Are Automatic Balancing Mechanisms Appropriate for Private Sector Defined Benefit Pension Plans?

Doug Andrews, MBA, FCIA, FSA, CFA
University of Southampton

Presented at the 2008 Retirement 20/20 Conference
Defining the Characteristics of the 21st Century Retirement System
Crystal Gateway Marriot, Washington, DC
November 17-18, 2008

ABSTRACT

The Swedish social security system contains a mechanism referred to as an automatic balancing mechanism (ABM) that adjusts the rate credited to contributor accounts and the amount of increase in pensions in payment when liabilities exceed assets. The Swedish social security system also includes some other adjustment features including adjusting annuity factors to reflect, in part, improvements in cohort mortality and crediting accumulations (and to a certain extent pensions in payment, as will be explained in the paper) with the rate of growth in average wage per capita, thus connecting the growth in contributions and pensions to economic growth. The German social security system adjusts benefits by a sustainability factor that has been calculated to maintain long-term contribution rates within a certain range.

The above description of Sweden's social security applies to the component of the system that is Notional Defined Contribution (NDC). The German system, as it has been modified, could be considered to be quasi NDC. Mathematically, NDC and career-average-earnings defined benefit (DB) plans are similar.

This paper considers the question of how the adjustment mechanisms described for the Swedish and German social security systems might be incorporated into private sector DB plans of the following types: multi-employer and single employer. The paper will argue that such adjustment mechanisms may be appropriate in multi-employer pension plans and will present innovative ways in which DB multi-employer pension plans could incorporate adjustment mechanisms. However, the paper argues that adjustment mechanisms are inappropriate in private sector single employer pension plans. The paper does present a modified approach to designing single employer pension plans that combines an employer-paid DB benefit and an employee-paid contribution account that would enhance financial sustainability and provide employees with greater flexibility.

TABLE OF CONTENTS

1.0 INTRODUCTION

The social security retirement systems (SSRS) of most developed countries have experienced financial stress in the last 20 years or are anticipated to face financial issues in the next 10 years. Certain countries, such as Sweden, have addressed the financial issues facing their SSRS by making changes, including introducing an automatic balancing mechanism (ABM). Many of the conditions that have created financial stress for SSRS are also present in private sector pension plans, such as increasing life expectancy, minimal funding, generous early retirement provisions and an increasing ratio of pensioners to active workers. In addition, some private sector pension plans have faced financial stress due to their investment policies.

There is interest in the ABMs adopted for SSRS, both to understand how they operate and to determine if they could be applied to private sector pension plans. In the remainder of this introduction, the desirable characteristics of ABMs are discussed. In the following section, the Swedish and German ABMs are described. The next section discusses the differences between SSRS and private pension plans and argues that ABMs should not be applied to single employer pension plans (SEPPs) but might be applied to multi-employer pension plans (MEPPs). Before discussing how these ABMs might be applied to MEPPs, two suggestions are made on how to improve the governance and management of MEPPs. In the penultimate section, ways to adapt the Swedish and German ABMs for use in MEPPs are described and a number of problems identified. This section also notes that MEPPs are industry-dependent and mentions ways in which this dependency might be addressed. The final section summarizes the conclusions of this paper.

It is inherent to SSRS that some guarantees will be imbedded. For example, in a traditional defined benefit (DB) partially funded SSRS, such as exists in Canada, a benefit based on an established formula is guaranteed to be paid for a retiring participant's life. Moreover, the pension is adjusted to offset the erosion of purchasing power due to inflation, which is another type of guarantee. There may also be guaranteed death benefits both before and after retirement. The contribution schedule may be presented as fixed or guaranteed. Or, for example, in a fully funded defined contribution (DC) SSRS, such as exists in Chile, there are guarantees in that the accumulated contribution balances at retirement are converted to income, which is guaranteed to be paid for the

retiring participant's remaining lifetime. These are just examples of a few of the guarantees that may exist. Guarantees will be discussed more fully later.

SSRS are long-term undertakings. In the most limited form, there is a commitment to the generation of participants able to work for whatever is defined to be the period of full service that such participants, when they retire, will receive benefits determined in some stated manner for the rest of their lives. For some participants such an undertaking may last at least 70 years, e.g., 40 years during the service period establishing full benefit entitlement and 30 years during the period when benefits are received. For other participants of this generation such an undertaking may be shorter or longer. But typically the establishment of an SSRS is not merely a commitment to current generations; it is viewed as an undertaking to future generations as well. As such an SSRS is a long-term undertaking, potentially with an indefinite horizon.

There are many factors that may impact the ability of an SSRS to deliver on its guarantees over a long horizon. Increasing longevity has been an important factor affecting the cost of lifetime pension guarantees. The rate of inflation impacts the cost of providing inflation-adjusted (referred to as "indexed") pensions. Investment returns are a factor in partially funded schemes and whenever an interest rate is assumed in determining the value of a guarantee or the amount to be guaranteed. Within an SSRS with guarantees, each individual participant cannot be responsible for fully backing or supporting his or her own guarantee; some pooling or insurance will apply. The participant may pay some risk premium that is more or less than the actual value of the participant's guarantee but each participant does not pay only the exact value of his or her guarantee; there is some pooling of risk associated with providing guarantees. As such, demographic factors and changes to those demographic factors will affect the ability of the system to deliver on the guarantees. Depending on what benefits the SSRS includes, there may be other factors affecting the ability to deliver on guarantees such as: incidence of disability and rates of recovery (if disability guarantees exist); family composition and survivor mortality (if survivorship guarantees exist); participation rates and work history (if there is not a one-to-one link between benefits and work history). Finally, and perhaps most importantly, the assumptions made in establishing the SSRS will affect its ability to deliver on its guarantees. If the contribution schedule is unlikely to support the generous level of benefits guaranteed, except in the most optimistic scenarios, the ability of the SSRS to deliver on its guarantees is more likely to be challenged than if the contribution schedule and benefit levels have been set using realistic assumptions.

Due to:

- the existence of guarantees,
- the long-term horizon of the SSRS, and
- the many factors which may affect the guarantees, all of which may change in the long term,

it is likely that all SSRS will experience stress at some time. This stress may manifest itself in different ways, or observers, especially if they are not impartial, may identify the stress more strongly in relation to certain components. For example, the stress may be stated as a funding deficiency, or as a need to increase contribution rates, or as a requirement to cut benefits or as a need to raise the retirement age to be eligible for full benefits. Reforms that address the stress by changing some parameter, such as the contribution rate or retirement age, are referred to as parametric reforms. But structural reform may also be the response to stress. In a structural reform, the structure of the SSRS is changed. For example, in 1981 Chile replaced its DB SSRS with a system of fully funded DC accounts (FDC). Or, for example, in 1999, Sweden replaced its DB SSRS by a combined system of notional defined contribution accounts (NDC) and FDC accounts. These are both examples of structural reform.

Because SSRS are likely to require adjustment at some point to respond to the stress experienced, it is reasonable to attempt to describe the characteristics that the most acceptable adjustments to an SSRS should have. These characteristics are listed below.

