Pension Design Innovation

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Public Pension Funding Forum

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Pension plan types

Traditional contributory plans

- Defined contribution (DC)
- Defined benefit (DB)

Hybrid contributory plans

- Notional defined contribution (NDC)
- Collective defined contribution (CDC)
  - Contributions
  - Accrual of benefits
  - Benefits in payment

Pension plan sponsors

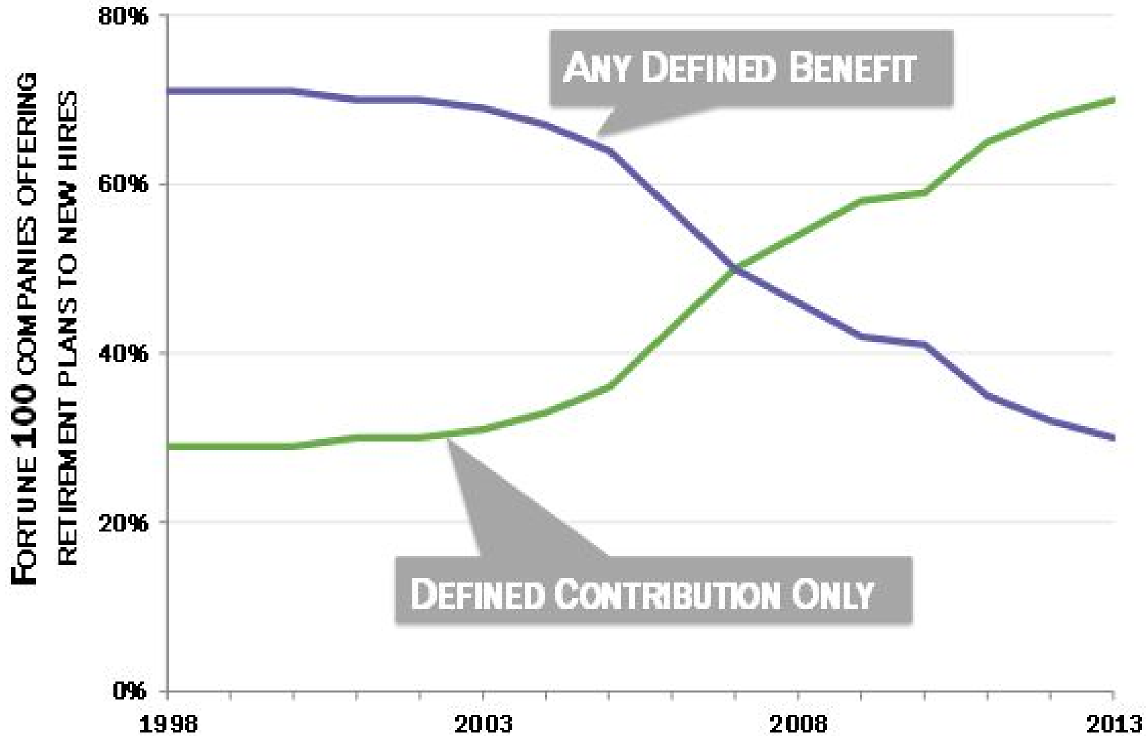
National government – national plan

Public employer

Private employer; group of employers

Individual worker; group of workers

A SHIFT TO DEFINED CONTRIBUTION PLANS



SOURCE: Towers Watson

WWW.BIPARTISANPOLICY.ORG

BIPARTISAN POLICY CENTER

Netherlands

Name	Type of Pension
General Old Age Pensions Act (AOW)	Noncontributory pension
Occupational Quasi-mandatory	Fully funded defined benefit Defined contribution Collective defined contribution

Netherlands
Collective defined contribution pensions

- A single pooled fund for investment purposes (normally at the industry level).
- Benefits are price-indexed or wage-indexed lifetime payments beginning at retirement, based on a “career average” benefit formula (was final pay).
- Benefits in payment and future benefits are both adjusted based on asset returns and mortality experience.

Decline of DB pensions in the UK

Since late 1990s, c8000 private-sector DB schemes gradually closed, replaced mainly by DC with low contributions.

