30 Cannon Street, London EC4M 6XH, United Kingdom
Tel: +44 (0)20 7246 6410 Fax: +44 (0)20 7246 6411
Email: iasb@iasb.org Website: www.iasb.org

International Accounting Standards Board

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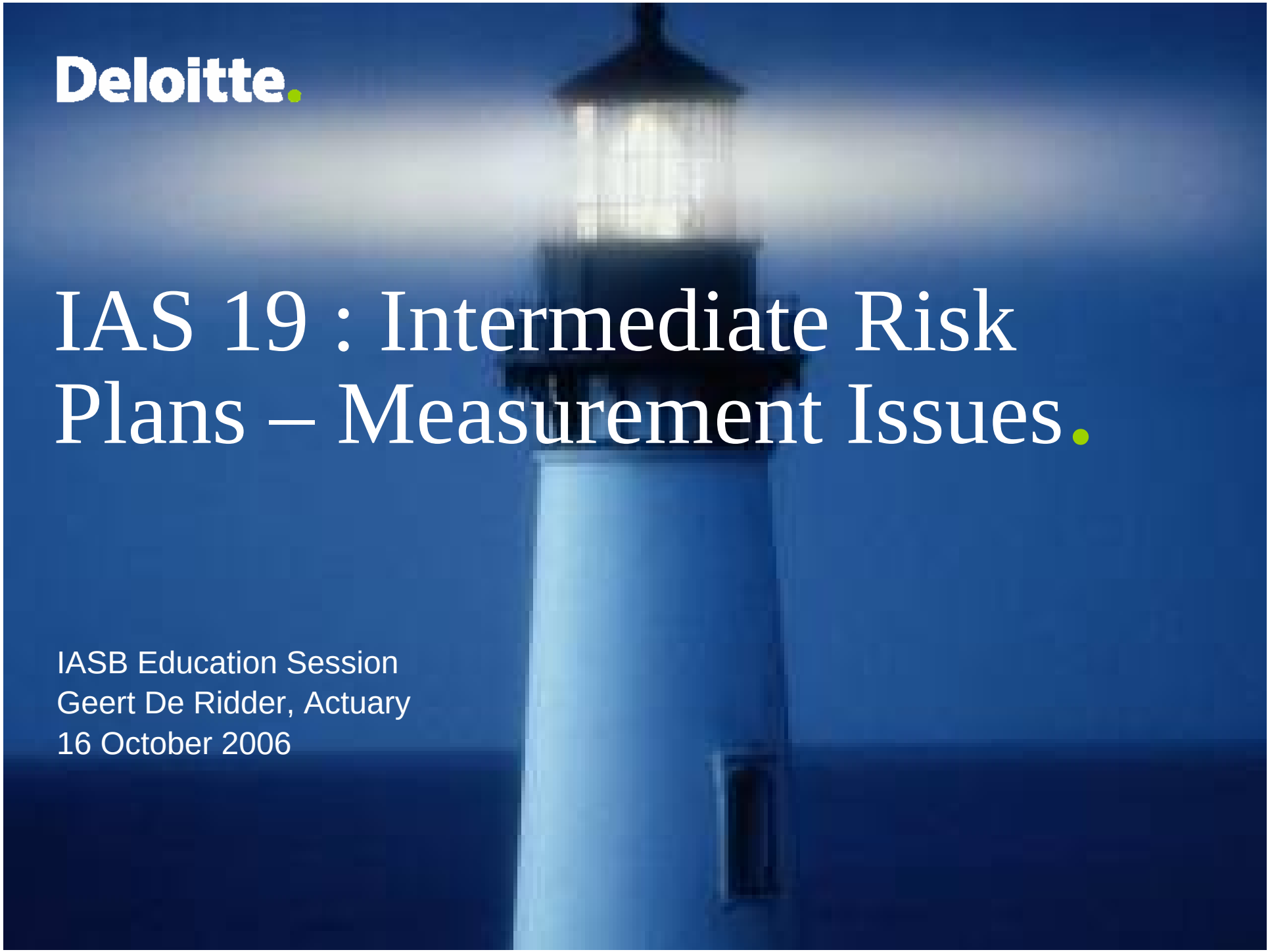
These notes are based on the staff papers prepared for the IASB. Paragraph numbers correspond to paragraph numbers used in the IASB papers. However, because these notes are less detailed, some paragraph numbers are not used.

INFORMATION FOR OBSERVERS

Board Meeting:	**16 October 2006, London**
Project:	**Post-employment benefits**
Subject:	**Intermediate Risk Plans – Education Session (Agenda Paper 3 - Appendix C)**



Deloitte.

