

**Hybrid Pensions:
Risk Sharing Arrangements for Pension Plan
Sponsors and Participants**

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Pension Section Research Committee**

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Abstract

Because of the proliferation of types of hybrid plans and their growing importance, this paper evaluates a number of hybrid pension plans, including hybrid plans used to provide social security benefits in some countries. The paper provides an overview of types of hybrid plans provided around the world. Most of the hybrid plans are fairly new, but some have been in existence for many years, and some have not been developed but are proposals. The paper describes in depth as case studies four different hybrids: the hybrid DB plans in the Netherlands, where participants and retirees face benefit cuts if funding falls below a certain level; the nonfinancial DC plan in Sweden, which is the main part of social security and is similar in some respects to an unfunded cash balance plan but includes life expectancy indexing of benefits; cash balance plans in the United States, Canada and Japan, and the Riester plans in Germany, which are DC plans that involve a rate of return guarantee. The paper describes in less depth a broad range of hybrid plans that have been developed in different countries or that have been proposed. These plans are categorized as to the risks transferred to participants. Lastly, the paper constructs a risk index for further categorizing hybrid plans. In an appendix, the paper presents a survey of the types of hybrid pension plans used in a small selection of countries.

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I. INTRODUCTION

Employers are reducing the pension risks they bear. They have done so in at least three ways. First, they have shifted pension provision from defined benefit (DB) plans to defined contribution (DC) plans. Second, they have engaged in pension de-risking techniques, such as by selling their DB pension liabilities to insurance companies and by offering lump sum payments to their participants and retirees. Third, they have shifted from traditional DB plans to hybrid plans. At the same time, some hybrid DC plans have been developed with guarantees that shift risks away from participants. This paper focuses on the development of hybrid plans.

The most common type of hybrid plan in the U.S. private sector is the cash balance plan. Pension equity plans are used to a considerably lesser extent, with some other hybrids also being used (Hill et al. 2010). Some state governments, which are not constrained by ERISA (U.S. private sector pension law), have adopted hybrids that are DC plans incorporating guarantees or are DB plans where the participant contribution depends on the funding status of the plan (Neumann 2010). Around the world, numerous types of hybrid pension plans are in use, and even more have been proposed by pension experts.

Because of the proliferation of types of hybrid plans and their growing importance, this paper evaluates a number of hybrid pension plans, including hybrid plans used to provide social security benefits in some countries. Most of the hybrid plans are fairly new, but some have been in existence for many years, and some have not been developed but are proposals.

The paper describes in depth as case studies four different hybrids: the hybrid DB plans in the Netherlands, where participants and retirees face benefit cuts if funding falls below a certain level; the nonfinancial DC plan in Sweden, which is the main part of social security and is similar in some respects to an unfunded cash balance plan but includes life expectancy indexing of benefits; cash balance plans in the United States, Canada and Japan; and the Riester plans in Germany, which are DC plans that involve a rate of return guarantee. The paper describes in less depth a broad range of hybrid plans that have been developed in different countries or that have been proposed. These plans are categorized as to the risks transferred to participants. Lastly, the paper constructs a risk index for further categorizing hybrid plans. In the appendix, the paper presents a survey of the types of hybrid pension plans used in a small selection of countries.

II. WHY HYBRID PLANS?

The decline in DB plans and growth in DC plans in the United States, Canada, United Kingdom, Ireland, Australia and elsewhere suggests the need for new risk sharing arrangements. New risk sharing arrangements may provide better sharing of risks for both participants and plan sponsors. Past efforts by government policymakers to reduce the risks that participants bear in DB plans, for example by changing minimum vesting standards, may have reduced employers' willingness to offer them.

The viability of employer-provided pension plans in the future may depend in part on a new distribution of risk bearing between employers and participants. The shift toward hybrid plans may indicate changing perceptions by employers of their responsibility for risk bearing for workers versus the individual responsibility of workers. They are shifting risks to participants. Some employers considering terminating a DB plan, however, may consider hybrid plans desirable because employers bear less risk, even though not all the risk is shifted to participants. Employers offering DC plans may consider hybrid plans desirable because of the well-documented problems that participants often have with the decision-making required of them in DC plans.

Pension plans incorporating hybrid risk-sharing approaches combine aspects of DB and DC plans. Hybrid DB plans preserve positive aspects of DB plans for participants while reducing some risks that employers face. The risk sharing can be between participants and employers, but it can also be risk sharing among participants, or it can be split between active participants and retirees.

III. FOUR ASPECTS OF RISK

This paper focuses on four aspects of risk affecting pension plans—(1) investment risk, (2) longevity risk, (3) interest rate risk and (4) inflation risk. A more expanded discussion including other risks is provided in a later section.

Risk bearing relates to the bearing of costs in different situations where the outcome in the future is uncertain, for example, with respect to longevity. In some situations, the costs may be borne by employers. Ultimately, however, economic theory holds that in the long run, costs are borne by employees through lower wages as an outcome of competition for jobs and workers in the labor market (Pugh and Yermo 2008). Some risks going forward may be initially borne by employers but later shifted to workers. For example, an unexpected decrease in mortality could initially be borne by the employer in a DB plan but later become a cost borne by future workers, when the outcome of improved longevity is built into the expected future costs of the plan. This issue as to the ultimate bearing of costs is not pursued here, where the focus is on the bearing of risks (and costs) in the short run. Another topic that is touched on but is not explored in depth is the sharing of risks across generations of workers.

Investment risk is the risk inherent in financial markets that investments may not perform as expected. Traditional DB plan sponsors generally bear all the financial market risk associated with the plan because the benefits promised to participants are not linked to the financial performance of the underlying pension assets. However, the indexation of benefits in payment may be tied informally to the investment performance of the plan's assets, shifting some risk to retirees.

Longevity risk is the risk that participants will live longer than expected. This risk is pooled and borne by the plan sponsor in DB plans because those plans generally provide annuitized benefits.

Interest rate risk is the risk resulting from the unpredictable cost of annuities due to swings in interest rates. Annuities provide an element of insurance because retirees are guaranteed benefits as long as they live. If an account balance is converted to an annuity at a higher interest rate, the resulting annuity will be larger. Interest rate risk typically does not arise for participants in traditional DB plans that do not offer lump sum benefits because those plans provide benefits based on a formula, and the benefits they provide are not affected by changes in interest rates at retirement. It does occur, however, for defined benefit plan participants who take lump sum distributions. Interest rate risk does affect employers by affecting the value of pension liabilities in DB plans and by affecting the value of bonds they hold. It affects employers and employees by affecting the value of lump sum benefits.

Inflation rate risk for participants is the risk that inflation will reduce the real value of benefits in payment or that it will reduce the real value of accrued benefits for participants in DB plans. In a DB plan, inflation can reduce the real value of accrued benefits if it reduces the real value of the earnings base used to calculate those benefits. This effect can happen in a career average DB plan when the wages used to calculate the career average are not fully revalued for inflation. In a DB or DC plan that provides an annuity, generally pension annuities are not fully indexed for inflation, and often no indexing is provided.

While the next several sections focus on risk bearing relating to these four risks, the discussion is not limited to those risks, and other risks will be discussed where different risk sharing arrangements have been developed.

IV. NON-HYBRID VERSUS HYBRID PLANS

To provide a baseline for comparison, this section discusses the risk bearing characteristics of non-hybrid DB and DC plans. DB plans base benefits on a formula that usually involves the participant's years of service and earnings. Examples of types of DB plans include final salary plans, where the benefit is based on the last few years of earnings, and career average plans, where the benefit is based on the average of earnings over the participant's career. DC plans are retirement savings plans where the participant accumulates assets in an individual account. The most prominent example of DC plan in the United States is the 401(k) plan, where the participant generally has the option to contribute on a pre-tax basis, and where the employer may contribute based on the participant's contribution.

In this paper, non-hybrid DB and DC plans are defined in terms of whether the employer or the participant bears all of the four risks described above—investment risk, interest rate risk, longevity risk, and inflation risk. A non-hybrid DB plan would be one where the employer bears all those risks. A non-hybrid DC plan would be one where the participant bears all those risks. With these two basic plan types as extremes, these risks can be shared between employers and participants in many different ways. In theory, a continuum exists between these two extremes, with different hybrid plans falling at different points along the continuum.

Hybrid DC plans usually involve a rate of return guarantee. Because rate of return guarantees for DC plans have been extensively discussed elsewhere (Turner and Rajnes 2001, 2003, 2006), they are discussed here only briefly.

The positive features of both a DB plan and a DC plan can be achieved by an employer providing both a DB plan and a DC plan (Wesbroom and Reay 2005). These combinations of two plans are often called hybrids in Canada, and are sometimes called hybrids in the United States, particularly when describing state and local government plans. This report does not consider such arrangements of two separate plans provided by the same employer, but rather focuses on hybrid features contained within a single plan or within two plans that are explicitly coordinated in terms of risk bearing.

V. NON-HYBRID PLANS WITH HYBRID RISK SHARING FEATURES

The remaining sections of the paper focus on discussing and categorizing different types of hybrid plans. That discussion begins by considering some plans that are not normally considered as hybrid plans, but that nonetheless have, or may have, hybrid risk-sharing features.

A. 401(k) Plans

Normally, 401(k) plans are not considered to be hybrid plans. However, in some plans the employer matching contribution varies depending on how well the employer's business is doing, and declines during periods of economic stress. Thus, the participant is sharing some of the employer's risk in these plans, which are often qualified as profit sharing plans. In addition, while 401(k) plans typically do not offer annuities as an option, providing an annuity could be considered to be a hybrid or DB feature of a DC plan.