- Gradual—the adjustments take place over a period of time without any sudden significant adjustment being borne by any single participant or cohort of participants
- Equitable—the adjustments should be borne by cohorts of participants in a manner that each cohort would consider fair, i.e., although the adjustment may be viewed negatively, it should be implemented so that the method of implementation is not viewed as being distributed unevenly among cohorts
- Sustainable—the adjustments should be sufficient to deal with the stress for a reasonable period of time on some reasonable set of assumptions, not merely a temporary fix which simply delays the stress for a short period of time.

These three characteristics are essential to an acceptable adjustment mechanism, and an adjustment mechanism that displays these characteristics will be referred to as a "balancing mechanism." "Balancing" carries multiple

meanings. It provides financial balance so that as a result of the adjustment, the SSRS is sustainable. It also refers to balance among and within cohorts, i.e., no cohort is treated inequitably relative to others and members of a cohort are treated fairly. It also provides balance through the transition. There is no sudden significant change affecting any cohort. In this paper, only financial adjustments are analyzed. Equitable adjustments are also important to having a satisfactory ABM; however, a discussion of the equitability of the ABM is beyond the scope of this paper. In Andrews (2008b) the equitability of these adjustment mechanisms is considered.

There are also some characteristics of an adjustment mechanism that may not be essential but might be considered ideal.

- Automatic—Adjustments would occur as stresses develop in order to keep the SSRS in balance.
- Transparent—The nature of the adjustments would be open and understandable by all cohorts.

ABMs are relatively scarce, perhaps nonexistent. However, there is an immediate appeal to an effective balancing mechanism that makes the necessary adjustments in responses to stresses that have occurred. This paper describes two ABMs. The most famous example of an ABM occurs in the Swedish SSRS. The German SSRS incorporates an ABM that includes a demographic sustainability factor. This ABM will also be described. Both of these ABMs were developed for SSRS. However, private sector DB pension plans also include guarantees, have a long-term horizon, and the guarantees are subject to many of the same factors that are affecting the financial viability of SSRS. This paper considers how the Swedish and German ABMs might be adapted to apply to private sector pension plans.

Before concluding this introduction, a few comments on the characteristic of transparency are warranted. If a robust ABM could be constructed that was also transparent that would be an improvement over a robust ABM that was not transparent. However, given a robust ABM, i.e., an adjustment mechanism that automatically adjusted to stresses, in a manner that was gradual and equitable in its treatment of cohorts and members within cohorts, and which produced financially sustainable results, such a mechanism would be considered successful. So transparency is an ideal rather than an essential characteristic. Moreover, given the complexity of SSRS and the relatively small amount of time and the limited amount of interest the public appears willing to expend in understanding adjustment mechanisms of SSRS, an adjustment mechanism is

unlikely to be transparent to all even though it might be transparent to a group with specialized knowledge pertaining to SSRS and SSRS adjustment mechanisms. Accordingly, transparency will not be a required component.

2.0 DESCRIPTION OF TWO COUNTRIES' ABMs

This section describes the ABMs of Sweden and Germany. Sweden has been selected because it is the most widely discussed of all ABMs. The German ABM is more recent (2004) and incorporates a sustainability factor based on a demographic dependency ratio and a sustainability parameter that could be used to adjust the burden of adjustment borne by active lives and pensioners; hence, it provides some interesting features not present in the Swedish ABM. The final subsection identifies important adjustment components that are not technically part of the ABM.

2.1 Sweden's Balancing Mechanism

The Swedish SSRS is a complex system with many components, most of which have been commented on in the literature. This subsection briefly outlines the Swedish system identifying components to be included in any subsequent analysis.

The Swedish SSRS requires an aggregate contribution from the employee and on behalf of the employee by the employer of 18.5 percent of the employee's pay. Of this contribution 16 percent is allocated to the NDC part of the system and the remaining 2.5 percent is allocated to the FDC part of the system. The FDC part will be excluded from further discussion and analysis. An important characteristic of the NDC part is that the contribution rate is, and will remain, fixed.

Within the SSRS there is a guaranteed minimum pension. The excess of the guaranteed minimum pension over the pension provided by the NDC is paid for through general taxes and hence is outside the fixed-contribution NDC component. As such, it will be excluded from further discussion and analysis.

There are also certain disability and survivors' benefits within the SSRS that are paid for through general taxes. As such, they will be excluded from further discussion and analysis.

Within the NDC, the contributions are credited notionally to the account of the contributor. This is notional because benefits paid to pensioners are financed using contribution income and any contribution income that exceeds pension payments is deposited in a buffer fund, which is invested. However, the actual investment earnings on the buffer fund are not credited to the contributors' accounts. Annually, the notional balances in the contributors' accounts are credited (notionally) with "interest" at the rate of growth in average wage or income of the population over the past year, calculated on a per capita basis.

At retirement, the contributor's notional account balance is used to purchase the contributor's initial pension. The pension is calculated using an annuity factor that incorporates a 1.6 percent per annum discount (interest) rate and a mortality factor that is reflective of the mortality improvement by cohort. Table 1 from Settergren (2003) shows the projected annuity factors at age 65. This table also shows the projected increase in life expectancy at age 65. An alternative to having one's pension be less than the pension at age 65 of someone in the 1940 birth cohort with an equivalent notional balance at age 65 would to be to postpone retirement beyond age 65. The table also shows the period of postponement necessary to equate the initial pension amount to that available at age 65 to the 1940 birth cohort.

Table 1: Effect of Projected Life Expectancy on Annuity Factor, Pension Levels or Retirement Age

Birth Cohort Born	Year Reaches 65	Age 65 Projected Annuity Factor	Reduction In Pension Due to Increased Life Expectancy	Retirement Age To Neutralize Increased Life Expectancy	Remaining Life Expectancy At Age 65
1940	2005	15.7	0%	Age 65	18 years & 6 months
1945	2010	16.1	2%	+ 4 months	+ 6 months
1950	2015	16.4	4%	+ 7 months	+ 11 months
1955	2020	16.7	6%	+ 10 months	+ 16 months
1960	2025	17.0	7%	+ 13 months	+ 20 months
1965	2030	17.2	9%	+ 16 months	+ 24 months
1970	2035	17.4	10%	+ 18 months	+ 28 months
1975	2040	17.7	11%	+ 21 months	+ 32 months
1980	2045	17.9	12%	+ 23 months	+ 35 months
1985	2050	18.0	13%	+ 25 months	+ 38 months
1990	2055	18.2	14%	+ 26 months	+ 41 months

Once pensions commence they are adjusted annually by the increase in the average wage per capita, the same rate that is used to adjust the notional accounts of contributors. Hence, if the increase in the average wage per capita exceeds the rate of inflation by 1.6 percent, then the pensioner's pension is adjusted to fully reflect the rate of inflation. If the increase in the average wage per capita less the rate of inflation is more (less) than 1.6 percent, then the pensioner's pension is adjusted by more (less) than the rate of inflation.

The changing annuity factor by birth cohort to reflect increased cohort life expectancy is a component of the balancing mechanism. There is another component of the system referred to as the ABM. This component is applied to bring the system into financial balance. To understand how assets and liabilities are calculated for this NDC system, see Andrews (2008b).