IAS 19 : Intermediate Risk Plans – Measurement Issues.

IASB Education Session
Geert De Ridder, Actuary
16 October 2006

Agenda

- Introduction
- Belgian “Defined Contribution” Plans
- Problems with Current DB Accounting
- Measurement of Embedded Guarantees
- Illustration of Deconstruction Approach

Introduction

Type of plan	**Defined contribution (DC)**	**Defined benefit (DB)**
Obligation of entity	Limited to amount that it agrees to contribute to the fund	To provide the agreed benefits to current and former employees
Actuarial and investment risk	Fall on employee	Fall on employer
Recognition and measurement	Expense equals contribution due for period	Expense based on **Projected Unit Credit** method

Introduction

- Defined benefit plans where risks are shared by the employee **and** the employer are referred to as **Intermediate Risk Plans** (IRPs)
- Problems regarding the accounting treatment of such plans have previously been identified, cf. :
  - **IFRIC D9** regarding Employee Benefit Plans with a Promised Return on Contributions or Notional Contributions (July 2004)
  - IFRIC Update, June 2005
- **Deconstruction approach** under which DB, DC and embedded guarantees are valued separately, was outlined in IFRIC Updates (e.g. August and November 2005)

Introduction

- Using, by way of example, relatively straightforward **Belgian "defined contribution" plans** (which can be considered as Intermediate Risk Plans), this presentation illustrates :
  - **problems** with applying current defined benefit accounting methodology
  - **alternative measurement approaches**

Belgian “DC” Plans – Minimum Guarantees

- As from 1 January 2004, Belgian pension plans have to provide :
  - **minimum guaranteed rates of return** in case of DC pension plans
  - right to convert lump sums into pensions in which case **minimum commutation factors** apply

  (similar minimum guarantees apply in Switzerland)

Belgian “DC” Plans – Minimum Guarantees

- **Minimum guaranteed rates of return** (DC plans) equal :
  - on **employee contributions** : currently **3.75%** (*)
  - on **employer contributions** : **same less 0.5%** (**)

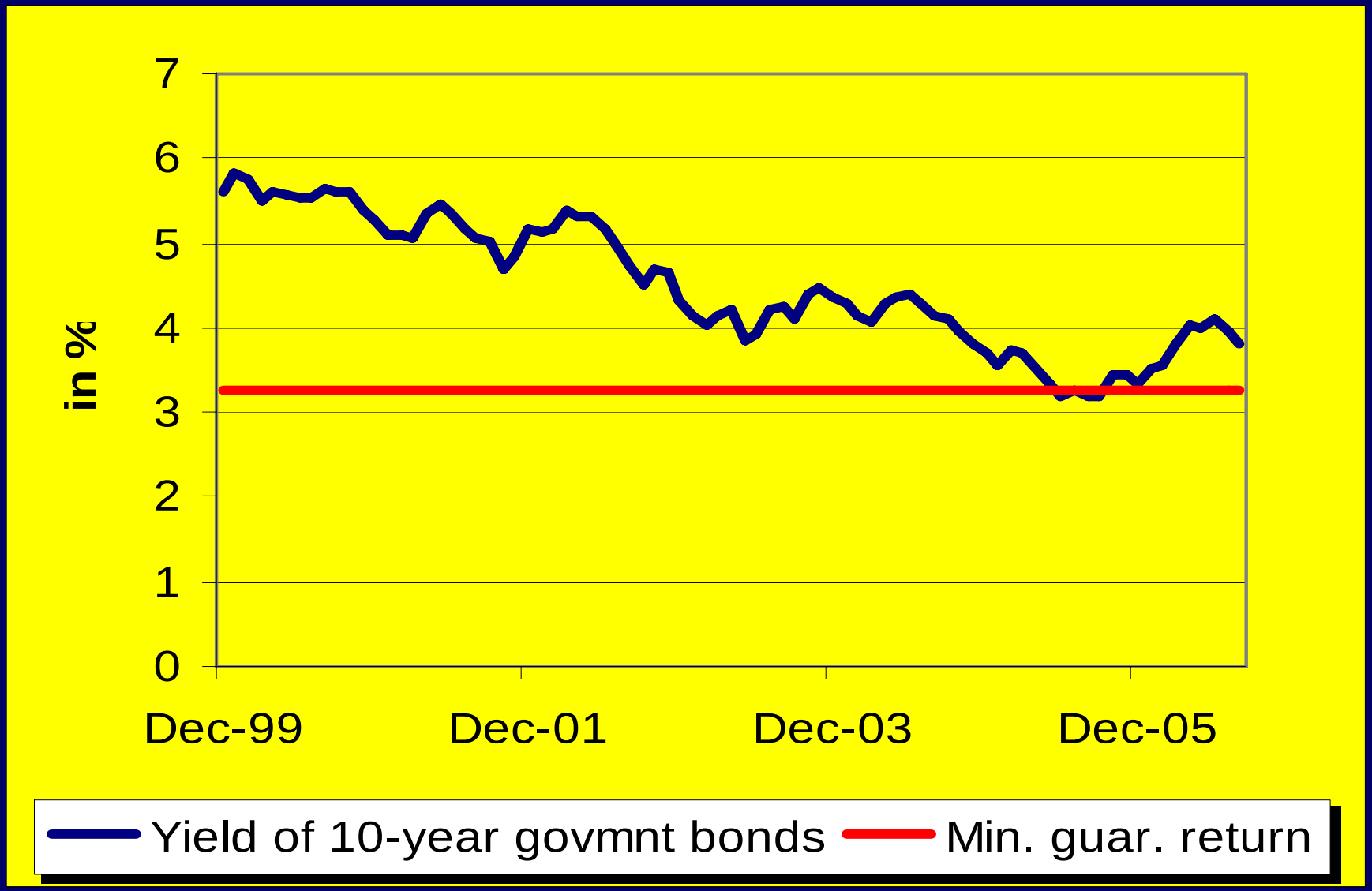
  (*) currently defined as maximum interest rate which can be guaranteed by life insurance companies (rate fixed by Royal Decree)