B. Defined Benefit Plans

Generally, U.S. DB plan participants bear inflation risk after retirement because U.S. private sector employer-provided DB plans rarely provide inflation indexing of benefits. That is not the case in the U.K., where indexing of benefits in payment is required. In DB plans offering lump sum benefit options, longevity risk is shifted to those separated participants taking that option, making the plans more like DC plans from the participant's perspective.

When DB plans are in distress, some risks may be transferred to participants or retirees. With a distress termination in the United States, the Pension Benefit Guaranty Corporation (PBGC) insurance does not fully insure the benefits of some high earners, so that they bear some funding risk as well as the risk of employer bankruptcy. With employer bankruptcy, even if the participant receives the full value of benefits accrued to date, the participant still bears a risk that is equivalent to portability risk, which occurs due to having benefit accruals ended before retirement, with no indexing for inflation up to retirement.

In the United States, if the funding level of a DB plan falls below 60 percent by one funding measure, the plan must cease accruing benefits, shifting risk to participants through the cessation of accruals.

In public sector DB plans, part of the cost and risk is borne by participants through employee tax deductible contributions that may be increased to deal with problems of underfunding. That mechanism for risk bearing by participants is also part of DB plans in Canada, the United Kingdom, and a number of other countries, but not in the U.S. private sector.

In some countries, retirees may bear part of the risk of DB plans, through adjustments in their benefits. As explained later, in the Netherlands, the indexation of accrued benefits for workers and the benefits in payment for retirement is linked to the funding level of the pension plan. Even nominal accrued benefits can be reduced in Portugal if the pension plan is in financial difficulty, or in Japan if both the pension plan and the sponsoring employer are in financial difficulty. In the United States, pension plans must eliminate lump sum benefits and freeze accruals if their funding falls below a certain level (Pugh and Yermo 2008). In addition, the employer can elect to freeze accruals at any time, as long as it meets all the legal standards to do so.

VI. FOUR CASE STUDIES

This section considers in detail four types of hybrid pension plans. Later sections survey numerous other hybrid plans in less detail.

A. Hybrid Plans in the Netherlands

Since the year 2000, the pension system in the Netherlands has changed dramatically.¹ Traditionally, most pension plans in the Netherlands were DB plans. Before the stock market downturn in 2000-2001, many plans were final salary DB plans. Thus, employers bore most of the risk in the workplace retirement plan system. Since the stock market decline of 2000-2001, employers have modified the workplace retirement plans they provide, shifting risks to participants.

Career Average DB Plans with Conditional Indexation. Risk bearing was first shifted to participants when employers converted from final average pay DB plans to career average benefit plans with conditional indexation. An unusual aspect of this conversion is that it occurred not only for new benefit accruals but also for benefit rights already accrued. In the early 2000s, roughly a third of DB plans were final average pay plans (Whitehouse 2007). Within a few years, a majority of DB plans had been converted to career average plans. At the end of 2008, 87 percent of pension participants were in career average plans (Verheijden 2010). As of 2012, most DB plans based benefits on

¹ This section is derived in part from Turner and Rhee (2013).

career average earnings, with only one percent of DB plans basing benefits on final average earnings (IBIS 2012).

Risk Bearing in Career Average DB Plans. In the career average DB plans in the Netherlands, the indexing of the career averages to keep pace with inflation is contingent on how well the plan is funded, which is a way of shifting investment risk from employers to participants. It also shifts from employers to participants the risks of mortality and interest rate changes that affect the value of pension liabilities. If the pension fund's funding ratio is greater than 105 percent, the salary average is indexed to the growth in prices or wages, depending on the plan. If it is less than that amount, average wages are not indexed (Dutch Association of Industry-wide Pension Funds 2013). Thus, participants face conditionality in their accrued rights. Their accrued benefits can decrease in real terms if the career average wage is not indexed fully for inflation.

In general, workers can face differing degrees of risk with respect to their accrued benefit rights in a defined benefit plan. The greatest degree of risk bearing would be nonguaranteed nominal accrued rights, where nominal accrued rights could be reduced. That would be followed by guaranteed nominal accrued rights, where the nominal rights could not be cut, but they would not necessarily be indexed for inflation. The lowest level of risk for workers would be guaranteed real accrued rights, where the accrued rights are indexed for inflation.

Most career average DB plans apply a so-called indexation ladder, which results in partial indexation between a funding ratio of 105 percent and an upper bound that averages 125 percent, but that varies widely among funds. If the funding average is less than 105 percent, average wages are not indexed (Dutch Association of Industry-wide Pension Funds 2013).

Collective DC Plans. Collective DC plans are labeled as DC plans in the Netherlands, but would be considered DB plans in the United States (Shea et al. 2012). This labeling in the United States is because participants do not have individual accounts. Benefits are based on the participant's salary, using a career average benefit formula, and number of years of participation in the plan. Furthermore, although these plans shift certain risks to participants and retirees, these risks are pooled across participants and spread over time, rather than borne individually.

Employers and participants both contribute a fixed percentage of wages to collective DC plans. Unlike in the United States in the private sector, the contributions of both are tax deductible. The contribution rate for employers must be fixed for at least five years. Periods longer than five years can be negotiated in contracts with participants, and the period can be set as a minimum of five years, with the actual length being determined by circumstances laid out in the contract. The employer contribution rate can be renegotiated at the end of the time set for the rate, but contribution rate changes resulting from renegotiation cannot be based on the funded status of the plan or the rate of return it has

received.² Higher contribution rates can be negotiated to cover higher costs of providing future benefits, for example due to increases in life expectancy. Thus, the future contributions of the employer are independent of past performance.

Starting in 2005, companies listed on the Dutch stock market were required to use International Financial Reporting Standards. Under these accounting reporting rules, companies offering a DB plan are required to report the funding status of that plan, and its unfunded liability, if it has one, on their annual report. This accounting standards requirement does not apply to industry-wide pension funds. The stock market decline in 2007-2008, combined with the new reporting standards, further motivated employers to reduce the financial market risks they were bearing in pension plans. Consequently, employers offering company pension plans have begun to shift toward collective DC plans.

Employers who have switched to collective DC plans have increased their contribution rate to the pension plan to compensate participants for the extra risk the participants are bearing. In addition, the plans that are being converted must be fully funded at the time of conversion (Verheijden 2010). This shift has not occurred for industry-wide pension funds.

Risk Bearing in Collective Defined Contribution Plans. When life expectancy increases, the increase in costs of providing benefits for past benefits is borne entirely by the participants, while the increase in costs of providing future benefits can be shared with employers. Thus, employers may share a part of the longevity risks with participants. These plans are appealing to employers because the employer bears less risk than in a traditional DB plan. They can be appealing to participants because the participant bears less risk than in a traditional DC plan.

Although investment and longevity risks are transferred to the participants, and ultimately are borne individually, their effect is reduced through risk sharing across participants. The individual longevity risks that participants bear in DC plans that provide annuities can be diversified across the pool of participants. The investment risks can be diversified over time. These risks are not contingent on the participant's retirement date, as is the case for an individual account. Risk bearing can be shared across generations through the build-up of financial buffers (plan overfunding) during good times that can be used to cushion the shocks of financial market downturns during bad times. Buffer funds are one way of spreading risks across time and across generations. This risk sharing is based on the assumption that low rates of return during a stock market downturn will later be offset by higher rates of return when the stock market rises again. Thus, as in a traditional DB

² The International Financial Reporting Standards stipulate that to be exempt from the reporting standards, changes in the funding ratio can have no effect on employer's contributions. This requirement is often translated into a fixed contribution rate for employers for a certain period of time, but setting a fixed contribution rate for a fixed period is not a requirement.

plan, benefits are still paid when the collective DC plan is underfunded. When the plan is overfunded, a reserve is built up as a cushion for future downturns.

An advantage of this type of hybrid plan over a traditional DC plan is that investments are pooled and, due to economies of scale, investment fees are considerably lower. The plan can take a long-term outlook on investments, and it can share investment risks across generations of participants. For these reasons, collective DC plans can maintain a portfolio that is largely invested in equities, while a participant with an individual account would likely find it desirable to gradually move the portfolio into fixed income as retirement approached. Also, participants do not have the responsibility of making investment decisions for an individual account. Another advantage compared to DC plans is that participants in collective DC plans do not bear interest rate risk when receiving annuitized benefits because their benefits are determined by a benefit formula. For these reasons, collective DC plans are much more like DB plans than DC plans in terms of the risk bearing by participants (Verheijden 2010).

Risk sharing arrangements can occur automatically according to pre-determined rules regarding how benefits and contributions will be adjusted under certain financial conditions. Alternatively, they can occur subject to the discretion of a Board of Trustees, which would take into account the circumstances in reaching a decision. It can be made by an increase in contributions of participants (but not employers) or a reduction in benefit indexing and in the benefit accrual rate. While in a career average DB plan in the Netherlands, the real accrued benefit rights of participants can be reduced by the plan using less than full price indexation, in a collective DC plan, even the nominal accrued benefits can be reduced if necessary when a plan becomes underfunded. Thus, not even the nominal accrued benefits are guaranteed for workers. However, if the plan becomes overfunded, the participants, rather than the employer, benefit.

