the influence of any one investment plan (Severinson and Stewart 2012).

Beginning in 2009, annual pension contributions fell short of annual pension payouts, which meant the system was relying on returns from the buffer funds to cover the financing gap. Current projections indicate pension contributions will remain below payouts through 2040, as the population ages and growth of the working-age population does not increase commensurately. The returns on the buffer funds are thus crucial to continued full payment of benefits over the coming two decades.

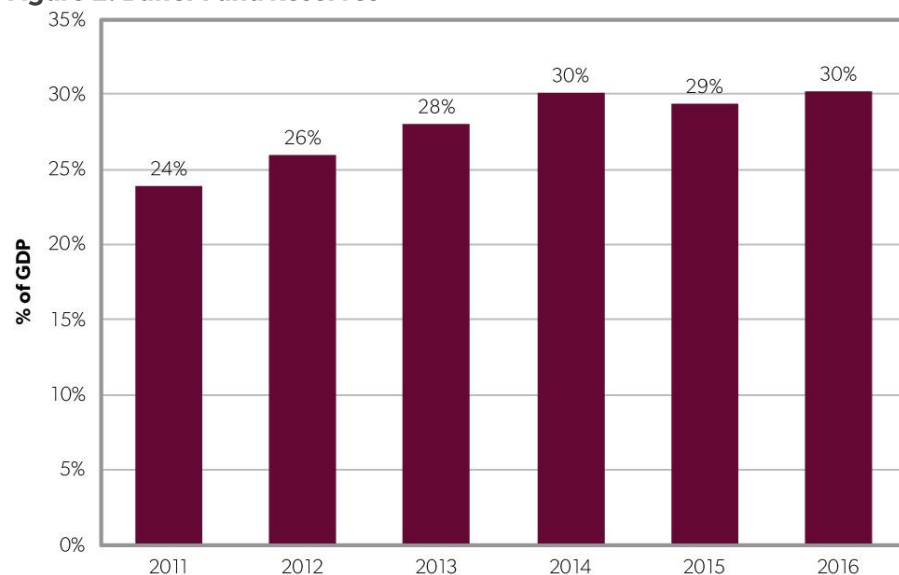
The Balance Ratio, Turnover Duration, and Indexing

Paul Samuelson first stipulated that the rate of return in pay-as-you-go pension systems would equal growth in the contribution base (Samuelson 1958). The authors of the Swedish system built on and refined this central insight when designing their new NDC pension system in a way that is consistent with academic work since Samuelson’s original formulation. They created a balancing formula—called the balance ratio—to comprehensively assess the sustainable annual rate of return that could be payable by the pay-as-you-go pension system.

As Samuelson demonstrated, in the first instance, assuming static population trends and steady patterns of contributions and pension payouts, a pay-as-you-go system can finance higher benefits in the future at a rate of return equal to growth in the wage base for contributions. In particular, during periods of

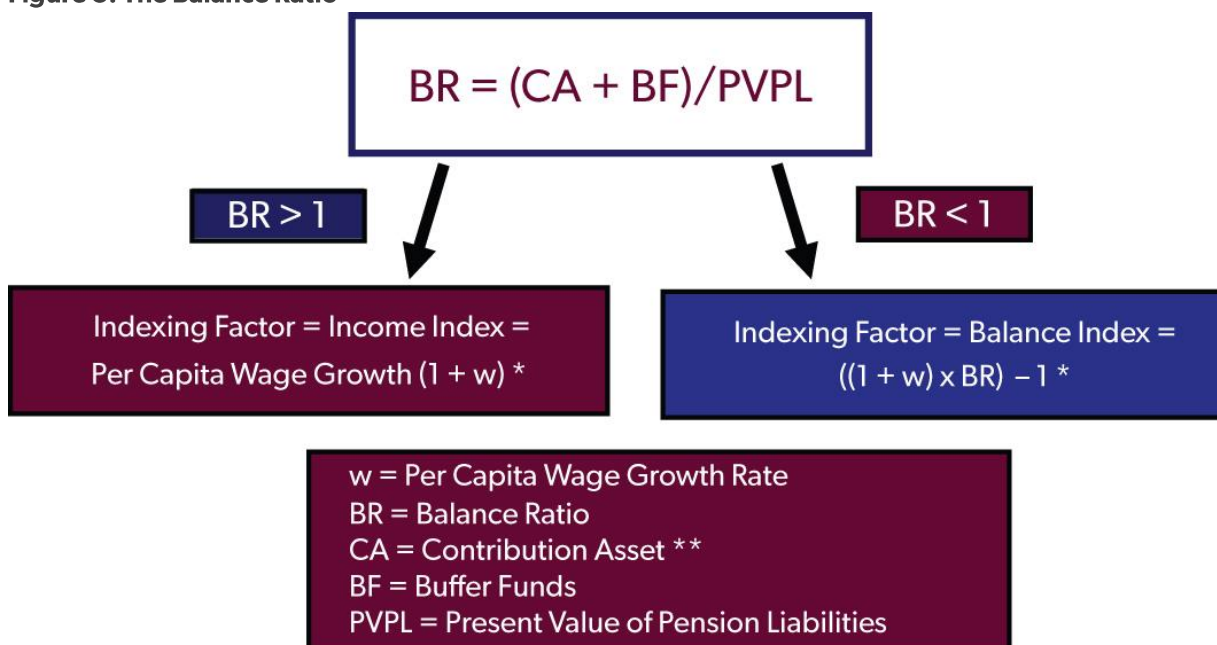
steady population growth, the real rate of return will increase with the growth rate of the working-age population along with productivity growth. However, when the timing and amounts of wages across differing age groups shifts or when the population’s mortality pattern changes, the real rate of return that can be financed by a pay-as-you-go system can differ substantially from the contribution base’s aggregate level of growth (Settergren and Mikula 2006).