  (**) limited to inflation during first 5 years of affiliation; the employer contribution may be reduced by up to 5% for expenses
- Those rates do not apply on a year by year basis but **on average** over the employee’s period of affiliation to the plan
- In case of a deficit, the employer has to pay an additional contribution at the employee’s date of leaving

Belgian “DC” Plans – Minimum Guarantees

- The **minimum commutation factors**, applicable in case of commutation of a lump sum into a pension, are currently based on :
  - a 3.25% discount rate
  - MR / FR mortality tables with an age correction of -5 years
- At least 60% of the profits realized on such lump sum conversions must be used to increase the pensions

Belgian “DC” Plans – Minimum Guarantees



Belgian “DC” Plans – Minimum Guarantees

Year	Contribution Employer (boy)	Actual rate of return (1)	Account balance (eoy)	Minimum reserves @ inflation (eoy)	Minimum reserves @ 3.25% (eoy)
2000	10,000	-0.1%	9,990	10,250	10,325
2001	10,000	-5.1%	18,971	20,696	20,986
2002	10,000	-11.9%	25,523	31,125	31,993
2003	10,000	9.3%	38,827	41,824 (2)	43,357
2004	10,000	8.9%	53,172	53,016	55,091
2005	10,000	15.0%	72,648	-	67,207

(1) Average return of Belgian pension institutions (BVPI/ABIP 2005 survey)
(2) In case of leaving at, for example, 31/12/2003, the employer would have had to pay an additional contribution equal to 41,824 less 38,827 EUR

Belgian “DC” Plans – Minimum Guarantees

- Illustration of potential impact of **conversion of lump sum into pension :**
  - at retirement, an employee opts to commute his accumulated savings (i.e. 100 kEUR) under a defined contribution plan into a pension
  - for a single man, aged 60, the **minimum guaranteed pension** equals :

    100,000 / 16.85 = 5,934 EUR p.a.
  - unless settled with an insurance company, the **employer retains a defined benefit obligation** after retirement (cf. investment risk and longevity risk)