Exactly how the adjustments are done when funding is insufficient determines the extent to which the risk is borne by the younger generation of participants compared to the older generation of retirees. The current generation of participants is the future older generation of retirees, but a system where the risk is primarily borne by participants depends on long-term stability in the workforce supporting that pension. If an industry's workforce is being reduced, for example due to technological changes causing competition from other industries, the future workforce supporting the plan could be smaller than the current workforce.

The risk sharing arrangements resulted in a reduction in nominal benefits in payment to retirees in 2013, which was the first time such a reduction had occurred. While the average benefit cut was about 2 percent, for some small plans it was as large as 7 percent. While these benefit cuts did help in restoring the solvency of the affected plans, they occurred at a cost to retirees, and were unpopular (Cohen and Steinglass 2013).

In the United Kingdom, the Department for Work and Pensions (2009) (corresponding to the Department of Labor in the U.S.) conducted a review of collective DC plans. The purpose of the review was to decide whether collective DC plans should be adopted in

the United Kingdom. As a result of its review, it concluded against them, in part out of concern that under some circumstances they might not appear to be equitable in the sharing of risk across generations. Their study using actuarial modeling of possible outcomes across a range of possible investment scenarios found that on average, and in general, participants received higher rates of return in collective DC plans than in traditional DC plans. However, under extreme circumstances, some participants did worse than under a traditional DC plan, while some participants did better.

A hybrid variant in the Netherlands, which is not a collective DC plan, is a plan that is similar to a collective DC plan in most respects, but where the employer retains the right to withdraw funds if the plan becomes overfunded beyond a high funding level. In this case, the employer has no down side risk, but may benefit from upside potential (Verheijden 2010).

Defined Ambition/ Defined Aspiration Pension. In 2010, the social partners (workers' organizations and employers' organizations) in the Netherlands agreed to a new risk sharing mechanism for DB pensions, which is called "soft real rights." With this mechanism, financial market risks are borne to a greater extent by younger participants than older participants. With the new risk sharing mechanism, the effect of a financial market downturn on future benefits is smoothed over a ten-year period, so the effect is reduced for participants less than ten years from retirement (Nijman et al. 2013). The Dutch government is planning to introduce a new pension law in 2014 in which this new risk sharing mechanism is introduced, allowing pension funds to change again.

The Dutch have called this innovation a defined ambition pension (DA), while it is called a defined aspiration pension in the U.K. Collective DC plans can be considered to be a DA pension in that the employer's contribution is fixed, and the adjustments in contributions and benefit levels are made by participants. The additional step taken in the DA proposal is that employer contribution rates would be considered to be permanently fixed, not just fixed for five years (Schouten and Robinson 2012). This plan is similar to a target benefit plan, discussed below. Hybrid pensions currently are being considered in the United Kingdom under this new terminology (National Association of Pension Funds 2012). Having a wider range of options may lead to increased pension coverage, with some options appealing to employers who did not find that existing options met their needs.

B. Nonfinancial DC Plan in Sweden

Nonfinancial DC (NDC) plans, also called notional DC plans, establish an individual account for each participant. The participant's contributions are credited to the account, as are notional interest earnings on the account. However, the system is financed on a pay-as-you-go basis, and thus differs from a cash balance plan, which also provides notional accounts, but is funded. A collectively managed trust fund is maintained to cover periods when payroll tax payments are temporarily low. The trust fund thus has the role of filling in gaps when contributions are low due to an economic downturn. The trust fund also is designed to help pay for the retirement of the baby boom generation. Without

such a trust fund, the retirement of the baby boom generation would result in a large reduction in benefits.

NDC plans are similar to DC plans in that both define benefits for participants in terms of an account balance. In DC plans, however, the participant bears the financial market risk associated with the underlying assets in which the plans are invested. In NDC plans, the crediting rate on participants' account balances is established in advance at a fixed rate or is tied to an index, typically related to the growth in wages.³ Sweden implemented its NDC plan in 1999. Italy, Poland, and Latvia also have NDC plans (Holzmann and Palmer 2006).

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

Each year, due to the life expectancy indexing of benefits, the initial benefits received by new beneficiaries are adjusted downward as a new birth cohort reaches the eligibility age of 61. Life expectancy indexing of benefits is done by an adjustment that reflects improvements in life expectancy at age 65. No further adjustments to retirees' benefits are made for improvements in mortality after age 65. Mortality experience is averaged over the previous five years to avoid year-to-year fluctuations that do not reflect longer-term trends.

The Swedish system uses period mortality tables, which are mortality tables based on the experience of the cross section of older persons, not projecting future mortality improvements. For example, period tables would be based on the mortality experience of the population alive in the year 2010, rather than the expected experience of people age 61 in that year, projecting into the future. For each cohort, the annuity divisor adjustment—the amount by which the participant's accumulated balance is divided to determine the participant's initial benefit—is established at age 65, with a provisional adjustment made for retirements starting at age 61, which is the eligibility age.

Risk Bearing in NDC Plans. In establishing risk bearing mechanisms for pension plans, a fundamental question is whether any of the risk will be borne by current retirees. Retirees are often considered to be a vulnerable group. They generally are not able to offset benefit reductions by returning to work. The life expectancy adjustment in Sweden does

³ The actual procedure for calculating the present value of future contributions is somewhat different. The expected turnover distribution is calculated as the difference between the expected average pension-weighted age of benefit receipt, which is 76, and the expected average income-weighted age of payroll tax payments, which is 43. The difference between those two ages is 33. Total assets are measured as the buffer fund plus 33 times annual contributions.

not affect retirees once benefit payment has started. However, another adjustment factor may affect them.

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

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

C. Cash Balance Plans in the United States and Canada

Unlike a traditional DB pension plan or a traditional DC plan, but similar to a nonfinancial DC plan, a cash balance plan provides participants with hypothetical or notional individual accounts. In a cash balance plan, each participant's account is periodically credited with a dollar amount by the sponsoring employer, usually based on a percentage of the participant's salary. They are career average plans in that the contributions allocated to the participant's hypothetical account are based on the participant's pay each year. Participants accrue benefits in a pattern similar to the accrual in a DC plan, with the exception that accrued benefits cannot fall, as can happen in a DC plan during a financial market downturn. Like DC plans, the early years are more heavily weighted than later years. This weighting pattern particularly affects participants whose earnings rise rapidly over their career, providing them a relatively low replacement rate compared to final earnings. Because they have that accrual pattern, the benefits they provide are less closely linked to final salary than in a final average pay plan, and thus the participant faces greater risk as to the replacement rate they will provide. This feature can be dealt with by the plans having age or service weights, with crediting rates increasing by either of those factors (Allen et al. 2008).

Cash balance plans have been widely used in the United States, but are not as popular in Canada because of regulatory requirements (Gendron 2006). They are also used in Japan, and the plans in Switzerland may be considered to be a type of cash balance plan (Pugh and Yermo 2008). While cash balance plans in the U.S. are required to offer annuities as an option, their benefits are expressed as a lump sum, and typically participants withdraw their benefits in the form of a lump sum payment.

Risk Bearing in Cash Balance Plans. Cash balance plans from the perspective of participants have many features of DC plans. Because they provide lump sum benefits, they shift longevity risk to participants. Because they accrue benefits as an account balance, they allow workers to change jobs without suffering portability losses, similar to DC plans. Benefits are accrued over the entire period of participation in the plan, similar to DC plans. Participants also may bear some investment risk, in particular if changes in the crediting rate have some relationship to market rates of return, but the plans provide some protection from investment risk (Johnson and Uccello 2004).

From the perspective of employers, however, they have features of DB plans (Turner 2003). Pension law treats them as DB plans because the plans specify a formula for determining benefits at retirement—a DB feature. Like traditional DB plans, participants are automatically enrolled in cash balance plans. Also like traditional DB plans, cash balance plans are insured by the Pension Benefit Guaranty Corporation (PBGC), which provides participants a degree of protection against benefit risks.

The cash balance pension formula determines account balances as a function of wages, pay credit rates, and interest credit rates, which can be converted to an annuity. Contributions credited to the participant's account by the employer (pay credit) are generally quoted as a given percentage of the participant's pay. Interest credits equal to the product of the participant's credited account balance times an interest credit rate are also accrued in the account. An interest credit rate is either a fixed rate or a variable rate tied to an index, such as the 30-year Treasury bond rate, or the rate on one-year Treasury bills reset every six months.

Although a cash balance plan portrays benefits to participants in the form of an individual account balance, the cash balance account does not depend on the performance of plan assets. Contributions and investment earnings are not actually allocated to individual accounts; instead, contributions are made to a common trust fund for all participants, and benefits are paid directly from the fund. These plans must provide an annuity option, but typically also provide a lump sum option, which is the most common form of payment.

In a cash balance plan, the employer bears the investment risk of the underlying assets in which the plan is invested, but the participant may bear some investment risk due to fluctuations in the rate of return on the asset underlying the interest credit rate. Participants bear interest rate risk if they choose to convert their account balances to annuities. They bear longevity risk if they do not convert to annuities, which is the usual practice. The arrangements by which the rate of return provided participants is determined and in the way that the account balance is converted to an annuity vary causing variation in the extent to which these plans are more like DB or DC plans (Wesbroom and Reay 2005).

A *minimum balance pension plan* is a cash balance plan variant that offers participants the greater of a traditional DB plan benefit (often final average pay) and the cash balance plan benefit (Allen et al. 2008).