Figure 2. Buffer Fund Reserves



Source: Swedish Pensions Agency (2017); GDP figures provided by the Statistics Portal.

Figure 3. The Balance Ratio



Notes: *Pensions are indexed to either the income or balance index minus 1.6 percentage points. ** Contribution Asset = Expected Turnover Duration x Contributions in Year.
 Source: Swedish Pensions Agency (2017); and Barr and Diamond (2011).

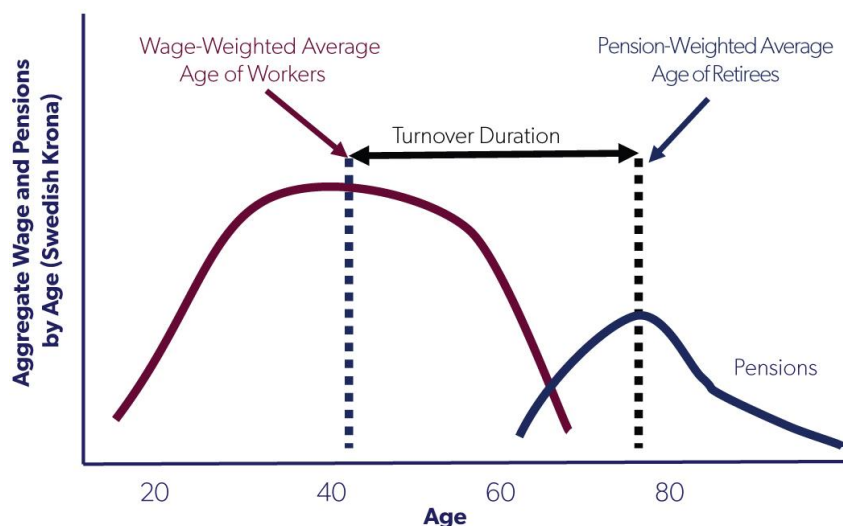
To fully capture all the scenarios that can occur over multiple decades, including the effects of rapid population aging, and to establish an effective budgetary constraint, the authors of the Swedish reform created a mechanism to automatically adjust the internal rate of return paid by the system consistent with actual demographic and economic factors—called the balance ratio. As shown in Figure 3, the balance ratio is an assessment of the pay-as-you-go system’s “assets” relative to its liabilities. If assets exceed liabilities, then the system is in balance and benefit commitments are indexed using the default rate of return. If liabilities exceed assets, then “balancing” occurs, and indexing of the system is adjusted accordingly.

The concept of measuring assets in a pay-as-you-go system is novel and central to the balancing mechanism. In Sweden, the buffer funds are an obvious contribution to total system assets and are included in the calculation. The more interesting component is the “contribution asset,” which assesses how much of a pension liability can be financed

based on the current year’s annual contribution, given the wage, retirement, and mortality patterns prevalent in the system. It is calculated by multiplying the current year’s contribution amount by a concept called “turnover duration,” illustrated in Figure 4.

Turnover duration is the amount of time, measured in years, between the wage-weighted average age of workers and the pension-weighted average age of

Figure 4. Illustration of Turnover Duration



Source: Author’s depiction based on Mikula (2010).

those drawing benefits. This measurement captures in one number the economic and demographic factors that are crucial to a pay-as-you-go system, including the workforce's typical wage pattern and the ages when most workers exit the workforce for retirement. When turnover duration is multiplied by the current year's pension contributions, the product is like a limit on the amount of pension liability that can be financed in the future commensurate with the country's current economic and demographic conditions.

Put another way, the contribution asset implicitly states that if today's contributions were collected each year during the time of the turnover duration, then, at the end of the turnover duration period, there would be sufficient funds in place to finance a pension liability equal to the product of this year's contribution and the turnover duration (Settergren 2001). In 2016, the Swedish Pension Agency calculated the system's turnover duration at 30.13 years, down from 31.51 years in 2012 (Swedish Pensions Agency 2017).

Examples can help clarify the concept. If a country has a high fertility rate and a pattern of long working lives and late and short retirements, then the turnover duration would be relatively long, as measured in years. In this case, the contribution asset also would be relatively large because high turnover duration increases the size of the contribution asset, which then implies that the system can finance a large pension liability with a high rate of return on contributions. On the other hand, a country with

low fertility and earlier exits from the workforce by retirees would have a shorter turnover duration and thus a lower contribution asset. In a country with this kind of demographic profile, the pay-as-you-go system would have a lower sustainable real rate of return.