To determine if there is financial balance, a balance ratio is calculated. The balance ratio is total assets divided by total pension liabilities. When the balance ratio is less than 1, then the ABM is triggered, affecting the next and subsequent years until financial balance is restored. Pensions are no longer increased by the rate of increase in the average income. Instead they are increased by the rate of increase in average income multiplied by the balance ratio. Similarly, the interest rate credited to notional accounts is no longer the rate of increase in the average income; rather it is the rate of increase in the average income multiplied by the

balance ratio. To summarize, when the total assets are less than the total pension liabilities, there is no change to the contribution rate but the rate at which notional accounts are credited is reduced (from the level that would have applied if the balance mechanism had not been triggered) and the rate of indexing of pensions is reduced below the rate of increase in the average income.

It is expected that the application of the ABM will rectify the financial balance over time. After the ABM has been triggered and it is subsequently determined that the balance ratio exceeds 1, then indexing of pensions and crediting of (notional) interest to notional accounts continues at the product of the balance ratio and the rate of increase in average income until the pension liability attains the level it would have been at if indexing had been (continuously) at the rate of increase in the average income.

2.2 Germany's Balancing Mechanism

This subsection describes briefly the component of the German public pension system that applies to employees (excluding civil servants and the self-employed) after the reform package, proposed by the Rurup Commission in 2003, was put into law in 2004. It does not include a description of revised tax measures that were introduced subsequently that are described by Toft (2007). These reforms are frequently referred to as the Rurup Reform. The system had undergone significant change in 2001, referred to as the Riester Reform after the Secretary of Labour at the time. This description is based on an article by Borsch-Supan et al. (2006).

The reforms have transformed a pay-go career-average DB retirement insurance system that provided a high level of net income replacement, approximately 70 percent, to a worker who had earned average lifetime earnings and participated for 45 years to a notional defined contribution (NDC) system look-alike. Net replacement rate was based on disposable income defined as gross income net of income tax. Approximately 70 percent of the budget of the retirement insurance system is financed by contributions administered like a payroll tax, levied equally on employers and employees. The remaining 30 percent of the budget is financed by earmarked indirect taxes and a subsidy from the federal government. The insurance system distinguishes five types of old-age pensions: normal; long service life; women; older disabled; and unemployed. Only "normal" does not have an earnings test, so it will be the focus of this analysis. The "normal" pension is available at age 65 after five years of service.

Benefits are computed on a lifetime basis and adjusted according to the type of pension and the retirement age, as follows:

$P_{t,i} = EP_i \times SY_i \times AF_i \times PV_t$

where in respect of pensioner i:

$P_{t,i}$ is the annual value of a pension in year t

EP_i are earnings points expressed as a multiple of the average annual contribution in each historical working year, e.g., one EP corresponds to average earnings, $0.5\,EP$ corresponds to 50% of average earnings, two EP corresponds to earnings twice as large as earnings for the year

SY_i comprise years of active contributions plus years of credit where no contributions were made, e.g., in respect of military service, parent's time in respect of a child's education, etc., and notably years of unemployment

AF_i is an adjustment factor that is 1 for the normal old-age pension

PV_t represents the current pension value in year t and is the crucial link between workers' earnings and pensioners' benefits. It is indexed to the annual changes in the level of wages and salaries, net of pension contributions.

The mechanism follows the following formula:

$$PV_t = PV_{t-1}\left(\frac{AGI_{t-2}}{AGI_{t-3}}\right)\left(\frac{1-\delta_{t-2}-\tau_{t-2}}{1-\delta_{t-3}-\tau_{t-3}}\right)\left(\left(1-\frac{PQ_{t-2}}{PQ_{t-3}}\right)\alpha+1\right)$$

where PV_t, PV_{t-1} are current pension value in year t and year $t-1$ respectively

AGI_{t-2}, AGI_{t-3} represent average gross income in year $t-2$ and year $t-3$ respectively

δ_{t-2}, δ_{t-3} represent the assumed contribution rate to supplementary pensions in year $t-2$ and year $t-3$ respectively, which is gradually increased from 0.5% in 2003 to 4%, which is the ultimate level, in 2009 and thereafter

τ_{t-2}, τ_{t-3} represent the contribution rate to social security in year $t-2$ and year $t-3$ respectively

PQ_{t-2}, PQ_{t-3} represent the ratio of the number of pensioners to the sum of the number of contributors and the unemployed in year $t-2$ and year $t-3$ respectively

α is the sustainability parameter that is set (at least for some time) at 0.25, which shares the burden of the adjustment between pensioners and workers

In the 1992 reform, normal retirement age was increased to age 65. Further increases to normal retirement age, which are not directly linked to life expectancy, are scheduled. The 1992 reform also anchored benefits to net wages of social security taxes and savings rather than to gross wages, which provides a stronger link between pensioners' benefits and workers' wages.

The Riester Reform changed the nature of the system by introducing a funded supplementary pension component. It also introduced measures to control costs and provide for stable pension levels. Contributions must remain below 20 percent until 2020 and below 22 percent until 2030, and the net replacement rate for pension benefits in relation to lifetime earnings must stay above 67 percent until 2030. Net replacement rate is based on gross earnings less income tax and social security contributions, which effectively reduces the target replacement rate. To compensate for the drop in net replacement rate (from approximately 70 percent), a system of tax-assisted supplementary (funded) pensions, using a DC approach, was created. It is not mandatory to contribute, and the uptake in participation has been slow (although the change is relatively recent so it is too early to make any conclusive assessment regarding the popularity of this reform).

The Rurup Reform introduced two significant provisions to enhance the financial stability of the system. It provides for a gradual increase in the normal retirement age from 65 to 67 years, in monthly steps from 2011 to 2035. It also

introduced a sustainability factor that is a part of the mechanism that modifies pension benefits in relation to the system dependency ratio.

Let us consider how this mechanism works. To begin, assume a steady state population and a mature system so $\delta_{t-2} = \delta_{t-3}$ and $\tau_{t-2} = \tau_{t-3}$. In a steady state, population $PQ_{t-2} = PQ_{t-3}$ so the formula reduces to $PV_t = PV_{t-1}\left(\frac{AGI_{t-2}}{AGI_{t-3}}\right)$. This means that the current pension value is adjusted by the rate of increase in average gross income (wages) on a lagged basis. The lag was introduced to provide sufficient time to assemble the data and do the computations.

Note $AGI_{t-2}(1-\delta_{t-2}-\tau_{t-2})$ represents average income in year $t-2$ net of deemed pension saving, i.e., both through supplementary pensions and social security. So if the contributions to pensions increase, then the increase in the value of current pensions is dampened, so that pensioners share some of the pain of a more costly pension system.

Note also that PQ introduces a demographic dependency ratio of the number of pensioners to the number of non-pensioners, i.e., the contributors plus the unemployed. If this ratio increases year over year, then the ratio of $\frac{PQ_{t-2}}{PQ_{t-3}}$ is greater than 1 so there is a reduction in the otherwise calculated increase in the current pension value, because this term appears in the formula as $\left(1-\frac{PQ_{t-2}}{PQ_{t-3}}\right)$.