D. Riester Plans in Germany

While the previous plans just discussed are DB hybrids in that benefits are based on a benefit formula rather than on investment performance, Riester plans are DC hybrids. Riester plans in Germany, named after a former Minister of Labor, are mandatory for employers to offer, but employers are not required to contribute to them. To offset cuts in its social security benefits, Germany has provided generous tax incentives for Riester pensions, starting in 2001. The subsidies were increased in 2004, 2006 and 2008 (Pfarr and Schneider 2013).

Of the 30 million eligible Germans, by early 2005 only 4.2 million had signed up, or one in seven, despite generous tax subsidies. Explanations for the disappointing take-up include burdensome regulations, and the money back guarantee that increased costs and reduced rates of return. In 2005, a reform simplified the application procedure, causing the demand to increase (Pfarr and Schneider 2013).

In 2006, Riester pensions overtook occupational pensions as the main source of non-government pensions. At the end of 2009, about 40 percent of households potentially eligible for a Riester pension had at least one Riester pension. Note, however that this is a household measure of coverage rather than an individual measure. Largely as a result of the increase in Riester pensions, the percentage of households with pension coverage increased from 27 percent in 2001 to 55 percent in 2009 (Börsch-Supan et al. 2013). In 2008, only 60 percent of the eligible population contributing made a sufficient contribution to receive the full government subsidy. In 2010, there were 13.6 million Riester contracts at the end of the year, but this was only about 37 percent of the eligible population (Pfarr and Schneider 2013).

The high contribution rate for German social security may have been a factor in some German workers feeling they could not afford to pay more for retirement benefits. The Riester pension was a form of paying twice for retirement benefits—once for their parents through the pay-as-you-go social security system and once through the funded Riester system (Capretta 2007).

Because low-income households and households with children were assumed to have the most difficulty saving for retirement, the tax incentives for the Riester pensions are most generous for these households (Börsch-Supan et al. 2013). People eligible to receive subsidies include not only workers paying social security contributions, but also spouses of those workers, unemployed persons and recipients of child rearing benefits. A government match of the person's contribution is provided on a means-tested basis for low and middle income households. The second component is a subsidy based on the number of children in the household, which is a flat amount per child per year that is contributed by the government into the person's account. The third amount is the tax deductibility of the worker's contribution, which was raised considerably between 2002 and 2008, but since then has been held constant in nominal terms, so it will erode in real value over time.

The tax incentives to contribute to a Riester pension increase with the number of children in the family. Pfarr and Schneider (2013) find in an empirical study that the tax incentives are effective. People with more children are more likely to sign up for a Riester pension. However, the incentives to encourage lower income people are not effective, according to their study.

With the Riester pension, the combination of the government subsidy and the worker's contribution must be at least 4 percent of the worker's yearly gross income to be eligible for a subsidy. The higher the subsidy, the lower the required contribution by the individual. The subsidy for each additional child reduces the required level of the personal contribution down to the lower limit of €60 a year (Pfarr and Schneider 2013).

The value of the tax subsidy relative to the contribution averages 45 percent, but ranges from 24 percent to 90 percent, depending on income level and number of children. The subsidy is slightly U shaped by income, with low-income persons receiving a relatively high subsidy due to the matching contribution and high-income persons receiving a relatively high subsidy due to the progressivity of the income tax, with them having higher marginal tax rates (Börsch-Supan et al. 2013).

In 2010, Riester pensions cost the government €3.5 billion, of which about 80 percent was due to the means-tested direct subsidies and the remainder was due to foregone income tax revenue (Börsch-Supan et al. 2013).

Risk Bearing in Riester Plans. Riester Plans must provide a guarantee of principal, which is a guarantee of a zero nominal rate of return, or a money back guarantee. Thus, the nominal value of the principal is guaranteed, but its real value can be eroded by inflation. Individuals who participate can contribute up to 4 percent of their gross annual income. In exchange, if they contribute the full 4 percent they receive a subsidy from the government of €154, plus €184 for every child born before 2008 and €300 for every child born in 2008 or later, or a tax refund, whichever is greater. (one euro equals approximately USD 1.4.) At least 70 percent of the accumulated account at retirement must be received as an annuity or phased payment, but 30 percent can be received as a lump sum payment at retirement (Kluth 2013). With these plans, one of the distribution options is to have a phased withdrawal with an annuity starting at age 85.

VII. ANALYSIS OF RELATIVE ADVANTAGE IN RISK BEARING

In evaluating hybrid plan designs, it is useful to consider whether employers or participants are better able to bear particular risks. This section addresses that question for three of the most important risks—longevity risk, interest rate risk, and stock market risk.

If employers are risk neutral (or less risk averse than employees) and employees are highly risk averse, pension arrangements will be developed with employers bearing most of the risks. In this case, employers are effectively selling insurance to the participants, who pay for it through reduced wages. The risk aversion of workers allows employers to

sell the insurance for more than its expected cost, allowing them to reduce their compensation costs (McCarthy 2006).

Longevity risk has two components—idiosyncratic risk and systemic risk. Idiosyncratic risk is the risk that a particular participant will live longer than expected. Systemic risk is the risk that life expectancy improves by more than expected for the relevant population. Employers, in particular large employers, are better able to bear idiosyncratic longevity risk than participants because they can pool this risk and reduce it in aggregate by diversification over the plan population. However, participants may be better able to bear the systemic risk, which is correlated across participants, because for participants it represents better health and a longer life. It thus for many participants presumably provides the possibility of a longer work-life. For employers, systemic longevity risk is an unhedgeable risk, since no asset currently exists to hedge it (Blake and Turner 2014).

The question also arises as to whether the employer or the participant is better able to bear interest rate risk that employers bear in DB plans, as it affects the value of their liabilities, and also possibly the value of their assets. Increases in interest rates reduce the price of bonds, and they also reduce the value of pension liabilities. The effect on liabilities disappears when employers switch to DC plans. Arguably, participants bear relatively little interest rate risk in DC plans (Fuerst 2006). However, they do bear interest rate risk to the extent that it affects the value of their investments. They also bear it if they wish to annuitize part or all of their account at retirement, which admittedly is done rarely in spite of policy analysis suggesting it would be a good strategy.

Stock market risk is the risk related to the ups and downs in the stock market. An argument for the employer bearing it is that the employer has a long time horizon, while the employee has an estimated or desired date of retirement that may be near. An argument for the participant bearing it, at least for young workers, is that they can adjust over a number of years to a market downturn, while the employer is required to make up the funding gap over a short time period (Fuerst 2006). However, the shift to DC plans generally shifts portfolio decisions from financial professionals managing DB plans to workers who often are financially unsophisticated.

VIII. ANALYSIS OF HYBRID PLANS

An earlier paper (Pugh and Yermo 2008) categorized defined benefit-based hybrids into four categories: (1) cash balance plans, (2) conditional benefit plans (where the contributions of workers or their benefits could vary), (3) nursery plans (where the worker is in a DC plan up to a certain age then switches to a DB plan) and (4) floor or underpin plans (where the worker receives the higher of the two benefits from either the DB or DC plan). Of the four types of hybrids, conditional benefit plans may pose the lowest risk to plan sponsors and the greatest risk sharing by workers and retirees. Floor or underpin plans are more costly for plan sponsors than an equivalent DB plan, since that plan provides a minimum level of benefits in the floor or underpin plan. A second paper, also from authors at the OECD, analyzes hybrids in terms of the variability in outcomes as to replacement rates (Blommestein et al. 2009). That paper distinguishes six types of

risk sharing arrangements, one of them being traditional, non-hybrid DB plans. In addition to the four types of hybrids in the previous study, it adds collective defined contribution plans, where contributions are fixed but benefits and benefit accruals adjust.

Instead of focusing on who bears the risk (participants, retirees, plan sponsors, third parties), that paper focuses on the tradeoff in different hybrid plans between variability in benefits and variability in contributions. That paper argues that variability in contributions constitutes a risk for workers, no matter what party pays for them, because ultimately workers pay for pension contributions through tradeoffs against their wages. However, while workers bear the cost in the long run, the arrangements may provide protection against risk in the short term.

In the United States, risk sharing options are limited by the prohibition of tax deductible contributions by workers to most types of pension plans. Anti-cutback rules prevent the reduction of vested nominal benefits.

While that approach provides a useful categorization, the approach taken in this paper focuses on the specific risk, and provides a more detailed categorization of plans. The following sections describe a number of different types of hybrid plans, categorized according to which risks participants bear (**Table 1**). Rather than attempting to describe all aspects of these plans, the descriptions focus on the risk bearing aspects. Plans are categorized by whether they shift risk to participants during the accumulation phase, at the point of retirement, during the payout phase, or during both the accumulation and payout phase. The plans are further categorized within those periods. For example, plans that shift risk to participants during the accumulation phase are categorized by whether they shift investment risk, funding risk or longevity risk.

A. Plans that Shift Risk to Participants During the Accumulation Phase

This section discusses actual and proposed hybrid plans that shift risk to participants during the accumulation phase. The section distinguishes between investment risk, funding risk, and demographic risk. Investment risk refers to the risk as to rates of return received. Funding risk refers to all the factors affecting the funding level of a DB plan. Demographic risk refers to demographic factors that affect the funding level of a DB plan, particularly longevity risk. These risks can be shifted to participants through variations in their contributions, employer contributions, or benefit accruals.

Plans that Shift Investment Risk to Participants During the Accumulation Phase

The first group of plans shifts investment risk to participants through a DC plan that is tied to a DB plan.