Belgian “DC” Plans – Classification under IAS 19

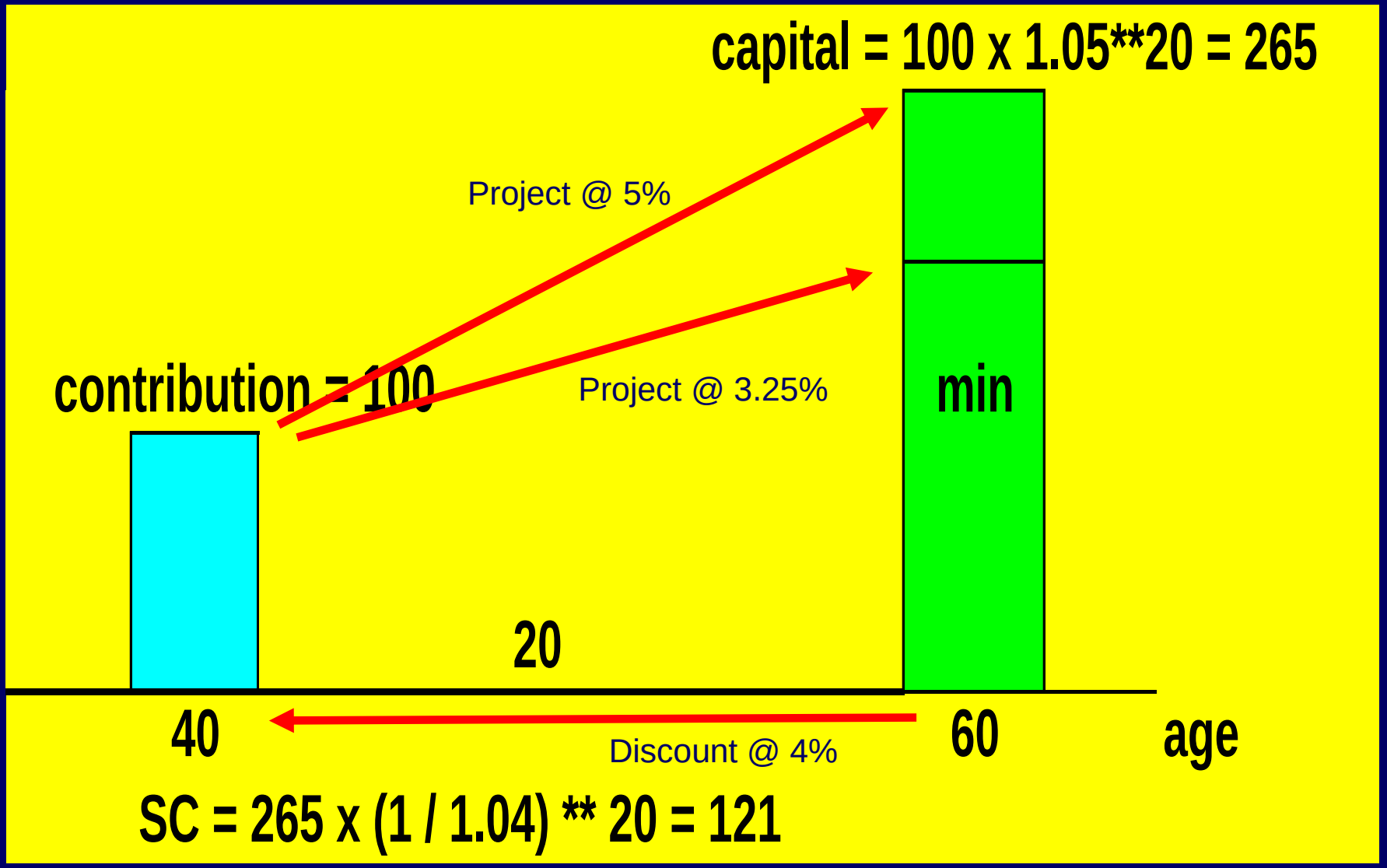
- The Belgian DC Plans classify as **defined benefit plans** (cf. IAS 19.24 and 25 which refer to “a specified return on contributions”)
- Most plans are **insured** in which case the insurance company covers most of the risk, i.e.
  - currently, most insurance companies guarantee a 3.25% interest rate
  - currently, most insurance companies apply tariffs which are in line with the minimum commutation factors
- As the risks are not entirely covered by the insurance companies, insured plans still qualify as defined benefit plans (cf. IAS 19.39)