The Case for Collective DC

November 2013

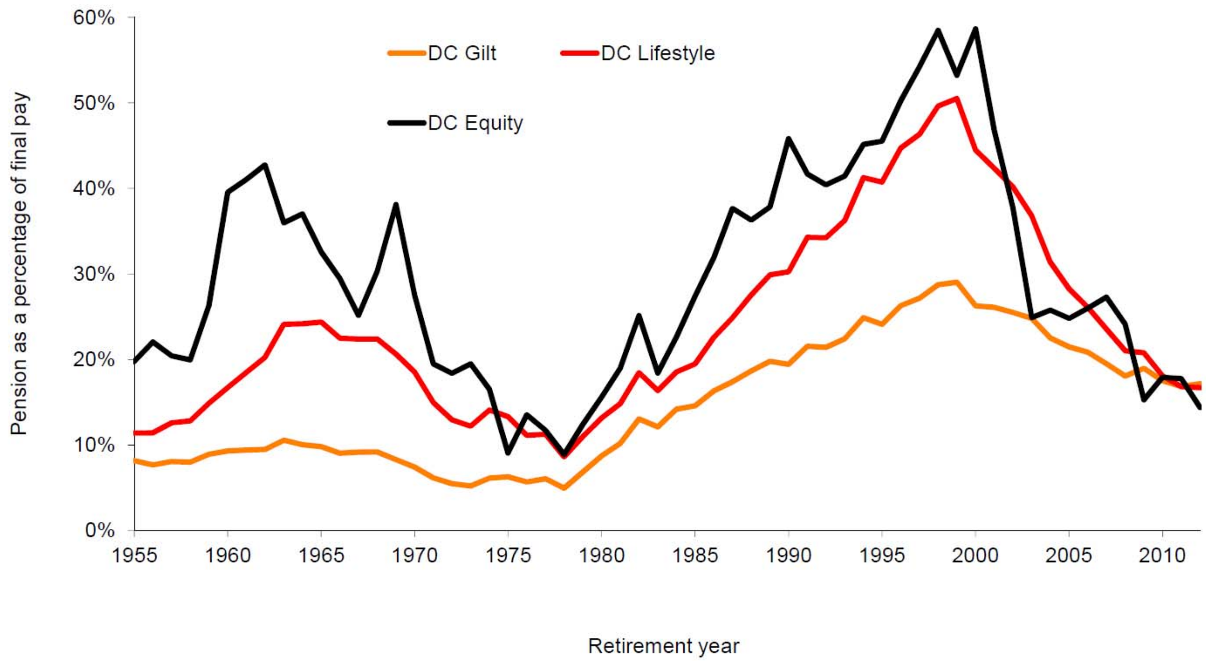
A new opportunity for UK pensions

An Aon Hewitt White Paper

Prepared by:
Kevin Wesbroom
David Hardern
Matthew Arends
Andy Harding

Aon Hewitt

Historic DC outcomes: The chart shows vividly the extreme range of outcomes a member might have experienced - ranging between 6% and 60% of final pay.



: Figure 1, Wesbroom et al. "The Case for Collective DC, A new opportunity for UK Pensions," *Aon Hewitt White Paper*, Nov 2013.

Collective Advantages (Aon Hewitt, 2013)

In our view the two strongest advantages of CDC plans over the best of DC solutions found in the market at present are:

- The mixture of risk that can be taken on behalf of plan members allows optimisation of investment returns over time and avoids decisions being driven by short-term issues.
- The fact that pensions are paid from the plan rather than being purchased by way of annuities in the open market means that greater amounts can be held in return seeking assets, thereby leading to superior expected outcomes.

  In addition, avoiding an annuity purchase means that the profit margin and cost of capital for an insurer are avoided, and more of the assets are applied to improving members' benefits.

Equivalent rates of return

- DC: Only safe asset **2%** real return
- DC: Also risky asset iid risk Er=**5.9%** ann risk of SP500
  Equivalent to safe return of **3.33%**
- DB: max chosen for zero expected growth of fund under optimal policy
  Equivalent to safe return of **4.39%**
- DB with participation constraint as in Netherlands:
  Equivalent to safe return of **3.83%**

Christian Gollier, 2008, Intergenerational risk-sharing and risk-taking of a pension fund. Journal of Public Economics, 92, 5-6, 1463-1485.

New Brunswick Public Service Pension Plan

The purpose is to provide secure pension benefits without an absolute guarantee, but with a high degree of certainty that base benefits can be met in the vast majority of potential future economic scenarios.

Future cost of living adjustments and other ancillary benefits such as early retirement subsidies will only be provided to the extent that the pension assets are sufficient to pay such benefits.

The Funding Policy provides guidance and rules regarding decisions that must, or may be made by the Board of Trustees around funding levels, contributions and benefits.

Funding Policy

- The 15 year open group funding ratio compares the fair market value of the Plan's assets, plus the present value of excess contributions over the next 15 years, to the Plan's liabilities.
- The Plan's liabilities are based on the benefits earned to the date of the report.
- This asset-liability ratio is used to determine the actions, such as granting indexing, to be taken by the Board of Trustees under the Plan's Funding Policy.