Flexible Pension Plans in Canada offer a participant in a DB plan a tax-sheltered savings account to which he or she can contribute. The participant bears investment risk on that account. At retirement that person uses the savings account to purchase extra benefits from the DB plan (Cohen and Fitzgerald 2007). For example, a participant could

purchase automatic inflation indexing and unreduced early retirement benefits. A flexible pension plan provides participants both DB and DC features and provides participants the ability to have a role in designing their benefits. A risk of flexible plans is the risk of accumulating assets in the DC account that exceed the value of ancillary benefits a member can purchase. In this case, the member runs the risk of forfeiting those excess assets (Gendron 2006).

Sequential Hybrid Plans in the U.K. typically offer a new participant membership in a DC plan at hire. After a fixed period with the employer, such as five years, the participant is enrolled in a DB plan. This arrangement provides the positive features of DC plans for short-tenure participants and the positive features of DB plans for long-tenure participants, and this is a way of lessening portability risk (Wesbroom and Reay 2005).

Combination Plans in the United Kingdom link a DB and a DC plan and identify the combination plan as a hybrid. For example, in some cases the assets in a DC plan will be used to pay DB liabilities if the DB plan becomes insolvent. Some use the same investment strategy for the DB and DC plans. In some plans, the participant receives only the DB or the DC entitlement, depending on which is larger (see floor offset plans) (Warren, Samuel and Newton 2011).

The following hybrid plan shifts investment risk to participants through variations in their contributions.

The ABP Plan for Dutch government workers, which is one of the largest pension plans in the world in terms of assets (de Jong and Turner 2001).⁴ It bases benefits on a formula, as is done in DB plans. However, the plan is financed by contributions by participants and employers, and the contribution rate varies annually based on the pension fund's investment performance. The calculation of the contribution rates uses a procedure that smoothes the fluctuations in the rates so that the annual variation is small.

The following hybrid plan shifts investment risk to participants by cutting benefit accruals.

Variable Annuity Plans in the U.S. are DB plans that provide for an automatic adjustment of benefits that is tied to the investment performance of the underlying assets. In these rarely used plans, participants accrue benefits in the form of points. The value of the benefit received varies depending on the value of the points, which is determined with respect to a target rate of return on the assets in the plan. This type of self-adjusting mechanism adjusts the liability for benefit payments to changes in the rate of return received on the pension fund.

Plans that Shift Funding Risk to Participants During the Accumulation Period

⁴ Originally ABP stood for Civil Servants Pension Fund, but now the name of the plan is simply ABP, without the former reference.

The following plan shifts funding risk to participants through variations in the participants' contributions.

Member Funded Pension Plans in Québec were developed in 2006 (Cohen and Fitzgerald 2007). They provide benefits based on a DB benefit formula. Employers contribute a fixed amount, just as in a DC plan. Participants' contributions vary depending on the level of over- or under-funding in the plan. This type of plan is only available for new plans, not for plan conversions. This plan is similar to Dutch collective DC plans in terms of the way participant and employer contributions are determined.

The following plan shifts funding risk to participants by adjusting contributions for both participants and employers.

The Tracker Plan is a proposal by Rowland Davis (2012), an actuary, for a DC plan with less risk to participants as to assets accumulated at retirement. It accomplishes this partly because it adjusts contributions if asset accumulations fall below the target. The framework is as follows:

- Select a target replacement ratio at a specified retirement age. (Could be 75 percent at age 65, for example, or could be 65 percent at age 67 – with much lower costs).
- Select a target for likelihood of successful outcomes. (Could be 90 percent, for example, or could be 75 percent, which permits more aggressive investment policy and/or lower costs).
- Calculate the target accumulation path, based on the above choices.
- Work out the adjustments triggers based on “tracking error” that are needed to meet the selected target for successful outcomes.

The plan would offer a single investment vehicle (no choice) that would for each participant be a target date fund that gradually decreased portfolio risk as the participant approached retirement. If the investment performance is worse than expected and the participant's account is tracking below the target path to reach the desired replacement ratio, contributions would be increased for the employer, and possibly the participant, up to a limit. If the plan did better than expected, the plan would automatically shift to a more conservative, less risky portfolio containing a higher percentage invested in bonds.

The following hybrid plan shifts funding risk to participants through variations in the employer contribution.

The Utah State Government plan for state and local participants hired after July 1, 2011 combines a DB and a DC plan. The state contributes up to 10 percent of participant pay to the DB plan, depending on the amount necessary to maintain full funding. The remainder of the 10 percent, if any, is contributed to the participants' DC plan (Snell 2012).

The following hybrid plans shift funding risk to participants by cutting future benefit accruals.

Multiemployer Plans in the U.S. are collectively bargained plans that are DB plans from the perspective of participants, with benefit formulas that determine the value of benefits. However, from the perspective of employers they operate like DC plans. Over a bargaining cycle, typically two or three years, the contributions of the sponsoring employers are fixed, but can be adjusted when a new contract is negotiated. Participant benefit accruals going forward are more likely to be reduced in contract negotiations when funding shortfalls occur, which shifts investment risks to participants. Benefits already accrued cannot be cutback.

Plan sponsors retain some aspect of liability for funding shortfalls in the form of the withdrawal liability if they withdraw from a multiemployer plan that is underfunded. The Retirement Review Security Commission of the National Coordinating Committee for Multiemployer Plans (NCCMP 2013) proposed a new type of multiemployer plan, which it calls a target benefit plan, where the employer would have no withdrawal liability. Their proposal also calls for the ability to make cuts in participants' accrued benefits, if necessary, to restore funding, provided certain criteria are met.

Adjustable Pension Plans in the United States have been adopted by some companies that negotiate with the Communication Participants of America (Bovie 2013). The plan is based on career average benefits or flat benefits (per year of service). Participants and employers share the investment risk, combined with the plan having a low-risk investment portfolio, which reduces the need for adjustments by participants. A floor level of benefits is guaranteed, with higher benefits provided if allowed by the funding of the plan.

Each year benefit accruals are adjusted for participants depending on the funding of the plan. For the adjustable part of the benefit, each year units are accrued. The value of the additional benefit per year is based on the number of units and the value assigned per unit. The value assigned per unit increases or decreases, depending on the funding status of the plan, so that it is possible for the value of the adjustable benefit already accrued to decrease. No adjustments are made for retirees once benefits are in payment status. If the adjustable benefit is greater than the base benefit at retirement, the participant receives the adjustable benefit. If the base benefit is greater than the adjustable benefit, the participant receives the base benefit. Conservative assumptions are used in determining the level of the employers' contributions, so as to provide adequate funding and reduce the need for risk bearing by participants. In addition, the liability for retirees is immunized through the purchase of bonds with durations that match the duration of the retiree liability (Hudson 2013).

Plain Old Pension Plans, proposed in the U.S. by the Conversation on Coverage (undated), an independent study group, are a variation on the traditional DB plan. They would provide a modest guaranteed benefit accrual that employers can boost for a year and then reduce back to the basic benefit accrual in future years. In these plans, financial

market risk is shifted to participants to the extent that employers reduce the level of benefit accrual when financial markets are performing poorly. The employer bears the interest rate and longevity risk that occurs at retirement when accounts are converted to annuities.

Group Variable Annuity Pension Plans (GVAPP), proposed in the U.S. by Thomas Lowman (2003), an actuary, would tie pension benefits in DB plans to funding levels so that participants would bear some investment market risk. GVAPP are like traditional DB plans except that they require a contingent future indexation of previously accrued benefits. The extent to which past accrued benefits are indexed would depend on the level of plan funding, and would vary over a range, such as from 0 to 5 percent per year. Thus, these plans would be similar to career average DB plans in the Netherlands. The indexing of accrued benefits would continue to occur after a participant terminates employment, so that participants changing jobs would suffer less portability loss than in traditional DB plans. It would also provide for indexation of benefits (up to a maximum rate) for inflation that occurs during retirement. However, the level of indexation would depend on the plan funding level. The employer funds (1) the Normal Cost based on full indexation of the benefit being accrued annually and (2) the amortization of any unfunded liability based on the value of unindexed past service benefits less the current value of assets.

Retirement Shares Plans (RSP), proposed in the U.S. by Mercer (2005) (see also Fuerst 2006), would transfer financial market risk to participants but would protect them from longevity risk. For employers, it provides stable and predictable costs with little risk of unfunded liabilities.

This type of plan is based on a *career-accumulation DB plan*. A career-accumulation plan is a DB plan where each year the participant accrues a benefit that is a fixed percentage of pay, payable as an annuity at the plan's Normal Retirement Age.

For example, the plan could accrue benefits at the rate of one percent of pay. For a participant earning \$50,000 a year, the participant would accrue \$500 of benefits payable as an annuity starting at the plan's Normal Retirement Age. Unlike in the traditional career-accumulation plan where the benefit accrued is fixed, in the RSP the value of the accrual could vary depending on variation in the value of the participant's Retirement Shares.

The value of the participant's Retirement Shares would be tied to the rate of return received by the plan on the underlying assets. The plan document would specify a rate of return called the Share Interest Rate (SIR). If the plan earned a rate of return higher than the SIR, then the value of the participant's shares would increase; while if it earned a lower rate of return, the value of the participant's shares would decline. The SIR could have a value of 4 percent or 5 percent. In this case, if the SIR was 5 percent and the plan assets earned 3 percent, the participant's shares would decline in value by 2 percent.

This plan has the advantage to employers of greatly reducing the risk that it becomes underfunded. The employer funds the plan assuming that the plan always earns the SIR.