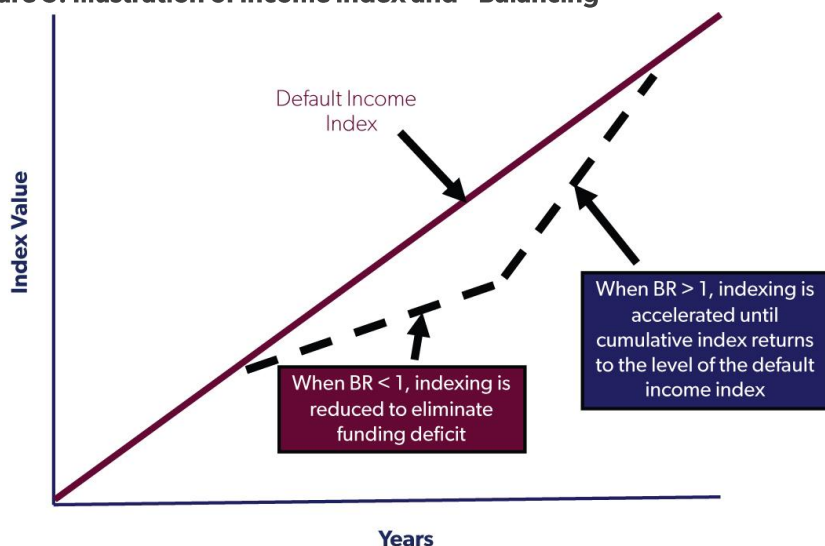
On the liability side, the calculation is more straightforward. Liabilities in the system are measured as the present value of all future pension commitments based on contributions to date. For workers who have not yet retired, the expected liability is equal to the balances in their notional accounts. For retirees, the liability is calculated as the present value of all future annuity payments made to them during their expected remaining lifetimes, discounted by the presumed real rate of return of 1.6 percent annually, which is built into the annuity payment formula (Swedish Pensions Agency 2017).

The default rate of return credited to the notional accounts of workers—called the “income index”—is the measured annual growth rate of per capita wages in the Swedish economy. This same rate of growth is also used to index the pension payouts for retirees, after subtracting the presumed 1.6 percent real rate of return that is already built into the annuity formula. If assets fall short of liabilities, then “balancing” requires suspension of the income index.

Indexing is switched to the balance index for amounts in the notional accounts of workers and the pensions paid to retirees. The balance index is equal to the income index adjusted by the balance ratio, as shown in Figure 5 (Barr and Diamond 2011). Consequently, the account balances of workers and the pensions of retirees will grow more slowly, or even be reduced, during years when the balance ratio is below 1.0. If the balance ratio in a year exceeds 1.0, then indexing of accounts and pensions will exceed that which would have occurred with the income index until the overall effect of indexing returns to the level it would have been without balancing.

Figure 5 provides an illustration of the balancing concept. As shown, indexing slows (and can become

Figure 5. Illustration of Income Index and “Balancing”



Source: Settergren (2001).

negative) during years when the balance ratio initially falls below 1.0. If the ratio then exceeds 1.0 in subsequent years, indexing accelerates until workers' accounts and retirees' pensions return to where they would have been if balancing had never been activated. When the accounts and pensions are fully back in line with what would have occurred with the income index, then balancing is suspended, and in future years the income index is again used, presuming the balance ratio stays above 1.0.

The activation of balancing in the aftermath of the financial crash of 2008 demonstrates how the system works. The measured growth in per capita wages used to establish the income index for 2011 was 1.9 percent. However, the balance ratio was below 1.0, at 0.955, as measured assets fell short of liabilities. Consequently, balancing was in effect, and the system was switched from the income index to the balance index. The notional accounts were credited with a -2.7 percent rate of return for 2011, which is equal to the income index (1.019) multiplied by the balance ratio (0.955) minus 1. Pensions for current retirees in 2011 were reduced by 4.3 percent, which is equal to the balance index rate for the notional accounts (-2.7 percent) reduced by an

additional 1.6 percentage points. For 2012, the applicable balance ratio was above 1.0, which allowed the system to credit the notional accounts with a 5.2 percent rate of return instead of the 4.9 percent increase that would have occurred with the income index (Settergren 2012).