Note that this demographic dependency ratio is not only affected by retirement practices and life expectancy but also by labor force dynamics such as retirement practices and participation rates. However, the full amount of this reduction is not applied—it is modified by a sustainability parameter α. In effect, α shares the burden of the adjustment between pensioners and workers. If α were 1, then pensioners would bear the whole burden of the adjustment. If α were 0, then pensioners would not bear any impact of a change in demographic dependency ratio. (α is now equal to 0.25.)

Legros (2006) refers to this mechanism to adjust the value of the current pension as the reverse spring mechanism. If the current pension value increases by more than the system can support financially, then the contribution rate would have to rise in a subsequent year. The consequence of a contribution increase in a subsequent year would be that the increase in current pension value

subsequently would be moderated, i.e., if the contribution rate, τ, is raised in $t-2$ and given that $\tau_{t-2} \geq \tau_{t-3}$ then the ratio $\left(\frac{1-\delta_{t-2}-\tau_{t-2}}{1-\delta_{t-3}-\tau_{t-3}}\right)$ is less than 1 and PV_t is less than PV_{t-1} (all other things being equal). (However, contribution rates are scheduled and could only change by legislative action, so Legros' description is somewhat idealistic.)

The German system contains some important features that will produce greater financial stability, as follows:

- the gradual increase in the normal retirement age that will reduce the financial pressure created by increasing life expectancy
- the method of adjusting the value of a current pension point shares the burden of any financial balance between workers and contributors in the following ways:
  (1) in the absence of other factors, the pension's value would increase by the rate of increase in average wages, on a lagged basis, net of (deemed) pension contributions; hence, if the contribution rate increases then the rate of increase in the current pension value is dampened
  (2) by including a factor that is based on the demographic dependency ratio, the rate of pension value increase is dampened when the demographic dependency ratio is increasing, on a lagged basis;
  (3) the sustainability parameter shares the adjustment between pensioners and workers; at present, pensioners bear 25 percent of the adjustment but the sustainability parameter could be changed.

2.3 Important Adjustment Components

Although the ABM of the Swedish SSRS refers specifically to the application of the ratio of assets to liabilities, when assets are less than liabilities, to reduce the rate credited to accounts and the rate of indexing of pensions, there are other components that make adjustments and help to maintain or restore financial balance. This is true also for the German adjustment mechanism. This subsection identifies two such components and indicates why they are important.

1. **Adjusting the age of full-benefit entitlement**—As shown in Table 1, the age for full-benefit entitlement is gradually increasing in the Swedish SSRS. It is age 65 for the cohort born in 1940 and is increasing by approximately 3 months for each cohort that was born at a 5-year interval

later than 1940, i.e., in 1945, in 1950, etc. Such an adjustment has a doubly favorable impact on the financial status of the SSRS. Raising the age of full-benefit entitlement both reduces the expected period for which benefits will be paid and extends the period for which contributions are made. The amount by which the age of full-benefit entitlement is raised is designed to be approximately actuarially equivalent among cohorts.

2. **Basing pensions on the average increase in wages**—Both the Swedish and the German SSRS include a factor to adjust pensions, both before and after retirement, by the average increase in wages. For North Americans, such an adjustment may seem odd. In the SSRS of both the United States and Canada, pensions earned prior to retirement are adjusted to reflect general wage growth from the time the pension credit was earned to retirement; however, pensions in payment are only increased with reference to price increases. Most would accept that it is necessary to increase pension credits to retirement to reflect wage growth in order for the replacement ratio at retirement for career pensions to be adequate. However, because the indexing of pensions in payment in respect of price increases maintains the purchasing power of pensions, North Americans tend to think this is an adequate adjustment. In Sweden, Germany and many other countries that have a strong sense of social solidarity, all participants in the SSRS, whether they be active contributors or pensioners, are considered to be entitled to the same adjustment in pensions. In this way, all participants receive the same amount of increases regardless of status. By adjusting pensions in payment by the increase in average wages rather than by the increase in prices, it is likely that the cost to the SSRS is increased. Nonetheless, this approach means that when average wage growth slows, so do pension increases; but when average wage growth is strong, so are pension increases. If the strength of wage growth may be taken as an indicator of the strength of the economy, then the indexing of pensions in respect of average wage growth places some regulation on the increase in pensions that may be afforded.

   This is the theory; however, there is a flaw in how the rate of average wage growth is calculated in both the Swedish and German SSRS. It is calculated simply as the change in wages per capita, between two measurement points. In terms of financial status of the SSRS, what is most important is the amount of wage growth, not the rate of wage growth. In an aging population, in which the number of workers may be declining, there may be pressures to raise wages per capita in order to attract

sufficient workers, which in turn would increase pensions. However, if the number of workers has declined, and there are more pensioners, the rate of increase in pensions is likely to be more than can be sustained financially. Letzner et al. (2004) observes that "when the work force decreases, the average income growth can be higher than the growth rate of the total wage bill and benefits and pension rights will grow faster than the contribution base from which benefits are paid." Hence pensions ought to be increased by the rate of total wage growth and decreased if total wages are declining. Such an approach would mean that pensions would be adjusted in relation to the ability of the SSRS to pay for them.

3.0 SOCIAL SECURITY SYSTEMS AND PRIVATE PENSIONS

This section begins with a discussion of the differences between SSRS and private pension plans. After making the case that due to the risk-sharing arrangements in MEPPs ABM might be applied to MEPPs, this section presents two suggestions to improve the governance and management of MEPPs, regardless of whether an ABM is in place.

3.1 Differences between SSRS and Private Sector Pension Plans

It is important to keep in mind that the ABMs described for Sweden and Germany apply to SSRS, not to private sector pension plans. This section considers the important differences between SSRS and private sector pension plans.

Although it is not a requirement that a SSRS operate on a pay-go basis, most SSRS do so operate. Generally a small buffer fund that is several times annual expenditures is maintained, in order to facilitate administration and because the contribution rate is not exactly equal to the pay-go rate. There are a number of reasons why SSRS use a pay-go basis including:

- it requires the lowest contribution rates or taxes at system inception and in the immediate future after start-up
- there are concerns over how excess funds, if a higher-than-pay-go rate were charged, would be used; e.g., they be might used for political purposes
- there are questions whether there is any meaningful investment differences between an SSRS which charges a pay-go rate or an SSRS

which charges a higher-than-pay-go rate and invests the excess in government securities (or lends the excess funds to the government)
- governments are considered to have unlimited power to raise contributions or reduce benefits so the objective in private sector pension plans, of providing benefit security through funding, is not present or is unnecessary

Secondly, there is generally a greater sense of social solidarity that exists in an SSRS than is present in a private sector pension plan. This means that citizens within an SSRS are generally more willing to accept policies that are redistributive, than are members of a private sector pension plan who tend to have a stronger sense of individual equity.

Finally, there is often a greater willingness of citizens to accept that governments can make changes to SSRS; whereas, members of private sector pension plans and the regulators of such plans frequently think of the plan terms as contractually and legally binding, especially with respect to accrued benefits.

Due to these differences between SSRS and private sector pension plans in how such plans are funded and perceived, it is unlikely that the ABM of Sweden or Germany could just be introduced, without modification, into private sector pension plans in North America.