If the plan earns less than the SIR, the value of the employer's liabilities is automatically reduced due to the reduction in the value of participants' Retirement Shares.

The following hybrid plans shift funding risk to participants through variations in crediting to a notional account.

USA Retirement Funds were proposed in broad outline by Senator Tom Harkin (2012). These plans would be DC hybrid plans, but with risk sharing among participants. Participants would not individually choose the investments. Instead, there would be a single investment fund for all participants. During periods of relatively high rates of return, funds would be built up that would be used to supplement benefits during periods of relatively weak returns. This aspect is similar to collective DC plans. In DC plans, compared to DB plans, investment management is transferred to participants from professionals. In USA Retirement Funds, professional management of the funds would be retained, with no participant involvement in the management.

SAFE Retirement Plans, an acronym standing for secure, accessible, flexible and efficient, have been proposed by the Center for American Progress (Davis and Madland 2013), as another variant on collective DC plans. These plans are similar in most respects to the Harkin plan, in that each participant would have a notional account to which returns were credited. In the SAFE Plan a specific formula describes how credits are earned in a way that smooths market returns across different age cohorts to achieve intergenerational risk sharing. The returns would be less than the market returns when the market returns were relatively high, and greater than market returns when the market returns were relatively low.

For an example of how the plan might work, the plan could have a maximum crediting rate of 8 percent per year and a minimum crediting rate of 0 percent. If the market returns were within that range, the participant would earn the market return. If the market returns were below zero, the participant's account would be credited with a zero rate of return. If the market returns were above 8 percent, the account would be credited with 8 percent. Thus, in this example, the plan aims to provide a payback guarantee, or a guarantee of a nominal rate of return of 0 percent. This guarantee is "purchased" with the returns that exceed 8 percent. In addition, if the plan had sufficient excess reserves, participants would be credited with excess returns. For example, if the funding ratio exceeded 130 percent, participants could receive a bonus credit of 3 percent, so that if the market rate of return on the portfolio was 6 percent, they would be credited with 9 percent. Careful consideration would need to be given to the exact parameters of the guarantee, the cap and the excess crediting to assure that the plan could meet its promises during extended periods of poor investment returns. If the plan becomes severely underfunded, the crediting could be less than 0 percent, which would result in a reduction in the value of the assets in the participants' notional accounts.

In addition to this accumulation mechanism, the SAFE Plan model has a separate payout mechanism to provide lifetime benefits in a cost-effective manner, again using intergenerational risk sharing techniques.

Plans that Shift Longevity Risk to Participants During the Accumulation Phase

The following hybrid plans shift longevity risk to participants through variations in their contribution rate.

Life Expectancy Hybrid Plans in the U.K. are DB plans that tie the level of participant contributions to the improvement in life expectancy at retirement age for participants in the plan.

ARRCO and AGIRC are mandatory pay-as-you-go plans in France, the first covering blue collar workers and the second covering white collar workers and management.⁵ In these plans, demographic risk associated with both pay-as-you-go plans and funded plans is transferred to participants. Participants contribute a fixed percentage of salary, which is used to “buy” points. The value of points adjusts to maintain balance in the systems, so that the aggregate of contributions matches total benefit payments on an annual basis. The benefit at retirement is based on the number of points the participant has and the value of the points at that time (CLEISS 2013).

B. Plans that Shift Annuitization Risk (Life Expectancy and Interest Rate Risk) to Participants at the Point of Retirement

Traditional DB plans provide annuities to participants, with the plan sponsor bearing the life expectancy and interest rate risk. DC plans may provide a mandatory annuity, an optional annuity, or no annuity, depending on the plan and the requirements of the country’s pension law. Hybrid plans may shift life expectancy risk and interest rate risk for converting an account balance to an annuity to participants.

Life expectancy risk relating to the participant’s life expectancy can be transferred to participants by paying benefits as a lump sum, rather than as an annuity. Life expectancy risk relating to changes in the life expectancy of an age cohort can be transferred to participants by life expectancy indexing of benefits at retirement.

Interest rate risk arises when participants desiring annuitized benefits must convert lump sum benefits. Inflation risk arises both before retirement (in DB plans) and after retirement for plans that are annuitized. In DB plans, inflation risk arises in career average DB plans to the extent that the averaging does not keep pace with inflation.

The following hybrid plans shift both longevity risk and interest rate risk to participants. Because benefits generally are not price indexed, they also shift inflation risk during the payout period.

⁵ ARRCO stands for Association for Supplementary Retirement Plans for Employees. AGIRC stands for Federation of Associations for Corporate Supplemental Retirement Plans.

Pension Equity Plans (PEP) in the U.S., called by the more descriptive name of final salary lump sum plans in the U.K., allow for the accrual each year of a certain percentage of final average pay. That percentage can rise with tenure or age so as to reward long-tenure or older participants. At retirement, the annual percentage amounts accrued over the participant's career are summed and then the total percentage is applied to final average pay to determine the participant's final account balance. The benefit payable is then determined from that balance (McGill et al. 1996). This plan shifts annuitization (interest and longevity) risk to participants. In a PEP, the employer bears the investment risk on the assets in which the plan is invested. PEPs are classified under U.S. pension law as DB plans and are insured by the PBGC.

The PEP is similar to a cash balance plan in that participants have notional individual accounts that are credited each year. Like in cash balance plans, participants bear interest rate risk if they choose to convert their account balances to annuities, and they bear longevity risk if they do not convert to annuities. However, the value of the account grows with increases in the participant's earnings, rather than also growing due to crediting of interest payments, as is done with cash balance plans. Participants do not bear any investment risk. While cash balance plans have accrual patterns similar to DC plans, PEPs have accrual patterns similar to final average DB plans.

A survey conducted for the Society of Actuaries in 2004 indicated that a small number of companies offered combination plans, where the participant's benefit was the greater of the benefit from a defined benefit plan or a pension equity plan, or the greater of the benefit from a cash balance plan or a pension equity plan (Matthew Greenwald & Associates 2005).

Floor Offset Plans, also called floor plans in the U.S. and underpin plans in the U.K., combine a DB plan and a DC plan. They differ from other hybrids that are single plans in that they are two different plans working in combination. The DB plan provides a guaranteed minimum benefit, and, like cash balance plans, is insured in the U.S. by the PBGC. The retiree receives the higher of the amount provided by the DB plan or by the DC plan (Cohen and Fitzgerald 2007). These hybrids protect participants from the downside risk of financial market investment, but to the extent that the DC plan accumulations produce a larger benefit, participants can gain from that upside potential. They are thus similar in their risk characteristics to Riester plans in Germany, where participants are protected from downside risk by a nominal rate of return guarantee. Whether the DB or the DC benefit is larger may depend on the participant's age when joining the plan and age at retirement. If the participant takes early retirement and is eligible for an early retirement subsidy, the DB benefit is likely to be larger. If the participant delays retirement, has a longer working career, and is not eligible for an early retirement supplement, the DC benefit is more likely to be the larger of the two (Gendron 2006).

To limit the financial market risk to the employer, the plan may limit the investment options the participant may choose in the DC plan, or the plan may select the investments.

The DC plan must be converted into an annuity, but the participant generally must bear the longevity and interest rate risk of the conversion.

The Guaranteed Benefit Plan, proposed in the U.S. by the ERISA Industry Committee (ERIC 2007), would be similar to a cash balance plan, but it would be financed by participant tax deductible contributions. It would have a guaranteed principal and a guaranteed rate of return. It would pay benefits as an annuity.

The following hybrid plan shifts systemic but not idiosyncratic longevity risk at retirement to participants through variations in their benefit level. Systemic risk is the risk that life expectancy will improve, while idiosyncratic risk is the risk affecting an individual.

Life Expectancy Indexed DB Plans, proposed by John Turner (2011), would shift the systemic life expectancy risk to participants but would protect them from the idiosyncratic risk. Life expectancy risk can be divided into two parts: the idiosyncratic risk that each participant faces concerning the uncertainty of his or her life expectancy, and the systemic risk that annuity providers face concerning the life expectancy of a birth cohort—the risk that on average a birth cohort will live longer than expected. Participants are concerned about the idiosyncratic risk relating to their own life expectancy, while pension providers are concerned about the systemic risk because with large numbers of participants the different idiosyncratic risks of different participants are diminished in aggregate for the plan provider through diversification of mortality risks.

The systemic risk is unhedgeable in that no asset currently exists that provides a good hedge against it. Life insurance companies have a partial hedge in that life insurance is affected in the opposite direction. However, life insurance is generally purchased by a younger cohort than the cohort that purchases annuities, and thus the risks are not perfectly correlated.

With this hybrid, the benefit formula in a traditional DB plan would be modified so that for each new retirement cohort, the annual benefit provided by the plan would be slightly reduced to offset the effect of increased life expectancy on the present value of future benefits, similar to the Swedish nonfinancial DC plan. This plan has the advantage for employers that they do not have to deal with the uncertainty of future improvements in life expectancy, except for those improvements that occur after the participant retires. As a DB plan, it would be insured by the PBGC. Unlike cash balance and pension equity plans, which are also insured by the PBGC, it retains a traditional benefit structure, with the exception of the life expectancy adjustment.

Retirement Savings Accounts with Participating Variable Annuities were proposed by Donald Fuerst (2010) as part of the Society of Actuaries (SOA) 20/20 competition for innovative retirement approaches. The participating variable annuities would result in retirees bearing investment and mortality risk through fluctuations in the level of their benefits.