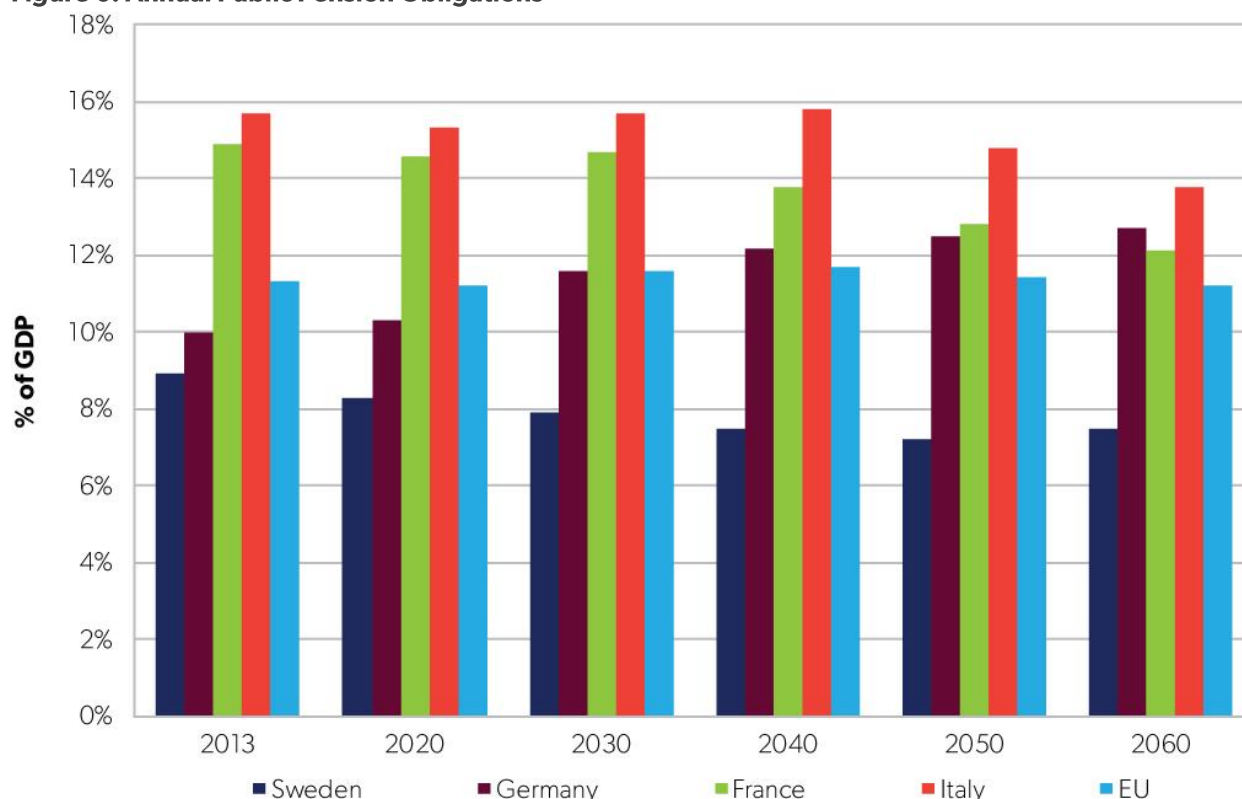
Current and Projected Performance of the System

Sweden put into law the specific features of its reformed pension system in 1998, and the transition commenced immediately. Persons turning 65 in 2019 will get their benefits paid entirely based on the notional account formula, and everyone under the age of 74 today is getting at least half their benefits based on their notional accounts. In other words, enough time has passed to look at the system's early performance and see how it has fared.

The primary goal of the reform was to bring stability and certainty to the financing of the nation's pension system. Without question, the reform has been successful in this regard.

As shown in Figure 6, Sweden's current and projected experience with public spending on pensions

Figure 6. Annual Public Pension Obligations



Source: European Commission (2015).

compares favorably with other countries. According to European Union projections, Sweden's total public pension obligations will equal 7.5 percent of GDP in 2060, which is a substantial reduction from the already-low 8.9 percent of GDP it spent in 2013. Sweden's spending on pensions is far below the EU average. In 2013, total spending on public pensions was equal to 11.3 percent of GDP throughout the EU member states. In 2060, EU countries are expected to spend 11.2 percent of GDP on pensions. Germany's public pension spending is projected to increase from 10.0 percent of GDP today to 12.7 percent in 2060.

France and Italy have very high pension commitments. France spent 14.9 percent of GDP on public pensions in 2013, and Italy spent 15.7 percent of GDP. Both countries are projected to have lower pension obligations in 2060. The EU forecast shows France's pension obligations will be 12.1 percent of GDP in 2060 and Italy's will be 13.8 percent of GDP. France has implemented a series of adjustments to its complex pension arrangements that, among other things, will require younger generations of workers to stay employed longer to get replacement rates in retirement equivalent to what they would have gotten under the previous benefit formula (Carnegie 2013). Italy has adopted a version of a notional account system modeled on the Swedish reform and other reforms to encourage longer working lives, but the reforms are phased in slowly. In the EU projections, Italy's pension obligations rise as a percentage of GDP through 2040 and only then begin to fall. France, Germany, and Italy all will spend far more than Sweden on their public pension programs in 2060.

The US Social Security program is smaller than Sweden's pension system, largely because Social Security was never intended to replace as much wage income in retirement as the Swedish system. The US relies more heavily than other advanced economies on retirement benefits financed through employment. The US has invested funds for private retirement plans with cumulative reserves equal to 135 percent of GDP, while Sweden has private investment reserves for pensions equal to 81 percent of GDP (Organisation for Economic Co-operation and Development 2017). Employer-sponsored pension programs in the US enjoy large tax subsidies that are not captured in public expenditure estimates. Further, the US has other public pension commitments not captured

in Social Security projections for low-income elderly and retired military and government workers. Including these programs would push up estimates of total public pension spending in the US.