With respect to private sector pension plans that have been established by an employer in respect of its employees where there have been no union negotiations, I view the contract as having been undertaken unilaterally by the employer and therefore to be contractually and legally binding on the employer, especially with respect to accrued benefits. Furthermore, in most cases the employer retains the right to terminate the contract should it decide that future benefits are unaffordable, for whatever reason. Moreover, in such a situation, I believe that some form of advance funding is appropriate in order to provide adequate benefit security to plan members. Although under this contractual structure I think it is inappropriate to reduce benefits using an ABM, I think it would be appropriate to structure the contract as a flexible pension promise, in which only a floor level of benefits are guaranteed and additional ad hoc benefits may be granted or eliminated. The flexible pension promise will be discussed in another subsection.

However, there are other types of private sector pension plan contracts that involve negotiations and some risk sharing with respect to the pension

promise. For example, in a union-negotiated pension plan where the members are represented by a democratically elected union that has strong bargaining power, I would support the negotiation of an ABM as part of the pension deal. Or, for example, in an MEPP, where the employers' and the employees' long-term livelihood is dependent on the continuing viability of an industry, and not on the viability of a single employer, and where the employees have been represented by a union, and where no party is in a position to terminate the plan, the agreement to apply an ABM could be quite acceptable. Nonetheless, for reasons of benefit security, I would not support abandonment of advance funding in either of these examples. An application of the principle of advanced funding, upon which I would insist, is the annuitization of (basic) retiree benefits. The reason for this requirement is explained in the next section. In this paper, I will examine how ABM might be applied to MEPPs, within a context of advanced funding and annuitization of basic retiree benefits.

3.2 Annuity Purchases

Some of the reasons to recommend annuitization of retired-life pensions follow. If the pension design with flexible pension promises (which will be described in a subsequent section) is in place, it is only the ultimate level of pension that should be annuitized:

- The trustees or plan administrator face a wide variety of risks, many of which cannot be transferred or hedged. When a risk can be appropriately transferred (or hedged), it is prudent to do so. The annuity market provides an appropriate method of risk transfer.
- Retirees have completed a period of service in the industry, earned a pension in respect of that service, and the amount of the pension is readily ascertainable. As a fiduciary charged with the responsibility of securing benefit promises, the trustees or plan administrator ought to attempt to secure the promise by purchasing annuities. (If at a subsequent date, the trustees or plan administrator found, for whatever reason, that benefit payments to the retiree that could once have been secured in full by an annuity must be reduced, the trustees or plan administrator would be in a very awkward situation).
- Certain issues of (perceived) conflict of interest are reduced. (Conflict of interest is a significant concern for MEPPs.) As discussed, there may be reasons why the administrator may wish to take some risk in investment management. In a pension plan in which liabilities of retirees and other

participants are commingled, it is normally not possible, except through an annuity purchase, to segregate the assets so that regardless of the risk exposure of the aggregate portfolio, the portion of the assets attributed to the retirees is secure and unaffected. Consequently, any decision to accept investment risk presents the trustees or plan administrator with a conflict between the interests of retirees and other participants. Conversely, one might argue that failure to accept investment risk might show unreasonable preference for the interest of retirees to the potential detriment of other participants. This situation is obviated by annuitization.

3.3 Flexible Pension Promises

Given the long-term commitment of MEPPs to provide pensions, the imbedded guarantees in the pension plan and the dependence on the ongoing financial health of the industry, I propose that MEPPs build flexibility into their benefit promises. For example, based on financial projections, the trustees would set a long-term benefit level ("the ultimate level") that would be expected to be maintained for all plan participants regardless of the financial position of the plan. Benefit increases above the ultimate level could be granted on an ad hoc basis but the communication would be clear that such benefit increases were not guaranteed and could be revised or eliminated at any time, subject to appropriate notice. Termination benefits would be based on the ultimate level. (This design will be referred to as flexible pension promises).

Suppose that the trustees have conducted studies showing financial projections over a suitable time horizon, say up to 10 years, and next let us examine other risk management issues to be considered within the investment policy. A fundamental premise of asset-liability modeling is that the most predictable financial results will be achieved via an investment policy that matches liabilities with assets of a similar nature, i.e., similar with respect to present value, with respect to timing and amount of payment, with respect to duration and with respect to non-payment due to call or default. Retired lives are the simplest class of liabilities for which to find matching assets. A carefully structured portfolio of zero coupon, real-return and long government bonds can normally match any retired life liabilities. However, I have argued that trustees should not expose themselves or the plan to retiree liability risk. This risk should be annuitized. Longevity risk cannot be hedged or diversified by the MEPP, but it can be by insurers. Granted, insurance companies accepting the annuity could

default, but with careful selection of insurers and diversification of policies among insurers, this risk is minimal.

Suppose that retiree pensions have been annuitized, what asset-liability attributes pertain to the remaining liabilities? Investment policy might be crafted based on whether the liabilities are in respect of active or non-active participants, whether benefits are vested or non-vested and whether benefits are inflation-adjusted, in full, partially or not at all.

Following the arguments of financial economics, one would claim that in an SEPP, where the employer is a publicly traded entity, fully vested accrued benefits should be matched by a suitably structured bond portfolio. I will argue that this claim is not appropriate for all MEPPs, without modification. (The only situation where I would agree that the claim is appropriate, without modification, is one where there is a guaranteed funding source and reduction of benefits cannot occur. There are very few, if any, such MEPPs).

With the flexible-pension-promise design, where the benefit formula for the MEPP contains an ultimate level or floor ("guarantee"), and additional benefits are granted on an ad hoc basis and can be temporary, then it is in the interests of the participants for the trustees to attempt to manage the investments and the plan in such a way that ad hoc increases can be granted. Furthermore, to meet fiduciary obligations, the trustees should grant increases on an ongoing basis that are viewed as appropriate, i.e., reasonable in view of the financial position of the plan judged over an appropriate time frame, and which are equitable among classes of members. One might consider the classes to be defined by the period when the participants receive benefits from the plan. To clarify, Trustees that did not grant any ad hoc increases for several decades when there was surplus and then granted ad hoc increases creating a deficit, might be viewed to be acting inappropriately and not maintaining equity among cohorts of participants.

On the basis of this argument, given that the floor (guaranteed) benefits have been suitably matched by relatively risk-free investments, then investment policy should permit risk-taking and should provide guidance on the risk-taking that is permissible and desirable. In this regard, the trustees face the issue of what target they should attempt to achieve through riskier investments. There is no single answer for all plans as the answer should be based on the level of the floor pension, the amount of "excess assets" available for investment and the projections for future cash flows, changes in demographics, economic

opportunities, future of the industry and financial position of the plan. However, within this analysis it is helpful to have a target by which to assess proposed investments, which might be the desired replacement ratio of pre-retirement income.