C. Plans that Shift Risk to Participants During the Payout Phase

Plans can shift risk to participants through variations in COLAs or through variations in benefit payments based on investment risk.

The following hybrid plan shifts funding risk to participants during the payout phase.

The Employees' Retirement System of Rhode Island, due to the Rhode Island Retirement Security Act of 2011, suspends cost of living adjustments (COLAs) until the aggregate funding ratio of all state government pension plans reaches 80 percent or higher. Once that target is reached, a COLA of between 0 and 4 percent will be awarded on the participant's first \$25,000 of pension income, depending on the pension fund's rate of return (Hiltonsmith 2013).

The following hybrid plan shifts investment risk to participants during the payout phase.

With Profits Pension Annuities are U.K. plans where the participant chooses an anticipated bonus rate (ABR). If the participant chooses an ABR of zero percent, the participant is guaranteed that each year's benefit in retirement will be no lower in nominal terms than the starting benefit--the guaranteed minimum benefit. If the underlying investments perform sufficiently well, the participant will receive higher benefits. If the participant chooses an ABR higher than zero percent, the starting benefit will be higher, but the participant risks that future benefits will be reduced at some point, but to no lower than the initial benefit if an ABR of zero percent been chosen. Rather than the plan's payments varying with the rate of return received each year, however, the plan smooths the benefit payments over time.

D. Plans that Shift Risk to Participants During Both the Accumulation Phase and the Payout Phase

The following plans shift risks to participants during both the accumulation phase and the payout phase.

Secure Choice Plans in the United States are a proposal by the National Council on Public Employee Retirement Systems (NCPERS) that is similar to a cash balance plan in terms of the way benefits are determined. They are DB plans that provide participants a notional account with an interest credit rate that is guaranteed at 3 percent, with the possibility of a higher crediting rate, depending on investment returns (Kim 2013). They are multiple employer plans that are managed through a public-private partnership that would be set up by a state or by groups of states. These plans would require that ERISA be modified so as to allow state governments to establish pension funds in which private sector businesses could participate. The assets would be invested in the same manner as one of the state government plans, allowing for economies of scale in investments that would result in reduced fees.

Participating employers would be largely freed of fiduciary and administrative duties, which would be the responsibility of a managing board. They would be liable for a fixed contribution, or possibly the contributions would be made entirely by participants, in which case they would only be responsible for transmitting the contributions to the plan board. They could be made liable for a withdrawal liability if they left an underfunded plan, or that liability could be borne by the participants of that employer, who would face cuts in their accrued benefits. Because the plan is a multiple employer plan, it would provide participants greater possibility of pension portability when they change jobs, and thus could reduce the portability risk that participants face (Kim 2011).

A variant of this plan is the California *Secure Choice Retirement Savings Program*. Every employer not offering a plan in California would be required to withhold 3 percent of participant earnings and send it to the plan managed by this program (Ross 2013).

Target Benefit Plans in the United States and Canada set contributions by employers and participants at a fixed level or within a fixed range based on a target benefit level. They operate like a pooled DC plan, with pooling of investment risks and longevity risks among participants. Employer contributions can be structured so that they are a higher percentage of pay for older workers. They use funding reserves to smooth fluctuations in benefits over time (Aon 2012), and thus are similar in this respect to the Harkin proposal and the Secure Choice proposal.

A problem with the implementation of these plans in Canada is that the provinces have been slow to pass enabling legislation (Vettese 2012). The Canadian Institute of Actuaries (2013) argues that larger surpluses should be permitted in these plans so as to provide greater ability to withstand financial market downturns and to provide greater likelihood that target benefits will be delivered.

These plans have some similarities with multiemployer pension plans in that the employer contribution is fixed in advance. In these plans, longevity risk is pooled because they provide a benefit as an annuity. In addition, the problem of participant management of investments can be avoided by having a single pooled management of investments, but often the plans' investments in the U.S. are participant directed (Allen et al. 2008).

The Canadian province of New Brunswick has passed legislation, called the *Shared Retirement Risks Plan*, that enables the provision of target benefit plans, including the conversion of past service liabilities to these plans (Sibson Consulting 2012, Munnell and Sass 2013). The province of Alberta has also passed implementing legislation. This plan splits benefits into two parts: a secure base benefit and ancillary benefits that are less secure, depending on the level of funding. It also involves predetermined adjustments to benefits, contributions and the plan asset mix if the plan becomes underfunded. The plan guarantees base benefits, but only provides ancillary benefits if the plan's financial conditions meet certain requirements.

The New Brunswick regulatory framework is not based on a simple measure of current funding levels. Instead, it uses a stress test based on a computer model generated set of 1,000 scenarios over a period of 20 years. The computer simulations must show that the base benefits will be fully funded in at least 97.5 percent of the scenarios, and the ancillary benefits must be at least 75 percent funded on average over all the scenarios (Munnell and Sass 2013). These scenarios form a stress test for the funding of DB plans. Plans that fail this test must modify their investments, funding, or benefits so as to pass the test. This forward-looking funding test is anticipated to identify funding issues earlier and to require smaller adjustments than traditional methods. Plans with riskier portfolios that are fully funded may fail this test because of their inherent risk. This approach has similarities to the Dutch defined ambition model.

The final plan is an example of a combination of two plans that provides risk diversification for participants but does not provide hybrid risk sharing arrangements as discussed in this paper.

DB(k) plans were enabled by the Pension Protection Act of 2006, but the effective date for implementation was 2010. Employers with 500 or fewer employees are eligible to offer this type of plan. A safe harbor DB(k) plan combines two plan designs: a traditional pension plan with a guaranteed lifetime payment providing a benefit equal to 1 percent of final average pay per year of service, up to 20 years; and automatic enrollment in a 401(k) plan that defers 4 percent of a participant's salary, with a 50 percent employer match on that, plus immediate vesting. The match applies to the first 4 percent, but a participant can opt to defer more or less. An employer can set up the pension plan portion using either a traditional DB plan or a cash balance plan providing minimum pay credits of 2 percent for participants ages 30 or under, 4 percent for ages 31 to 40, 6 percent for ages 41 to 50, and 8 percent for participants ages 50 or older (Ward 2010). This type of plan combines two plans but does not involve hybrid risk sharing arrangements.

IX. PENSION RISK INDICES

The financial effects of pension risks vary with changes in financial markets and the work experience of individual participants, making it difficult to measure the risk inherent in different types of pension plans because they vary under different circumstances. However, a simple risk index can be constructed by counting the different types of risks that participants are subject to in different types of plans.

A. Risks Included in Risk Indices

Taking an expanded view of risks affecting participants in pension plans, twelve aspects of pension risk are considered here in determining pension risk indices for participants and for employers (**Table 2**). These indices add eight risks—(1) portability risk, (2) participant decision error risk, (3) wage level risk, (4) fiduciary risk, (5) employer-related risks, (6) political risk, (7) retirement timing risk, and (8) disability risk—to the four risks discussed earlier—investment, mortality, interest rate, and inflation.

- (1) Portability risk is the risk that participants will receive lower benefits if they change jobs than if they stay with one employer. This risk includes the risk that a participant will be laid off, and thus that the job change is not voluntary.
- (2) Participant decision error risk is the risk that participants will make decisions with respect to their DC plans that cause them to have insufficient retirement income. These decisions include not participating in their plan, not contributing adequately, investing too heavily in the stock of their employer, otherwise failing to diversify, and taking a lump sum payment at job change or at retirement.
- (3) Wage level risk is the risk that changes in the participants' wages before or near retirement will affect the replacement rate provided by the pension.
- (4) Fiduciary risk includes the risk of bad advice and the risk of fraud or malfeasance by a plan service provider or fiduciary.
- (5) The employer-related risks include employers defaulting on their DB plans, and employers terminating or freezing DB plans. The risk related to employer defaults is partially shared with the PBGC.
- (6) Political risk is the risk of changes in tax laws and other laws and regulations affecting pension costs and pension risk sharing.
- (7) Retirement timing risk is that the participant will retire earlier than expected, which could be due to being laid off, having health problems, or having caregiving responsibilities.
- (8) Disability risk is different for DC and DB plans. For DC plans, it means that account contributions cease. For DB plans, often benefit accruals continue if a person becomes disabled.

Taking a broad perspective, another risk is the risk to the employer that workers will not retire when the employer would like them to, for example, during periods of reduced demand for the employer's product or service. With a DB plan, the employer can structure the plan so as to encourage retirement at certain ages. With a DC plan, the employer does not have that option, and workers may delay retirement at a time when the stock market is doing poorly, and their account balances are low. The problem for employers is that that time may be a time of low demand for employers, when they would like workers to retire. Related to this risk is the risk of job change, with DB plans providing an incentive for workers to not change jobs, which DC plans do not do. These risks have not been added into the risk index. Pension plan sponsors and participants in a global perspective face many risks that are not included in the risk index—for example, the risk of natural disasters, the risk of war, counterparty risk in direct investments, and others.

B. Pension Risk Indices

The pension risk index for participants is calculated by summing the different risks, adding 1.0 to the risk index if the participant entirely bears the risk, and adding 0.5 if the participant shares the risk with the employer or there is some other risk sharing mechanism. For example, investment risks may be shared across workers and across time by use of a reserve fund. The risk index for participants is a measure of the risk inherent in different pension plans from the perspective of participants. For any particular

participant, the riskiness of a particular plan would vary depending on the circumstances of the participant and the plan.