Still, it is clear from projections of just the Social Security program that costs are not under control. According to the Social Security Trustees, Social Security spending will grow to 6.0 percent of GDP in 2060, up from 4.9 percent of GDP in 2013 (Social Security Board of Trustees 2017). The current level of payroll taxation—12.4 percent, with half paid by employers and half by employees—is approximately 2 percentage points below the program's expected cost over the long run.

Adopting this kind of defined-contribution model eliminates much of the funding problem associated with benefit formulas that are more loosely connected to pension contributions.

Sweden has been able to keep its pension obligation costs under control because of the budget constraints imposed by the new pension system. Workers earn pension credits exactly in proportion to their pension contributions. Adopting this kind of defined-contribution model eliminates much of the funding problem associated with benefit formulas that are more loosely connected to pension contributions. Further, Sweden's use of the annuity divisor effectively adjusts the new system to the expected longer life spans of retirees in the future. And the balancing mechanism provides a backstop that keeps the system solvent if other factors mean the rate of return that can be sustained is something less than the growth in per capita wages.

The balancing mechanism was tested in the aftermath of the global financial crash and recession of 2007 to 2009. In 2008 and 2009, the balance ratio fell below 1.0 and thus forced a reduction in the indexing of the notional accounts and annuities paid to retirees. One reason for the drop in the balance ratio was the reduction in the value of buffer fund investments, which declined by 21 percent in 2008.

The Swedish government came under significant political pressure to override the indexing adjustments required by the balancing mechanism. Instead, political leaders chose to make a modest adjustment to the balancing formula by replacing the one-year assessment of buffer fund balances with a three-year average (Bosworth and Weaver 2011). This change smoothed balance ratio swings over a multi-year period. (This adjustment was later replaced in 2014 by an adjustment to the calculation of the balance ratio itself, called the “damped balance ratio,” as described below.) The Swedish parliament also lowered taxation of pension benefits, which helped retirees and did not need to be paid for out of the 18.5 percent contribution rate.

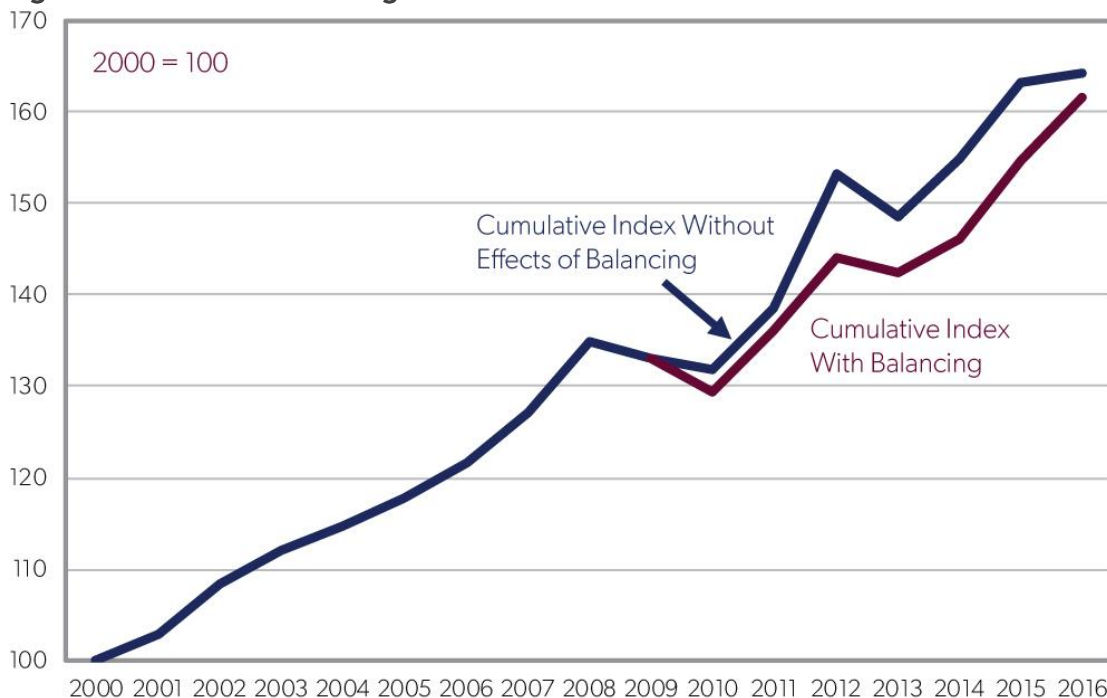
Despite these concessions, it remains remarkable that the Swedish government allowed the cuts to go into effect. The government applied a 3.0 percent reduction to the value of the annuities paid to retirees in 2010 and a 4.3 percent reduction in 2011, as required by the law. The average male retiree in Sweden received a public pension equivalent to about \$19,600 in 2016. Applying a 3.0 and then a 4.3 percent reduction to a pension in successive years would mean the loss of nearly \$600 in the first year and \$1,400 in the second compared to the pension received before

the reductions were applied. It is hard to imagine such large reductions in Social Security benefits for elderly citizens being sustained in the United States. Swedish workers also saw big reductions in the values of their notional accounts, which fell by 1.4 percent in 2010 and 2.7 percent in 2011 (Settergren 2010). A negative balance ratio in 2012 also caused a reduction in notional account balances of 1.1 percent in 2013 and a reduction in pensions of 2.7 percent.