Annual risk management tests

An annual calculation of at least 1,000 20-year simulations of a range of plausible parameter values. The results of these tests may cause the need for short-term adjustments in any one year to help preserve long-term financial health.

- Primary Risk Management Goal: Achieve at least 97.5% probability that benefits earned would not be reduced over the next 20 years.
- Secondary Risk Management Goal #1: members and retirees will receive 75% of the Consumer Price Index (CPI) over the next 20 years.
- Secondary Risk Management Goal #2: 75% of ancillary benefits (e.g., early retirement subsidy) will be provided over the next 20 years.

Open group funded ratio falls below 100% for two successive years

- A contribution increase of up to 3% of earnings (1.5% each for employee and employer contributions) until such time as the open group funded ratio reaches 110% (without considering the effect of the contribution increase) and the funding goal under regulation is met.

- Future and present benefits can be reduced:
  - Change the rules for non-vested members to a full actuarial reduction for early retirement; then
  - Reduce base benefit accrual rates for future service by no more than 5%; then
  - Reduce base benefits on a proportionate basis for all members for both past and future service in equal proportions.

Open group funded ratio exceeds 105% for two successive plan year ends

A portion of the excess may be utilized for the following summarized actions in their order of priority:

Reverse previously reduced base benefits under the
funding deficit recovery plan; then

Provide indexing of base benefits for future payments up to full CPI for every year that has been missed or
partially covered

Open group funded ratio is at least 140%

Reduce contribution rates in such an amount as to maintain an open group funded ratio of 140%; then

Establish a reserve to cover the next ten years of potential contingent indexing; then

Propose benefit improvements subject to certain criteria.

New Brunswick Public Service Pension Plan

- If, at any time, there is an increase or a decrease in employees employed by the employer of more than 5% in a given year, the initial contribution rates shall be re-calculated.
- Effective 15 years after the conversion, the employee and employer contributions shall be set such that the total initial contributions remitted are shared equally between the employees and employers.

Tontine

Lorenzo di Tonti: Born 1602 (Italy), died 1684 (Paris). Real name: Lorenzo Baroncini.

A simple tontine involves a group of investors who each buy a share of a fund that pays out returns that are divided among the remaining living members.

Sweden

Name	Type of pension
Inkomstpension (16%)	Notional defined contribution
Premium pension (2.5%)	Funded defined contribution
Guaranteed pension	Minimum pension guarantee

Sweden: Premium Pension in 2016

- 843 private funds administered by 108 management companies
  - 573 equity funds
  - 97 mixed funds
  - 41 generation funds
  - 132 interest funds
- 3 government funds administered by 1 management company (AP7 SÅFA)
  - 1 equity fund
  - 1 fixed income fund
  - Life cycle

Sweden: Premium Pension Annuity

Mandatory annuitization (unisex rules) with the government providing two options

- Traditional insurance-with-profit annuity: a nominal guaranteed monthly amount with possible monthly supplement, which may vary from year to year.

- Retain accumulated balance in the fund. The pension amount depends on the rate of return of the funds chosen by the saver and realized mortality.

Sweden: Premium Pension Annuity

The amount of the premium pension is recalculated once each year, based on the value of fund shares in December. The value of the pension account is divided by an annuity divisor, based on forecasts of future life expectancy. Each month, a sufficient number of fund shares are sold to finance payment of the calculated premium pension.

Inheritance gains arising and distributed are analogous to decedents' capital. Inheritance gains are distributed once a year, determined by the sum of the capital released by deaths in the previous calendar year.

Sweden: Inkomstpension balancing

Assets

The value of assets of the National Pension Funds

plus

the contribution asset, equal to the pension liability that the contribution revenue for the accounting year could finance if the conditions prevailing at the time of valuation remained constant.

Liabilities

Pension balances of insured persons who have not begun to draw an old-age pension