A key decision in constructing the pension risk is that when a choice is available to participants, the risk index is based on the option that participants usually take. Thus, for example, cash balance plans are evaluated on the assumption that participants take a lump sum benefit, even though they always have the option of taking an annuity. Because of the different options available in some plans, and the different possible outcomes in some plans, depending on circumstances, the risk index has an element of subjectivity underlying its construction.

A similar index is also constructed for large employers. The risk index for employers is calculated similarly to that for participants, counting 1.0 for a risk the employer entirely bears and 0.5 for a risk the employer shares with participants. The risks employers face depend in part on plan size. For an employer with numerous pension plan participants, the number of plan participants who die or who change jobs in a particular year at given ages may be fairly well predicted, and thus not an aspect of risk, at least at the aggregate level. For a small employer, however, predictions as to participant deaths or job turnover will generally not be as accurate because the small employer will not benefit from the statistical regularity that can be predicted with large numbers of participants. Participant deaths and job turnover will be a more important aspect of risk for the employer.

Table 3 applies the pension risk indices for participants and employers to a small selection of hybrid plans, as well as to traditional DB and DC plans. A number of simplifying assumptions were made in constructing the table. For example, in ranking DB plans, it assumes DB plans are final average pay plans.

In Table 3, plans are ranked according to their score on the participants' risk index. In this table, DB plans have a participant risk score of 6.0, while DC plans have a participant risk score of 10.0. Portability losses are one aspect of risk that DB participants face that vested DC participants do not. In between the DB and DC risk indices are life expectancy indexed DB plans with a score of 6.5 and cash balance plan with a score of 7.5. While the ranking provides a way for participants to assess the relative risks of different types of plans, the ranking could vary if the risk index excluded some risk factors or included additional risk factors.

Table 3 also provides a risk index score for large employers. In that table, as expected, employers bear the most risk in DB plans and the least in DC plans, with the hybrid plans ranging in between those two extremes. Among the hybrid plans considered in that table, the life expectancy indexed DB plan is closest to a DB plan from the perspective of both participants and employers. A Target Benefit Plan is closest to a DC plan from the perspective of participants and employers.

With this index, DC plans have a score of 10 for participants and 0 for plan sponsors. If the risk related to controlling employee retirements were incorporated, that would raise the employer risk score to 1. For DB plans, while it is sometimes considered that

employers bear all the risks, this expanded framework indicates that is not the case, with participants bearing portability risk, risk with respect to plan termination or accrual freezes, and inflation risks for benefits in payment status.

This simple index is based on equal weighting of all risks. Different variants on this index can be constructed using different weighting schemes, recognizing that some risks are generally more important than others. For example, the risks could be weighted based on a subjective assessment, with a weight, say, of 2 for more important risks, a weight of 1 for average risks and a rate of 0.5 for less important risks. For example, if it were decided to rate two factors at the level of 2—investment and mortality risk-- and two factors at the level of 0.5--political and disability risk-- the index could be recalculated. Then, for example, the risk score for cash balance plans for employees would change from 7.5 to 8. Different weighting schemes could result in a more significant change in the rating. This example provides an indication of how a more thoroughly developed weighting scheme would work.

X. CONCLUSIONS

Pension risks can be shared by participants, retirees, and employers in many different ways. In a traditional DB plan, the investment risk, the interest rate risk associated with annuitization, and the risk related to participants' longevity are all borne by employers. In a traditional DC plan, these risks are all borne by participants. However, in DB plans, participants still bear portability risks, inflation risks for benefits in payment, and risks as to plan termination or accrual freezes. This report has discussed hybrid DB plans where the investment risk, interest rate risk, the longevity risk and inflation risk are borne by participants.

DB plans have declined considerably in terms of the percentage of the workforce covered by them in both the United States and the United Kingdom. This decline has been less dramatic in Canada. Hybrid plans are of particular interest because they may provide an option that is more attractive to employers than are traditional DB plans, while preserving for participants some risk protections of traditional DB plans.

This report has analyzed the risks associated with many types of hybrid employer-provided DB and DC plans currently in existence. The analysis also has included some proposed hybrid plans and some hybrid social security plans.

Two risk indices have been calculated, one measuring the risk of different types of pensions to participants, the other measuring the risk to employers. Both indices are based on the assumption that a plan that imposes a larger number of different types of risks on participants is riskier to participants, and similarly for employers. The risk indices can be used for evaluating and comparing different types of hybrid pension plans. These indices can be constructed in different ways, with different weighting schemes, and with different risks incorporated. Nonetheless, they provide a useful way of analyzing and comparing hybrid pension plans.

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Table 1. Examples of Hybrid Pension Plans							
Plan name	EE or ER contributes	DB or DC accrual	Account balance or benefit formula	Risk borne by:			
				Investment Risk	Interest rate risk for annuitization	Mortality	Post retirement inflation
DB based							
Cash Balance Plan	ER	DC	A	ER and EE	EE	EE	EE
Pension Equity Plan	ER	DB	A	ER	EE	EE	EE
ABP Plan (Netherlands)	ER and EE	DB	B	ER and EE	ER	ER	EE
DB-k	ER and EE	DC	A	ER	EE	EE	EE
Plain Old Pension Plan	ER	DB	B	ER and EE	ER	ER	EE
Group Variable Annuity Plan	ER	DB	B	EE	ER	ER	EE
Retirement Shares Plan	ER, optional EE	DB	A	EE	ER	ER	EE
Life-Expectancy Indexed DB Plan	ER	DB	B	ER	ER	EE and ER	EE
Combination of DB plan and DC plan							
Floor Offset Plan	ER, with EE in some plans	Greater of DB or DC	Greater of A or B	ER and EE	ER	ER	EE
Sequential Hybrid (U.K.)	ER and EE	ER and EE	ER and EE	ER and EE	ER and EE	ER and EE	EE
Notes: A= account balance, B= benefit formula, DB= defined benefit plan, DC= defined contribution plan, EE= employee, ER= employer							
Source: Author's compilation							

Table 2. Pension Risk Index	
Type of risk	Risk to pension benefits arising due to:
1. investment	unexpected changes in prices in capital markets for pension fund investments
2. mortality	unexpected changes in mortality rates after retirement
3. interest rate	unexpected changes in interest rate used to calculate annuities
4. inflation	unexpected changes in inflation after retirement when benefits are not price indexed
5. portability	unexpected changes in job by pension covered workers
6. worker decision making error	worker decision making errors concerning contributions, investments, and the form in which benefits are taken
7. fiduciary risk	the risk of bad advice and the risk of fraud or malfeasance by a plan service provider or fiduciary.
8. employer-related	employer default on plan obligations, plan freezes, plan terminations
9. wage level	unexpected changes in the worker's wage level affects the value of accrued benefits
10. political	unexpected changes in tax law, pension law and pension regulations
11. retirement timing	retiring earlier than expected due to lay off, health problems, or care giver or family responsibilities
12. disability	disability affecting benefit accruals
Source: Author's compilation	

Table 3. Participant and Employer Risk Indices for Different Types of Pension Plans⁶

Plan type	Plan name	Benefits usually annuity (A) or lump sum (L)	Worker risk index	Employer risk index	Types of risk borne by participants in pension risk index
DB	Employer DB (U.S.)	A	6.0	6.0	portability, COLA, employer-related, political, salary, retirement timing
Hybrid	Life-Expectancy Indexed (LEI) DB	A	6.5	5.5	portability, COLA, employer-related, mortality (shared), political, salary, retirement timing
	Floor plan	L	6.5	4.5	COLA, investment (shared), mortality, interest rate, political, salary, retirement timing, disability
	Cash Balance Plan	L	7.5	3.5	COLA, employer-related, investment (shared), mortality, interest rate, political, salary, retirement timing
	Pension Equity Plan	L	8.0	4.0	portability, COLA, employer-related, mortality, interest rate, political, salary, retirement timing
	Target Benefit Plan	L	8.5	0	COLA, investment (pooled), mortality, interest rate, fiduciary, political, salary, retirement timing
DC	Employer DC (U.S.)	L	10.0	0	COLA, investment, mortality, interest rate, employee decision, fiduciary, political, salary, retirement timing, disability

Source: Author's compilation

⁶ This rating system represents the evaluation of the author.

Appendix 1. Hybrid Plans in Different Countries

This section surveys hybrid plan arrangements in a small number of countries where those types of plans are used. More information, including references, can be found in the body of the paper.

United States. Cash balance plans are by far the most common hybrid plan type in the United States. Also, there are some Pension Equity Plans, as well as floor offset plans and target benefit plans. Some non-ERISA DC plans provide rate of return guarantees.

Canada. There are some cash balance plans in Canada. Recently, the possibility of passing provincial legislation enabling Target Benefit Plans has been discussed, with these plans being called Shared Risks Plans. In Canada, employers providing both a DB and a DC plan are considered to be providing hybrid plans. While that might be considered to be a hybrid arrangement, providing two separate plans is not considered to involve hybrid plans in this paper.

The Netherlands. Collective defined contribution plans are common among single employer plans in the Netherlands.

The United Kingdom. The United Kingdom has some floor offset plans, which they call a DB scheme with a DC underpin, or simply underpin plans. The most common hybrid may be what they call a “nursery scheme,” where the participant is in a DC scheme until some age, such as age 40, then is transferred to a final average pay DB plan.

Germany. The Riester Plans in Germany, providing a rate of return guarantee of 0 percent, are a type of hybrid plan.

Sweden. The Notional Defined Contribution Plan, which is the main part of social security in Sweden, is a type of hybrid plan.