Problems with Current DB Accounting

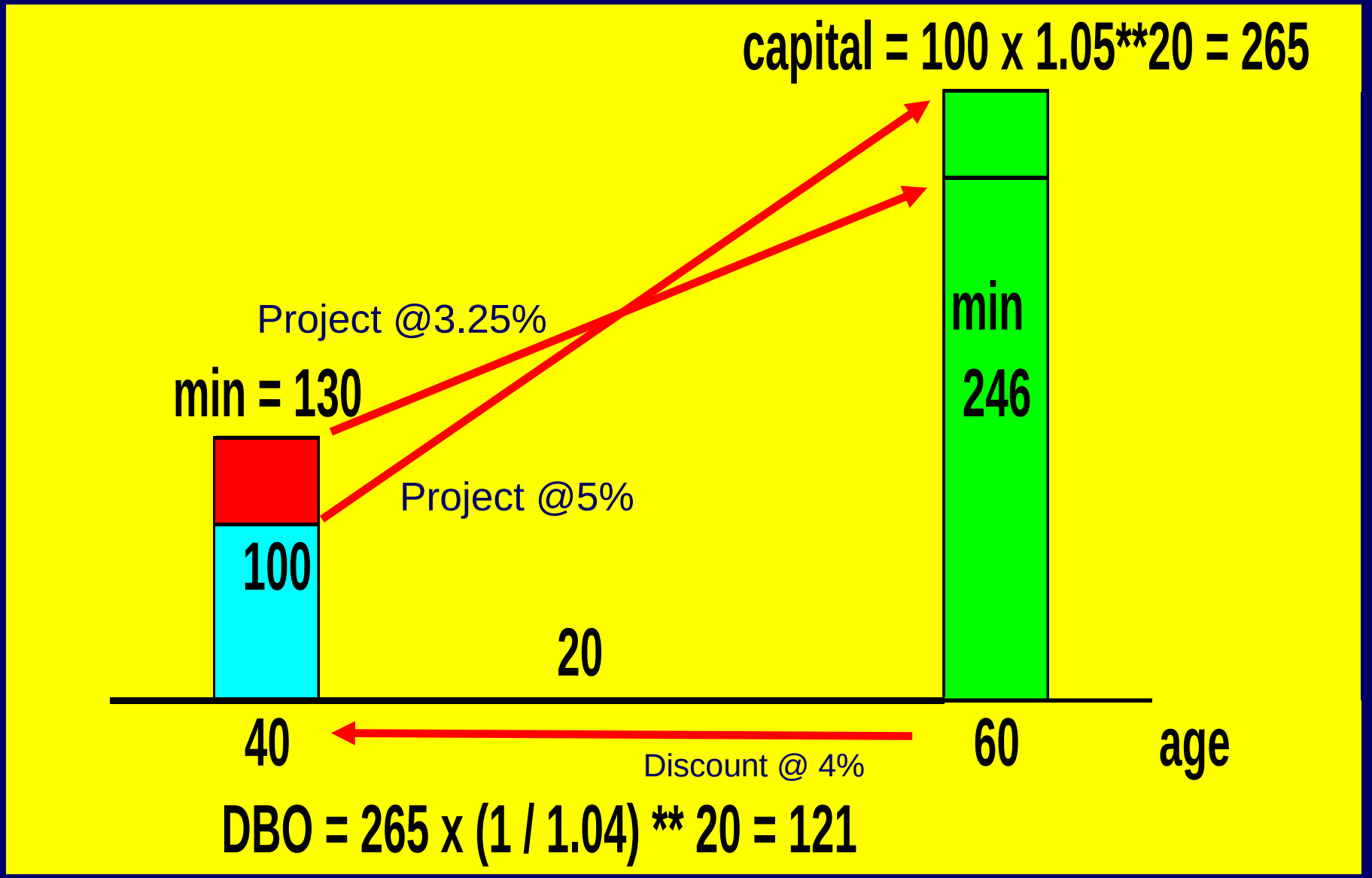
- Currently, IAS 19 prescribes for **all** defined benefit plans the Projected Unit Credit (PUC) method, which implies :

Step 1	Projection of benefits using "**best estimate"** assumptions For "DC" plans with a minimum guaranteed rate of return, the projected benefits are deemed to be estimated by projecting contributions based on the **expected rate of return**
Step 2	Attribute projected benefits to periods of service
Step 3	Discount the projected benefits using a **high quality corporate bond yield**

Belgian “DC” Plans : Service Cost vs. Contribution



Belgian “DC” Plans : DBO vs. Plan Assets



Problems with Current DB Accounting

	Plan 1 (Low risk)	**Plan 2 (Medium risk)**
Asset mix	100% bonds, 0% equities	50% bonds, 50% equities
Discount rate	4%	4%
Expected rate of return	4%	**5%**
Funded status	DBO = 100 Assets = (100) Deficit = 0	DBO = 121 Assets = (100) Deficit = 21

Problems with Current DB Accounting

	DC Plan 1	**DC Plan 1bis**
Minimum rate of return	3.25%	3.25% **+ 0.5%**
Discount rate	4.00%	4.00%
Expected rate of return	4.00%	4.00%
Funded status	DBO = 100 Assets = (100) Deficit = 0	Same !