To attempt to make this example more concrete, suppose that the floor benefit has been set at $15 per month per year of service and it is expected that a typical career in the industry, that is worthy of a full pension is 30 years, then the floor pension is $450 per month or $5,400 per year. Let us suppose further that government pensions can be expected to provide approximately $10,000 per year, and that the average wage in the industry for workers retiring with 30 years of service is $60,000. To assist in assessing the various alternatives, the trustees might decide that it is reasonable to attempt to deliver, from all sources, an indexed pension starting at $30,000 per year after 30 years of service, i.e., a 50 percent replacement ratio. Hence there would be a need to attempt to deliver ad hoc inflation adjustments to the floor pension of $5,400 and to attempt to provide additional ad hoc increases of $14,600 per annum that were inflation adjusted. While this might be a completely unrealistic objective given the other circumstances of the plan, it illustrates how a framework for establishing investment policy could be developed.

With respect to risky assets that might be considered for use with other than the floor benefits, one might consider equities, real estate, hedge funds, structured products, income trusts, etc. A careful analysis of the risk-return characteristics of each asset class should be conducted in the context of the financial projection model of the plan. Not only should the diversification effect of combining asset classes be examined, but the measures of correlation between asset class returns and plan and industry cash flows should be examined. For example, if the plan is for workers in the auto industry, investments that show positive return patterns when oil and gas prices rise (call them Oil-Gas-Plays) could provide some counter-cyclical benefits. Plan cash flows might decrease and industry layoffs might increase, both with negative financial implications for the plan when oil and gas prices rose, but this would be partially offset by favorable investment returns. Of course, the analysis should include liquidity constraints, i.e., if Oil-Gas-Plays are not liquid investments then other sources of liquidity should be present in the event oil and gas prices rise.

This brings us to a very important and related point. Investment policy should be developed based on an analysis of the industry. The financial status of the plan will be heavily affected by the fortunes of the industry and the

industry's business cycle, and by the life-cycle (maturity-status) of the participating employers. This is a major risk to be hedged or diversified. In this regard, to the extent that credit derivative products for the industry are available or can be constructed, they should be included in investment policy. Another idea in this regard would be to invest in contingent assets, such as letters of credit triggered in the event of insolvency of a participating employer and secured by a strong financial institution.

4.0 DEVELOPING AN ABM FOR MEPPS

This section discusses how the ABMs of Sweden and Germany could be adapted to apply to MEPPs. The penultimate subsection identifies a critical difficulty with respect to the long-term financial viability of MEPPs, namely its dependence on the financial health and state of maturity of the industry. Suggestions are made for the purpose of generating ideas and discussion on how this dependence could be addressed. The last subsection identifies regulatory concerns that may need to be addressed before ABMs could be applied to private sector pension plans.

4.1 Adapting the Swedish ABM

The Swedish ABM has been designed to be used in an NDC system. Whitehouse (2006) and others have noted that on certain assumptions regarding wage growth and interest rates, the benefit formula for an NDC and a career-average-earnings DB plan, with earnings upgrades, are the same mathematically. As such, it could be most easily adapted for use with a defined contribution style of MEPP. In this design, contributions would be as negotiated. A rate to credit to account balances would be selected equal to the average annual rate of increase in industry wages. The account balances would be converted to a basic pension at retirement using a 0 percent interest rate but allowing for increasing life expectancy, as is done in Sweden. The basic pension benefit would not include indexation. An annuity in respect of the basic pension benefit would be purchased from a strong financial institution. The actual contributed funds would be invested, administrative expenses paid and annuities purchased. The first obligation with any excess funds would be to provide ad hoc indexing on basic retiree benefits in respect of the full increase in the average wage.

If there were excess funds, then the plan would be considered to be operating appropriately and to be well funded. If this situation persisted over

long periods and significant excess funds developed, then, on the recommendation of an actuary, the rate credited to account balances could be increased.

If there were insufficient funds to provide ad hoc indexing on basic retiree benefits in respect of the full increase in the average wage, then the ABM would be triggered. It would be applied proportionately to reduce the rate of indexing and the rate credited to account balances. In the Swedish system, this proportionate calculation is complicated because the accounts are notional, so assets must be estimated. In respect of private sector pension plans, assets are real and actual, so the proportionate calculation is not quite so complicated. The Swedish ABM applies the ratio of assets to liabilities (as those terms are defined in that system), when such ratio is less than 1, to the rate credited to the notional accounts and to the rate of indexing of pensioner benefits. Mathematically, this approach is flawed, but it is a relatively close approximation when the rates are small so that 1 plus the rate is still close to 1. However, I would propose that the correct mathematical adjustment be made. It is not as simple to state or explain as the approach adopted by Sweden, but in this era of significant computing power it would be straightforward to determine the correct adjustment factor. That factor would be found by solving the following equation.

Assets_t = Adjusted Liabilities_t

$$\text{Adjusted Liabilities} = \sum_{\substack{\text{nc}_t \\ \text{sc}_t}} \text{adjusted}\, A_t + \sum_{np_t} \text{adjusted}\, P_x\, ep_x$$

but $$\text{adjusted } A_t = \text{unadjusted } A_t\left(A_{t-1}, C_t, T_t, \text{adjusted}\, r_t\right)$$

and $$\text{adjusted } P_x = \text{unadjusted } P_x\left(np_t, P_{np_{t-1}}, \text{adjusted}\, \pi_t, e_t, D_t\right)$$

where the symbols are defined as follows

Accounts

$A_t\left(A_{t-1}, C_t, T_t, r_t\right)$	Account at time t depends on account at time $t-1$,
$A_t \geq 0$	contributions at time t, the withdrawals T_t, and the
$C_t \geq 0$	rate credited to accounts r_t
$T_t \geq 0$	
$r_t \varepsilon R_n$	

Consumption

$P_t\left(np_t, P_{np_{t-1}}, \pi_t, e_t, D_t\right)$ Pensions at time t depend on np_t the number of pensioners at time t, the average pension the previous year $P_{np_{t-1}}$, the increase rate in the pension π_t, the number of new entrants to pension status e_t

$np_t \geq 0$ and pensioners deceased D_t, where $\ddot{a}_t$ is the annuity factor to convert entrants' accounts to pensions

$P_{np_{t-1}} > 0$

$P_{e_t} = \frac{A_t}{\ddot{a}_t}$

and the same adjustment factor would be applied to r_t as is applied to π_t.

ep_x represents the remaining life expectancy for a pensioner age x.

In the event that financial balance is restored and assets exceed liabilities in the Swedish SSRS after a period when the ABM has been applied to reduce the rates credited to accounts and to provide indexing, then the rate credited to accounts is increased, to the extent affordable, to a maximum of the rate that would have been credited had the ABM not been triggered. A similar approach could be applied to private sector pension plans.

4.2 Adapting the German ABM

A more typical type of benefit structure for MEPPs, than the DC-type structure discussed above, is a structure with defined benefits and a negotiated contribution rate. In North America, the defined benefits seldom include contractual post-retirement inflation protection; although, in Canada, it is not uncommon for retiree benefits to be upgraded periodically on an ad hoc basis. It is then the responsibility of the trustees, with advice from the actuary, to determine whether the benefits can be delivered or whether some modification to those promises is required. The trustees do not have the ability to change the contribution rate; although, the contribution rate may be changed from time to time through the collective bargaining process. For this type of benefit structure the ABM of the German system could be more easily adapted than could the ABM of the Swedish system.