In 2011 and 2013–16, the balance ratio exceeded 1.0 in value, which allowed the indexing of notional accounts and pensions to mostly catch up to where they would have been if balancing had not been triggered in 2009. As shown in Figure 7, as of 2016, the notional accounts have balances that are now at about 98 percent of where they would have been if full income indexing had occurred every year. The government expects the accounts and income pensions will be back to their full values beginning in 2018 (Swedish Pensions Agency 2017).

The Swedish Pensions Agency makes annual long-term projections of the reformed system under three scenarios (a base case and optimistic and pessimistic scenarios). The base case assumes that the birth rate will be 1.88 children per woman and that the average real growth rate of per capita wages will

Figure 7. The Effect of Balancing on Income Pension Account Growth



Source: Swedish Pensions Agency (2017).

be 1.8 percent annually. It also assumes the buffer fund will earn a real rate of return of 3.25 percent each year. With these assumptions, the projections show that the balance ratio will remain above 1.0 throughout the next 75 years. In this base case, the buffer funds will steadily accumulate reserves as system contributions exceed spending and will grow to be 16 times the value of annual pension payouts.

The pessimistic scenario assumes birth rates will decline to 1.45 children per woman for a period before rising later to 1.66. The real growth in income will be 1.0 percent annually, and the buffer funds will grow at a real rate of 1.0 percent per year. Further, men will live 2.7 years longer in 2050 compared to the base scenario, and women will live an additional 2.5 years. With these and other assumptions, the balance ratio in the pessimistic scenario would fall below 1.0 every year, thus triggering balancing and large reductions in the real rate of return earned in the notional accounts and payable to retirees. The buffer funds would be depleted of reserves in 2058, but the system would continue to pay benefits, albeit at a very low rate of return on contributions (Swedish Pensions Agency 2017).

Critiques of the Swedish Reform

Sweden broke new ground with its reform plan, and so it has generated considerable interest and study around the world. Some countries have adopted the notional account concept, including Italy and Poland, while others, including Germany, have incorporated automatic adjustment mechanisms into their benefit formulas to stabilize the financing of their pay-as-you-go pension systems.

For the most part, the authors of the Swedish reform have earned praise from commenters for building a financial stabilization mechanism directly into its pay-as-you-go plan centered on the system's affordable real rate of return. Every pay-as-you-go scheme has such a rate, but the Swedish government was the first to build its pension system around making this rate transparent and controllable. While many other advanced economy governments continue to struggle with the daunting challenge of large imbalances in their pay-as-you-go pensions, Sweden has put in place a plan that will plausibly remain solvent and stable for the foreseeable future.

Still, there have been credible critiques of the Swedish plan, too, mainly regarding some of the details of how it operates. Those critiques are worth noting as policymakers in other countries, including the US, consider their options.

Not surprisingly, the most pointed criticisms have focused on the operation of the balancing index and the large and abrupt reductions in pensions it can impose on retirees, many of whom live entirely on their public pensions and cannot easily replace reductions in their annuities. Barr and Diamond note that the balance mechanism ties annual indexing of pensions to changes in nominal per capita wage growth, which can be a volatile index based on swings in the national economic climate. In particular, they note that the Swedish balancing mechanism is susceptible to large swings because economic downturns tend to lower both returns on the invested reserves in the buffer funds (thus pushing the balance ratio below 1.0) and nominal wage growth, which determines the base rate of indexing. This combination is the main reason pensions were cut by 3.0 percent in 2010 and 4.3 percent in 2011.

Barr and Diamond recommend replacing the current wage indexation method with one that is a composite of price and wage growth, with price inflation determining 80 percent of the index and wage growth the remaining 20 percent. The balancing mechanism would only reduce the wage portion of the composite index, thus lessening the shocks from economic downturns but also stretching out the number of years of balancing that would be needed to eliminate a funding shortfall. They also concur with a recommendation from Auerbach and Lee to use a scaling factor to limit and slow the effects of the balancing mechanism to spread out the needed indexing adjustment over a longer period of time (Barr and Diamond 2011; Auerbach and Lee 2009a).

Barr and Diamond also note that a period that involves lower indexing due to the balancing mechanism, followed by higher levels of indexing during a catch-up period, creates the unintended consequence of increasing workers' notional accounts above the level that would have occurred if balancing had never been triggered. This is due to the higher rates of return during the catch-up phase applying to both the original account totals before balancing went into effect and the contributions credited to those accounts during the years when balancing is

in effect. This unintended effect of the balancing mechanism is adding to the system's measured liabilities, thus increasing the chances that balancing will be triggered.