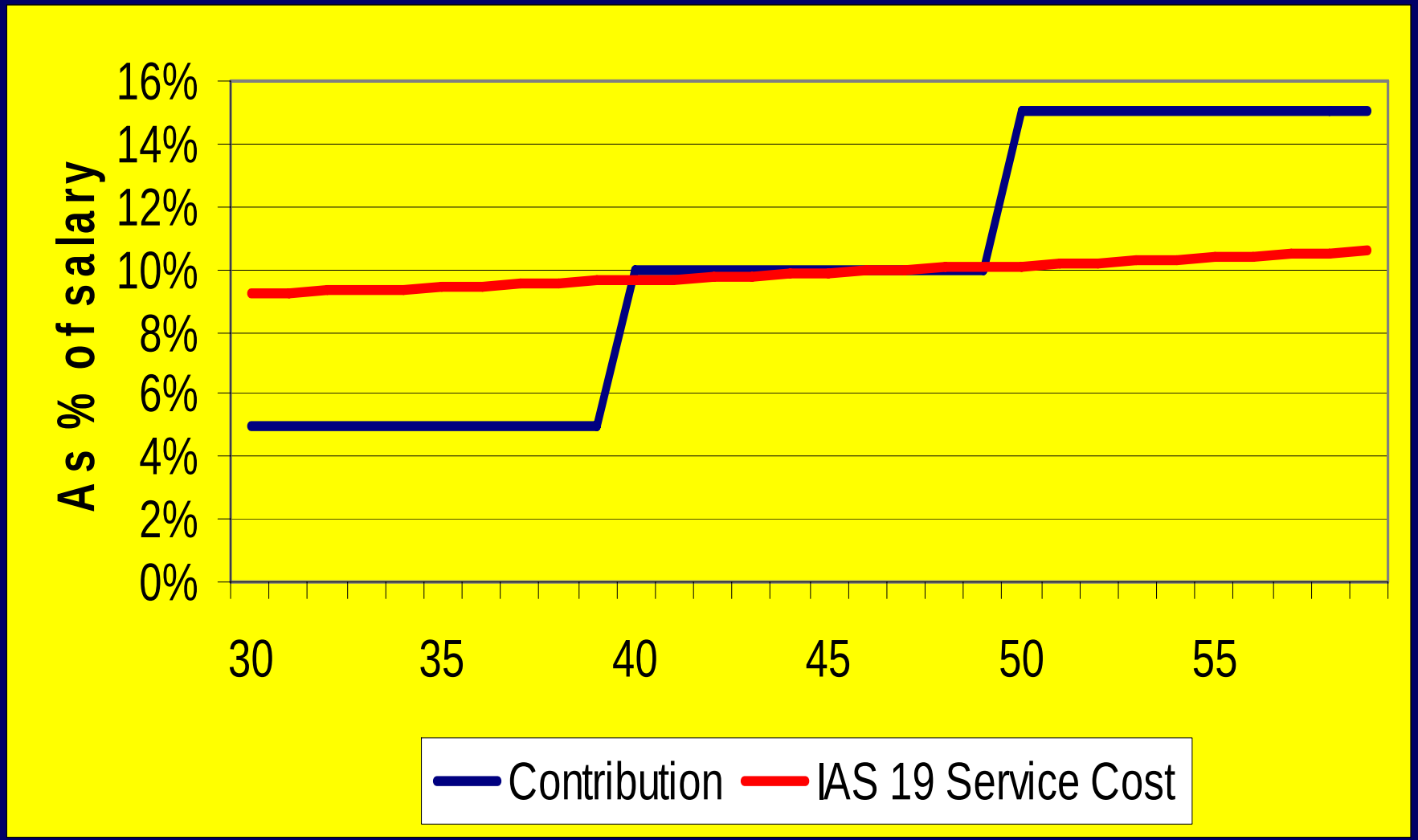
Problems with Current DB Accounting

- As pointed out in IFRIC Update, August 2005, projection of assets based on an **expected rate of return**, different from the discount rate, leads to problems
- IFRIC D9, dated July 2004, foresaw projection based on **minimum** guaranteed rate of return and recognition of an additional liability “just” to allow for excess returns obtained in the past
- The Projected Unit Credit method and the initially proposed alternative approach in D9 do not measure the embedded guarantee

Problems with Current DB Accounting

- Assume Belgian “DC” plan with age-related contributions :
  - below age 40 : 5% of salary
  - age 40 to 50 : 10% of salary
  - from age 50 : 15% of salary
- In case of “back-loaded formulae”, IAS 19.67 foresees that the projected full career benefits are attributed on a straight-line basis over the career
- As a result, the service cost will be approximately equal to the “average” contribution over the employee’s career

Belgian ‘DC” Plan : Contribution vs. Service Cost



Problems with Current DB Accounting

- **Such a “redistribution” of the cost does not apply to a similar DC plan without any minimum guarantees**
- Hence, there appears to be discontinuity in the treatment of “pure” DC plans and identical “DC” plans with a (sometimes small) minimum guarantee
- Note

  EITF Issue N° 03-4, dated May 2003, foresees **unit credit method** for certain cash balance plans (i.e. interest credit based on a fixed rate)

Embedded Guarantee – Empirical Analysis

- Empirical analysis over up to **820 calendar year periods** during last 40 years, i.e.