plus

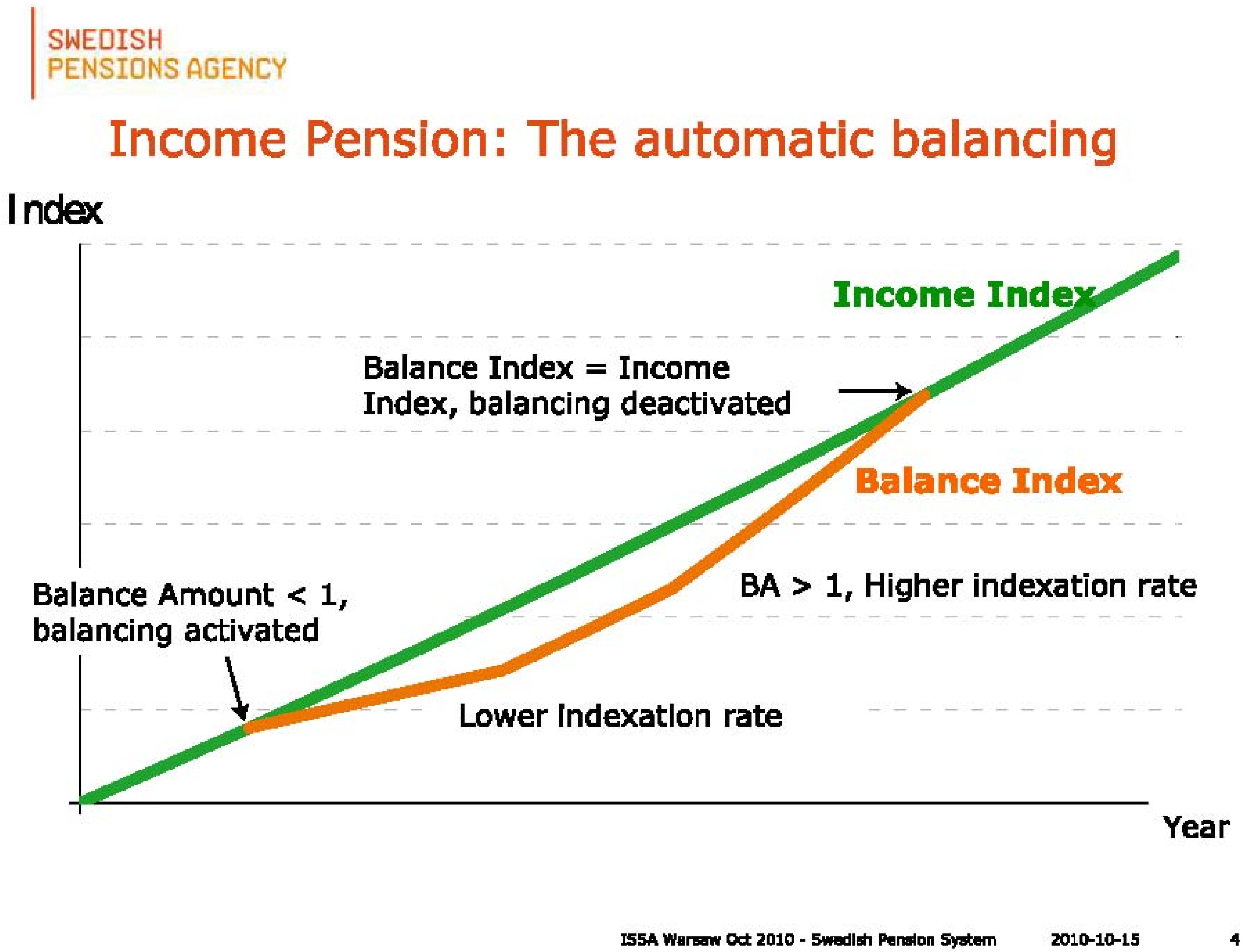
annual amounts to retirees multiplied by the expected number of years for which the amount will be disbursed. The number of years is discounted in order to reflect the indexation.