They offer a simple correction, which is to maintain two running account balance totals for every worker, one with balancing taken into account and one based strictly on the income index. At retirement, workers would get pensions based on the lower of the two, which would prevent workers from benefiting from the flaw in the balancing formula (Barr and Diamond 2011).

Auerbach and Lee focus on a different design specification. They note that the default rate of return in the Swedish system is the nominal per capita growth rate of wages, as opposed to the growth rate of wages for all workers, which is the key parameter for establishing the sustainable rate of return in a pay-as-you-go system. Consequently, the balance mechanism is used to correct for changes in the size of the workforce over time and specifically for reductions in the size of the workforce caused by low fertility rates. If the Swedish system had used the overall growth in wages as the default index instead of per capita wage growth, there would be less pressure on the balancing mechanism due to a stagnant or declining workforce because the income index would already reflect that effect (Auerbach and Lee 2009b).

Auerbach and Lee also note that, as designed, the Swedish reform will tend toward building a large accumulated reserve because the system slows benefits when the balance ratio is below 1.0 but does not increase the rate of return when the balance is above 1.0. Consequently, under many scenarios, the buffer funds will grow and provide a cushion against future financial risks, but the workers and pensioners will get a lower long-term rate of return as a result. They find that other system designs, such as automatic tax increases to cover shortfalls in a defined-benefit plan like Social Security, would produce higher real rates of returns on contributions (on average). Of course, in Social Security and most other defined-benefit systems, workers do not get a uniform rate of return on their contributions, and paying higher taxes to maintain current law benefits would help some workers and disadvantage others, which is a primary reason enactment of such a plan would be politically challenging (Auerbach and Lee 2009b).

The Swedish established an expert group to examine what adjustments should be made to the balancing formula in the aftermath of the financial crash. In the end, instead of the numerous changes recommended in the academic literature, the government chose in 2014 to adjust the calculation of the balance ratio and relabeled the measure the “damped balance ratio.” With the damped balance ratio, the effect of balancing in any year is reduced to one-third of the level it would have been under the unadjusted measure of the index. This change replaced the smoothing effects that were put into the calculations of the buffer funds and other factors in previous years. The damped balance ratio will limit the severity of the annual swings in indexing by stretching out adjustments over a number of years (Swedish Pensions Agency 2016).

What the US Might Learn from Sweden's Experience

The context within which reform of the Swedish system occurred was unique and very different from the US today. Sweden had an expensive, defined-benefit system that was geared toward replacing much more of a worker's earned income in retirement than is the case with Social Security. The Swedish replacement rate under the old ATP defined-benefit program was 60 percent of covered wages (Sundén 2000). Social Security's average replacement rate is 42 percent (Clingman, Burkhalter, and Chaplain 2017). Further, Sweden had imposed a contribution rate to finance its system of 18.5 percent of wages, which is well above the combined employer-employee payroll tax rate of 12.4 percent for Social Security.

Before reform, projections in Sweden indicated that population aging would require policymakers to raise the tax rate to at least 24 percent if nothing was done to change the system, which was viewed as unacceptable because of the burden such a tax rate would impose on workers. Closing the financing gap in Social Security with a tax increase alone, and no benefit adjustments, would eventually require a payroll tax rate of about 17 percent of taxable wages, not 24 percent.

The election in 1992 was a catalyst for reform in Sweden. The dominant Social Democratic Party was left out of government entirely. Political parties that had been mainly out of power for years were suddenly

brought into the government; they were eager to put in place a sweeping, pro-growth reform agenda. There was also a growing belief that the pension system needed to be reformed in a way that would remove it from the back and forth of daily political battle. In sum, the outlook for the previous Swedish pension system was unfavorable, and a unique political moment arrived during 1992 to 1994 that allowed political leaders to set in motion an ambitious reform plan.

The US in 2018 is not like Sweden in 1992. Social Security is facing a large funding shortfall, but the overall size of the problem, relative to the size of the US economy, is small compared to what Sweden faced with its pension system. Moreover, the US political system is deeply polarized, with little discussion of Social Security reform because of the political risks associated with even raising the subject. Absent a crisis, political leaders from either major party in the US are unlikely to step forward to propose a fundamental transformation of the program. It is also hard to imagine the two major parties in the US cooperating with each other over a multiyear period to enact a sweeping reform plan, as was the case with the major parties in Sweden in the 1990s.

Still, despite the obvious differences in political and economic circumstances, it would be useful for US policymakers to be familiar with what was done in Sweden in the 1990s. Those reforms have dramatically improved the long-term financial outlook for the pension system, and some of the ideas might be modified to work in the context of a reform of US Social Security. The following are four key attributes of the Swedish reform that US policymakers might consider as they contemplate Social Security reforms.