  1966 - 1966, 1966 - 1967, ... , , 1966 – 2005 (# 40)

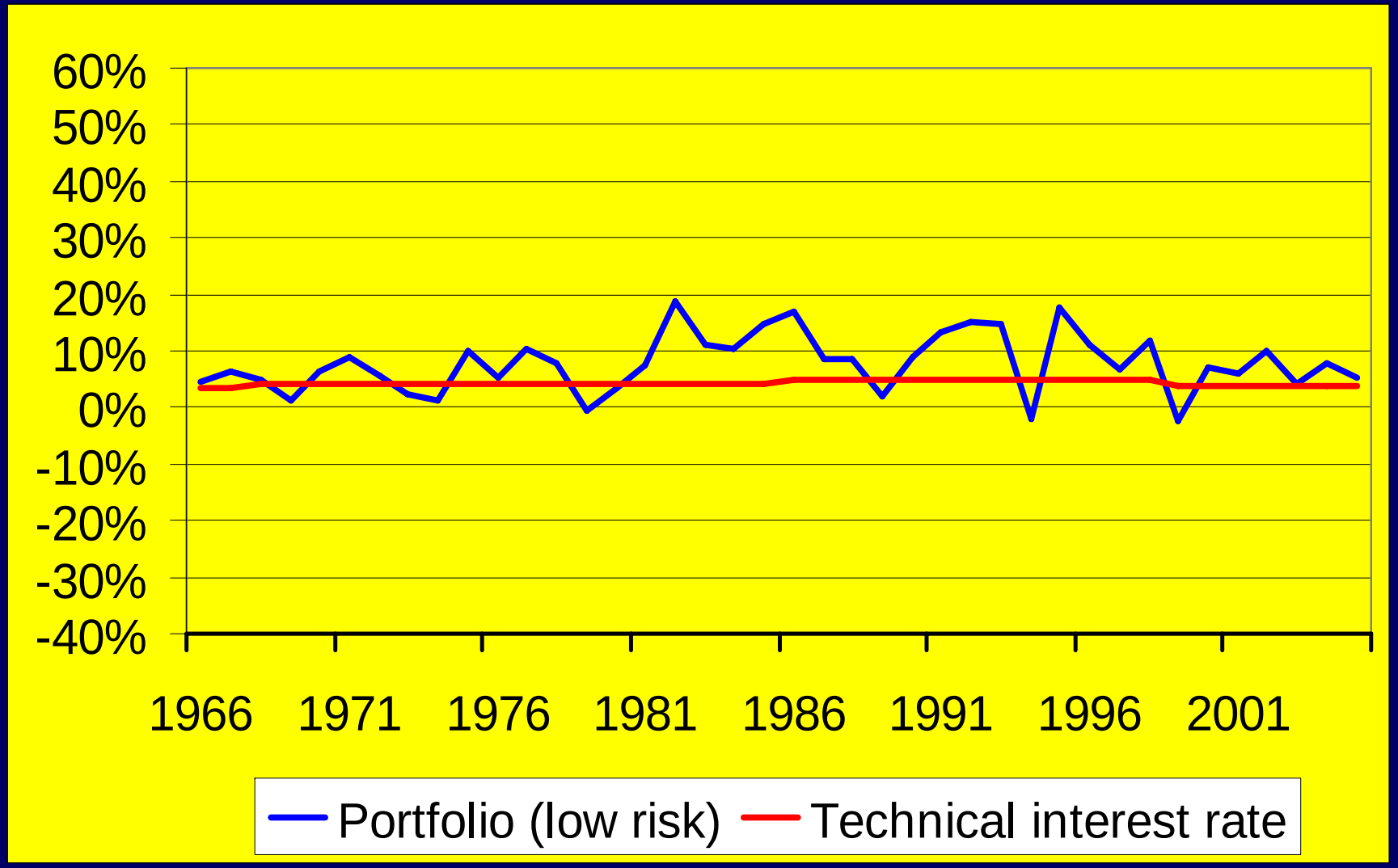
  1967 - 1967, … , , 1967 – 2005 (# 39)