The German system includes a sustainability factor that may be used to adjust benefits and which shares the burden of adjustment between active members and pensioners. In theory, if these adjustments were insufficient to achieve financial balance, then the contribution rate would be increased. In practice, contributions are set in legislation and only change if so legislated. This situation is very similar to MEPPs because contribution rates only change if negotiated and negotiations only take place at intervals of a few years. In the following paragraphs, we examine how the German sustainability factor might be adapted for MEPPs to provide for benefit reductions.

As noted above, the sustainability mechanism operates as follows:

$$PV_t = PV_{t-1}\left(\frac{AGI_{t-2}}{AGI_{t-3}}\right)\left(\frac{1-\delta_{t-2}-\tau_{t-2}}{1-\delta_{t-3}-\tau_{t-3}}\right)\left(\left(1-\frac{PQ_{t-2}}{PQ_{t-3}}\right)\alpha+1\right)$$

For the purpose of the current discussion let us ignore the δ_{t-2} factors since MEPPs typically do not have voluntary contributions to provide additional pensions. The τ factor would represent the contribution rate to the MEPP. The AGI_{t-2} factor would apply to recognize wage differences. The primary adjustment factor would be $\left(1-\frac{PQ_{t-2}}{PQ_{t-3}}\right)$. PQ introduces a demographic dependency ratio of the number of pensioners to the number of non-pensioners, i.e., the contributors plus the unemployed. Such a ratio would be appropriate in an MEPP where unemployed members in the industry provide both a measure of the potential for contributions and also the potential for pensions. In a growing industry in which the rate of employment opportunities is growing faster than the rate of retirements $PQ_{t-3} > PQ_{t-2}$ and pensions would be increasing. In a stagnating industry or in an industry in which life expectancy increased faster than job opportunities,
$PQ_{t-3} < PQ_{t-2}$ and pensions would be decreasing.

There are several problems with this adjustment mechanism. First, it does not ensure financial balance. The adjustments to the benefits are not connected directly to the amount by which the system is out of financial balance, so even after the mechanism has been applied, the system may still be out of financial balance. There are two adjustments that could be made to bring the system into financial balance, as follows: the sustainability parameter, α, could be changed, which adjusts the burden borne by pensioners; the contribution rate could be changed. Note, however, that neither of these adjustments is automatic. If it were desired to apply the German mechanism but to make the adjustment automatic,

one could borrow from the Swedish ABM and multiply the already adjusted PV_t by the ratio of assets to liabilities, if assets are less than liabilities.

A second problem arises because I have recommended that all pensions be annuitized. If annuities have been purchased, then the application of the sustainability factor will have no impact. I will return to this issue later when I discuss flexible pension promises and methods to reflect the state of maturity of the industry.

4.3 Making an Adjustment for Industry

Suppose that the flexible-pension-promise design has been adopted, that a very sound investment policy is in place with respect to the floor benefits and that at a participant's retirement, an annuity would be purchased in respect of the floor benefits. With respect to the non-floor benefits, for both active lives and pensioners, a balancing mechanism similar to the German system could be applied. The first adjustment would be to the value of benefits using the expression:

$$PV_t = PV_{t-1}\left(\frac{AGI_{t-2}}{AGI_{t-3}}\right)\left(\frac{1-\delta_{t-2}-\tau_{t-2}}{1-\delta_{t-3}-\tau_{t-3}}\right)\left(\left(1-\frac{PQ_{t-2}}{PQ_{t-3}}\right)\alpha+1\right)$$

For most MEPPs, no additional voluntary contributions would be made, so δ_{t-2} and δ_{t-3} would both equal zero. The sustainability parameter, α, could be selected to share the burden of adjustment between the active lives and pensioners, as desired by the trustees. However, the non-floor benefits would be adjusted to reflect wage growth, through the ratio of AGI_{t-2} to AGI_{t-3}. As noted in subsection 2.3, the adjustment should be in respect of the change in total covered wages between periods, not in respect of the growth of average wages, as is done in the German ABM. The non-floor benefits would also be adjusted by the change in the dependency ratio through the term $\left(1-\frac{PQ_{t-2}}{PQ_{t-3}}\right)$. As noted previously, the application of these adjustments does not ensure that financial balance would be achieved; further adjustments are required. Other possible adjustments are: the contribution rate could be increased, which is not likely a viable option in a collectively bargained plan; the non-floor benefits could be reduced further by multiplying by the ratio of assets to liabilities, if assets are greater than liabilities.

For the long-term viability of an MEPP, it is necessary to consider the financial health of the industry. Although not an example with respect to an MEPP, Lowenstein (2008) makes this point very clearly in his description of the history of negotiated pensions at General Motors. In 1950, when pensions were first negotiated at GM, the post-war economy was strong, families were purchasing cars, GM had more than a 50 percent share of the market, the level of initial pensions negotiated was low and initially there were no pensioners. During the period to the early '60s, the economy continued to be strong, especially for car sales as many families moved up from being one-car families to becoming two-car families; GM was reluctant to have a strike stop production so it agreed to improve pensions at each negotiation, including improving early retirement provisions. By 1977 GM's market share had shrunk to 45 percent and by 1987 it had plummeted to 35 percent. Not only had pensions continued to increase, but also there were now a large number of pensioners. By the late '90s, GM's market share fell below 30 percent; there were 180,000 active hourly employees and 400,000 retirees.

There are many other reasons that GM got into financial problems with respect to its pension plans, including: for many years, lack of a proper accounting method for treating pension obligations; continual underfunding of the plan; failure to recognize the long-term costs associated with pension commitments; desire to continue production regardless of the longer term implications of the negotiated settlement. Nonetheless, an important point to recognize, which is very significant for MEPPs, is that the industry can change over time and the health of the pension plan is dependent on the health of the industry and on the degree of maturity of the industry. An appropriate balancing mechanism needs to make adjustment for the economic state and degree of maturity of the industry. The factor $\left(1-\frac{PQ_{t-2}}{PQ_{t-3}}\right)$ makes some adjustment for changing demographics and the sustainability parameter, α, allocates the burden of adjustment between active lives and pensioners, but neither adjustment recognizes the long-term financial picture or the state of maturity. It is difficult to devise a suitable adjustment to reflect these factors. The following suggestions are made to generate discussion of what the appropriate adjustment should be:

- Suppose that an analysis has been done that indicated that the plan would be financially viable if the market share of the participating employers, in aggregate, was 40 percent. Then when aggregate market share exceeds 40 percent, funds should be held in reserve and when market share is less than 40 percent, the reserves should be available to be drawn. For

example, when aggregate market share is 50 percent, then 20 percent of contribution income might be held in a reserve and benefits would be determined only with respect to 80 percent of the contribution income, i.e., 40%/50% = 80%.

- To reduce the impact of changing demographics, annuities should be purchased in respect of floor benefits for retirees; however, there will still be some impact of changing demographics in respect of non-floor benefits. One way to share the burden of the changing financial position of the industry would be to calculate the liabilities with respect to non-floor benefits using an interest rate applicable to bonds issued for major employers in the MEPP. When the industry is strong financially, bond interest rates would be lower, the present value of liabilities would be higher, so fewer non-floor benefits would be granted. When the industry is weak financially, bond interest rates would be higher, so the present value of liabilities would be lower. Effectively more non-floor benefits could be granted but both retiree and active life non-floor benefits would have a greater (credit) risk of not being realized.