A System That Self-Corrects Without Ongoing Political Intervention. Pay-as-you-go pension systems get into trouble because they implicitly pay rates of return on contributions that are unaffordable at current contribution rates. Sweden set out to establish a permanent and enforceable budget constraint that would keep pension expenditures within an 18.5 percent payroll tax rate. They achieved that goal with an elegant system of adjustments that modifies the rate of return earned on contributions to stay strictly in line with demographic and economic reality. This system was tested in the aftermath of

the financial crash and was largely left intact. It has already removed massive unfunded liabilities from Sweden's books.

It is unlikely the US could move its entire Social Security system to a defined-contribution model, but policymakers should consider what can be done to build benefit adjustments into Social Security that are tied to the implicit rate of return the system pays to the average wage earner. This would be a complicated endeavor, but today's average rate of replacement of 42 percent might need to fall in accordance with the country's demographic realities. Biggs described one approach to building automatic adjustments into Social Security by adjusting tax and benefit levels based on shifts in the ratio of workers to retirees over time (Biggs 2008).

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The important thing is to make whatever adjustments need to occur automatic based on ongoing assessments of actual demographic and economic patterns. No public pension system can be entirely removed from political pressures. Elected politicians can always enact new laws undoing what was passed previously. But regarding pensions and entitlements more generally, many politicians know what needs to be done but they do not want to take the political blame for implementing unpopular adjustments.

Sweden shows that, if politicians can put in place an automatic system of adjustments, then needed calibrations of pension payouts are more likely to actually go into effect than if politicians must continually enact new legislation in a contentious political process. Automatic adjustments provide a bit of distance for politicians, which allows them to not take responsibility for every unpopular but necessary modification to a public pension system.

Calibrating the Retirement Age to Longevity. Separate from the balancing mechanism, Sweden's

system also calibrates retirement benefits automatically to the lengthening life spans of retirees. In Social Security, the retirement age is gradually being raised from 65 to 67 according to a legislatively prescribed transition period that is mostly unrelated to actual demographic trends. It is already apparent that these adjustments in current law, enacted in 1983, are insufficient to capture the increased life spans among current retirees. Trying to enact another increase in the retirement age is difficult because of its unpopularity.

What reformers should do is build into Social Security a provision that automatically keeps the number of years of retirement relatively constant over time, consistent with trends in mortality. The actuaries producing Social Security's cost projections estimate this kind of an automatic adjustment in the retirement age would eliminate 19 percent of the program's long-term financial shortfall (Social Security Administration 2017).

Transparent Personalization Without Massive Transition Costs. Sweden successfully transitioned to something like a defined-contribution system from a defined-benefit program without incurring large transition costs by using notional accounts to track contributions. A major barrier to fully funded individual accounts is the transition cost, as one generation will be forced to pay for the pensions of current retirees in the pay-as-you-go system, as well as for their own accounts. Notional accounts have no transition costs. Of course, there is no real money in the accounts either, but that does not mean they are worthless. They provide much more transparency to workers about the value of their accumulating pension credits, from which they will draw benefits when they retire.

In contrast, Social Security is an opaque program because it is built on a defined-benefit formula and includes large amounts of redistribution. Most workers have little sense of what their benefits will be in retirement. Surveys show nearly one out of every four workers near retirement is entirely unsure of what his or her Social Security benefit will be when he or she stops working (Biggs 2009). Policymakers in the US should consider what could be done to make Social Security's benefit more transparent to workers as they are accumulating credits and how

to make the benefits more directly related to lifetime contributions.

Redistribution Outside of the Basic Pension System. Sweden's reform effort was successful in part because the plan provided for a large income protection plan outside of the new defined-contribution pension system. The guaranteed pension provides a relatively generous floor of protection to the elderly with financing from general taxation, not pension contributions. The guaranteed pension ensures that even if the pension system must be reduced in size to stay within the system's budget constraint, low-income elderly will be fully protected through a program that will not be subject to the same constraints.

In the US, the Supplemental Security Income (SSI) program serves as a floor of protection for low-income elderly and is financed from general taxation. Reformers might consider substantially increasing the generosity of SSI, which would make it easier to lessen the cost of Social Security's redistributive features.

Conclusion

Some aspects of Sweden's approach to pension financing are less desirable than what exists in the US today. Sweden's public pension system is large relative to Social Security, and the country's private pension system is smaller than what exists in the US. It would be a step backward to increase the size of Social Security at the expense of the nation's robust system of private retirement savings and investment, which is largely a fully funded defined-contribution pension model.

Nonetheless, the Swedish reform from 1998 was creative and has, so far, achieved its goals. It put in place a new kind of public pension system with many favorable features.

At the moment, there is little momentum to move forward on any kind of reform plan for Social Security, despite the program's mounting financial problems. Perhaps if policymakers in the US were to study what has taken place in Sweden, they would come away with some new ideas about what needs to be done to modernize Social Security and ensure the program is stable and solvent for many decades to come.

About the Author

James C. Capretta is a resident fellow and holds the Milton Friedman Chair at the American Enterprise Institute.

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Arthur C. Brooks, President; Michael R. Strain, Director of Economic Policy Studies; Stan Veuger, Editor, *AEI Economic Perspectives*

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