Sweden: Inkomstpension balancing

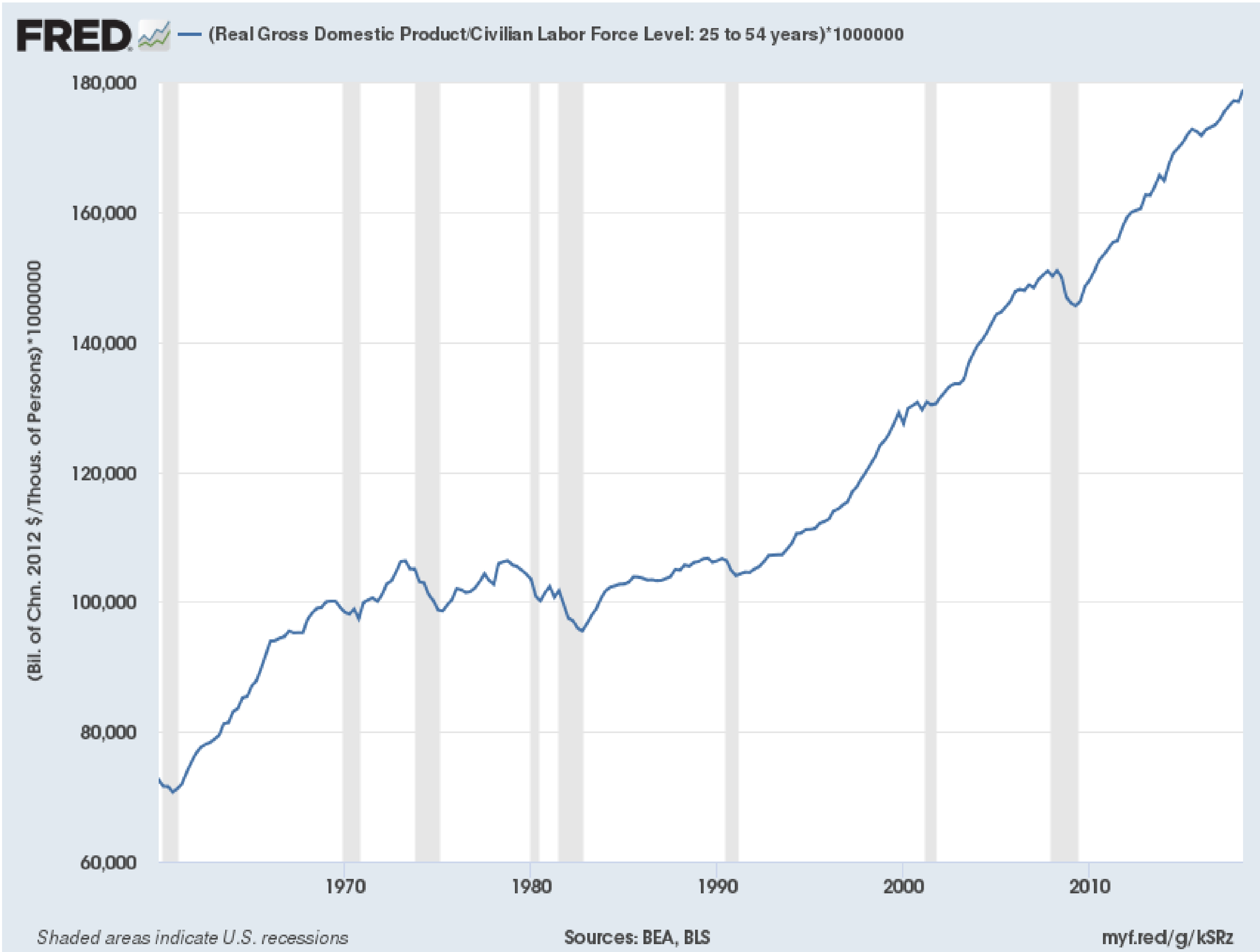
- Balance ratio is assets/liabilities, lagged for data availability. Damped balance ratio is equal to 1 plus one-third of the difference between the balance ratio and the number 1.

- If the balance ratio is less than 1.0, the balance index is used instead of the income index, $B_t = I_t \cdot B_T^*$, so indexation of pensions and pension balances is reduced.

- After balancing, later surpluses are used to increase indexation and thus to restore the value of pensions.



Source: Billberg, Lars. "ISSA Technical Seminar on funded public pensions: country experience – Sweden." International Social Security Association. 2010.


FRED
(Real Gross Domestic Product/Civilian Labor Force Level: 25 to 54 years)*1000000
180,000
160,000
140,000
120,000
100,000
80,000
60,000
(Bil. of Chn. 2012 $/Thous. of Persons)*1000000
1970
1980
1990
2000
2010
Shaded areas indicate U.S. recessions
Sources: BEA, BLS
myf.red/g/kSRz

Canada Pension Plan

- Every three years, the Chief Actuary of Canada reviews the contribution rate required to sustain the CPP over the next 75 years.
- If the system is not financially sustainable there is a semi-automatic adjustment that freezes benefits and increases the contribution rate until the next triennial evaluation.

Insufficient rates provisions of Base CPP serve as a safety net in case of political impasse

If the minimum contribution rate is higher than the legislated contribution rate

AND

if the federal and provincial finance ministers cannot reach an agreement

THEN

Contribution rate increased by ½ of excess over three years

Benefits frozen until next review (3 years).

Collective Advantage Questions

1. How important is accommodating different risk aversions during accumulation? One fund or many (by cohort or individual). Overlapping generations and risk sharing

2. How well does asset accumulation risk sharing across cohorts during working life work in the presence of limits on funding shortfalls?

3. How well do asset and mortality risk sharing across retirement cohorts work with limits on funding shortfalls?

4. How large is the low labor supply risk?

5. How fair is shifting risk to much younger people?

6. How can pension plans better address the shortcomings in the capital and insurance markets