  To many, especially regulators, this suggestion is likely horrifying. One implication is that greater non-floor benefits would be granted when the industry is weaker financially. The purpose of this suggestion is to try to break the typical industry cycle with respect to the granting of more generous benefits. When the industry is growing generous benefits are affordable and are granted; however, these benefits may become unaffordable when the industry matures. By using a lower interest rate that reflects the financial strength of the industry during the period of growth, the benefits may be affordable for a longer period. This suggestion is problematic but it is intended to draw attention to the issue of industry dependence, so that a viable solution can be found.

4.4 Regulatory Issues

To this point, adjustments to pensions have been considered without reference to regulation; however, pensions that benefit from tax assistance are heavily regulated, so it is important to identify regulations that would need revisions in order to be able to implement the ideas in this paper.

First, the main purpose of an ABM is to make adjustments to the system so that financial balance is achieved. In theory, this means raising contributions or decreasing benefits. In practice, the way that the ABMs of both Sweden and

Germany operate, this means decreasing benefits (and in the case of Germany may also include raising contributions). Most regulators, other than those only interested in tax, are averse to having accrued benefits decreased. They may permit reduction to the accrual rate for future benefits or they may permit pensions in payment to be indexed on an ad hoc basis so the amount of adjustment can be determined (and varied) each year, but they do not permit the reduction of accrued pensions. In the German ABM, the value of pension benefits is adjusted each year. In the Swedish ABM, as it is applied, only the rate credited to accounts in the year and the rate to be credited to pensions are revised. One could argue that such adjustments are merely part of how the rate to be credited is determined so that accrued benefits are not reduced; however, as identified earlier, such an adjustment is only a mathematical approximation that does not bring about financial balance. If the correct mathematical adjustment were used then accrued benefits might be reduced. The adjustments proposed for the financial health and state of maturity of the industry require an adjustment to accrued benefits and may also result in a reduction in the benefit security of accrued benefits. As such, they will be subject to tight regulatory scrutiny.

Second, some regulators would not approve of the flexible-pension-promise design, for any or all of the following reasons: it does not provide for a uniform accrual of benefits; it may result in margins or contingency reserves developing; it may result in unacceptably high levels of surplus; it may provide for termination benefits that are less than the value of accrued benefits; and it may provide for increases in pensions in payment that exceed acceptable limits.

Third, the flexible-pension-promise design may not be acceptable to Canadian tax authorities because it may be difficult to calculate the Pension Adjustment (PA), which represents the deemed tax assistance. In the case of SEPPs, the floor pension benefits might be provided by the employer and employees might be given the option to contribute should they wish to enhance the floor benefits. If the enhancements were only in respect of ancillary benefits, such as survivor benefits, early retirement provisions and indexing, and not through pension increases, this would be a highly tax efficient arrangement in Canada, because the PA would not be increased in respect of the additional ancillary benefits.

5.0 CONCLUSIONS

Both the Swedish and the German SSRS have interesting features in their ABMs that make them worthy of consideration. Although the Swedish ABM works better than the German ABM to attempt to achieve financial balance, neither of these two approaches is successful in achieving financial balance. This paper has included suggestions on how these ABMs could be modified to achieve financial balance.

Both of these ABMs have been developed for SSRS. With respect to the adaptability of these ABMs to private sector pension plans, I have argued that both might be adapted and applied to MEPPs. Due to the unilateral nature of the contractual promise for SEPPs, I have argued that the use of ABMs is inappropriate.

It is important to note that both the Swedish and German adjustment mechanisms include adjustment components other than the ABM. These components, adjusting the age of full-benefit entitlement and increasing all pensions in relation to wage growth, help to improve financial sustainability in the case of the former adjustment, and relate the growth of pensions to the ability of the system to support growth in the case of the latter adjustment, if the adjustment for wage increases is revised as suggested in this paper.

Because MEPPs are dependent on the financial condition of a single industry, their financial ability to operate will vary over time, depending on the financial health of the industry and on its state of maturity. It is important to develop adjustment factors to take into account the state of the industry. Two suggestions have been made in this regard. It is hoped that these suggestions generate discussions on how best to make such adjustments, rather than being treated as definitive proposals or being dismissed as impractical.

Finally, before ABMs can be introduced to private sector pension plans, it is likely that regulatory change will be required. This paper has identified some of the areas that may require change.

In summary, in SSRS and in MEPPs, which are very long-term undertakings that involve imbedded guarantees and where there is risk-sharing among participants, it is likely that there will be financial stresses over time that may not be bearable according to the original design of the system. In these

contexts, the ABM and other adjustment components provide reasonable and innovative methods of adjusting the system to achieve financial balance. This paper has only considered the Swedish and German ABMs and has only considered the perspective of financial balance. There are other ABMs that exist and likely others that will be created and these also warrant consideration. Also, since an adjustment to the original design of the system changes the contractual commitments between cohorts of participants, such an adjustment raises issues of equity. In designing an ideal ABM, both financial and equitable balance should be considered.

6.0 BIBLIOGRAPHY

Andrews, D. 2008a. A Framework for Enhancing the Management of Multi-Employer Pension Plans. Paper to be presented at the CIA Stochastic Modeling Symposium in Montreal, Canada

----------. 2008b. *A Review and Analysis of the Sustainability and Equity of Social Security Adjustment Mechanisms*. University of Waterloo. Waterloo, Canada, 148 (publication pending).

----------. 2006. Extending ERM to Multi-Employer Pension Plans. Paper presented to the Society of Actuaries' ERM Symposium

Borsch-Supan, A.H. and C.B. Wilke. 2006. The German Public Pension System: How It Will Become an NDC System Look-Alike. *Pension Reform: Issues and Prospects for Non-Financial Defined Contribution (NDC) Schemes,* R. Holzmann and E. Palmer, Eds. The World Bank, Washington, D.C., 573–610.

Legros, F. 2006. NDCs: A Comparison of the French and German Point Systems. *Pension Reform: Issues and Prospects for Non-Financial Defined Contribution (NDC) Schemes,* R. Holzmann and E. Palmer, Eds. The World Bank, Washington, D.C., 203–222.

Letzner, P. and O. Tippelmann. 2004. A German Perspective of the New Swedish Public Pension System. *Scandinavian Insurance Quarterly,* 315–325.

Lowenstein, R. 2008. *While America Aged.* The Penguin Press, New York, N.Y., 274.

Settergren, O. 2003. Financial and Inter-generational Balance? An Introduction to How the New Swedish Pension System Manages Conflicting Ambitions. *Scandinavian Insurance Quarterly*, 99.

Toft, C. 2007. The Transformation of the German Public Pension System and the Future Pension Benefit Level. Paper. Helsinki, Finland. www.uni-kassel.de/~toft/.

Whitehouse, E. 2006. New Indicators of 30 OECD Countries' Pension Systems. *Journal of Pension Economics and Finance* 5, 275–298.