  …

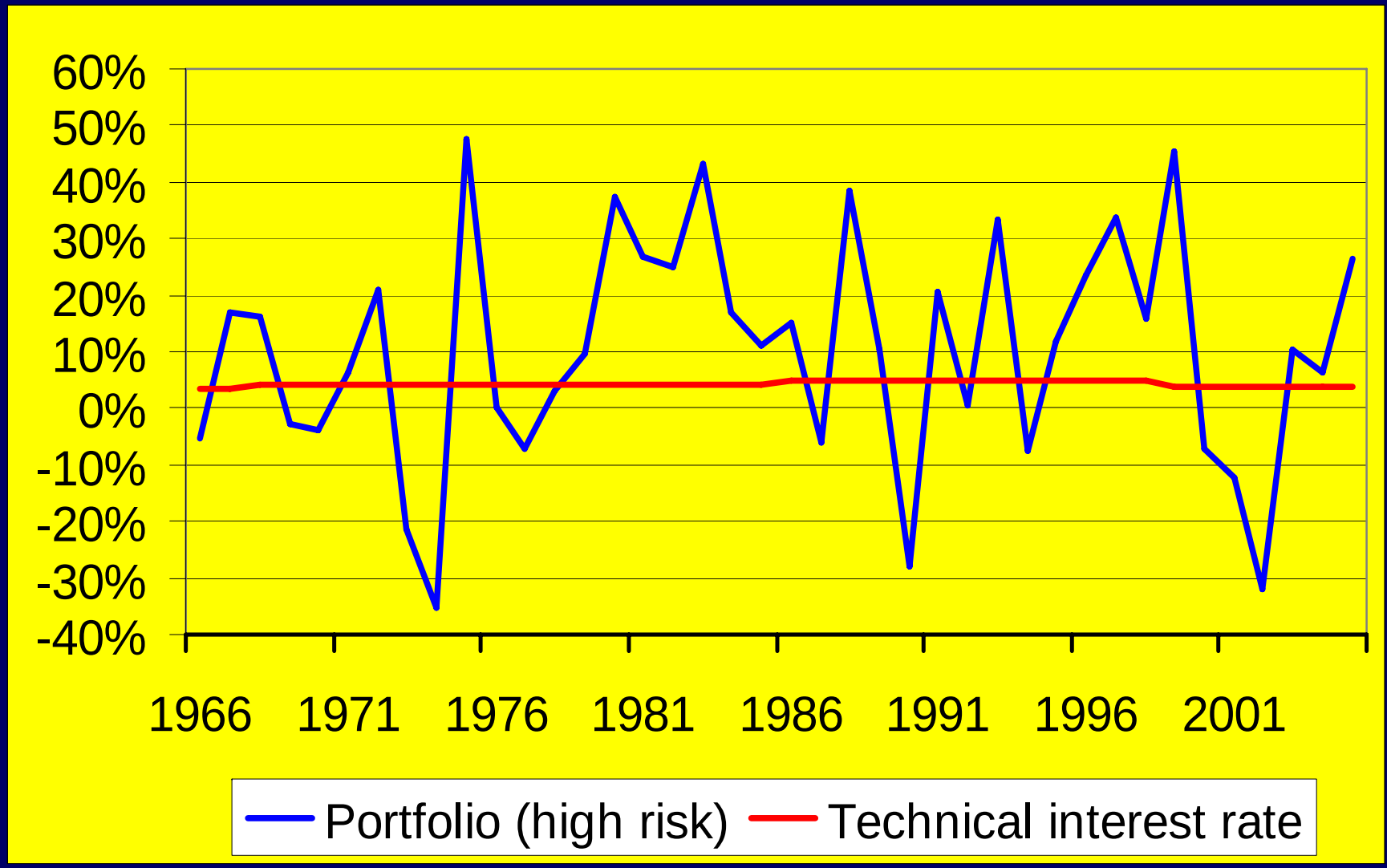
  2005 – 2005 (# 1)

- Assume employer contribution of 100 invested each year in **low or high risk portfolio**
  - Low risk : 100% euro goverment bonds (Belgian bonds <1999)
  - High risk : 100% global equities

Actual Rates of Return – Low risk portfolio



Actual Rates of Return – High risk portfolio



Sample of Deficits – High risk portfolio

From / to	2000	2001	2002	2003	2004	2005
2000	-11	-41	-137	-121	-112	0
2001		-16	-82	-68	-60	0
2002			-35	-24	-16	0
2003				0	0	0
2004					0	0
2005						0

Embedded Guarantee – Empirical Analysis

	Portfolio (low risk)		Portfolio (high risk)	
	1966-2005	1996-2005	1966-2005	1996-2005
Asset allocation	100% euro bonds		100% global equities	
Average rate of return	8%	7%	8%	9%
Standard deviation	5%	4%	20%	22%
Number of periods	**820**	**55**	**820**	**55**
Average period (years)	**14**	**4**	**14**	**4**
Number of shortfalls	**14**	**2**	**125**	**26**
Average shortfall as % of account balance	**0.0%**	**0.0%**	**0.2%**	**10.7%**

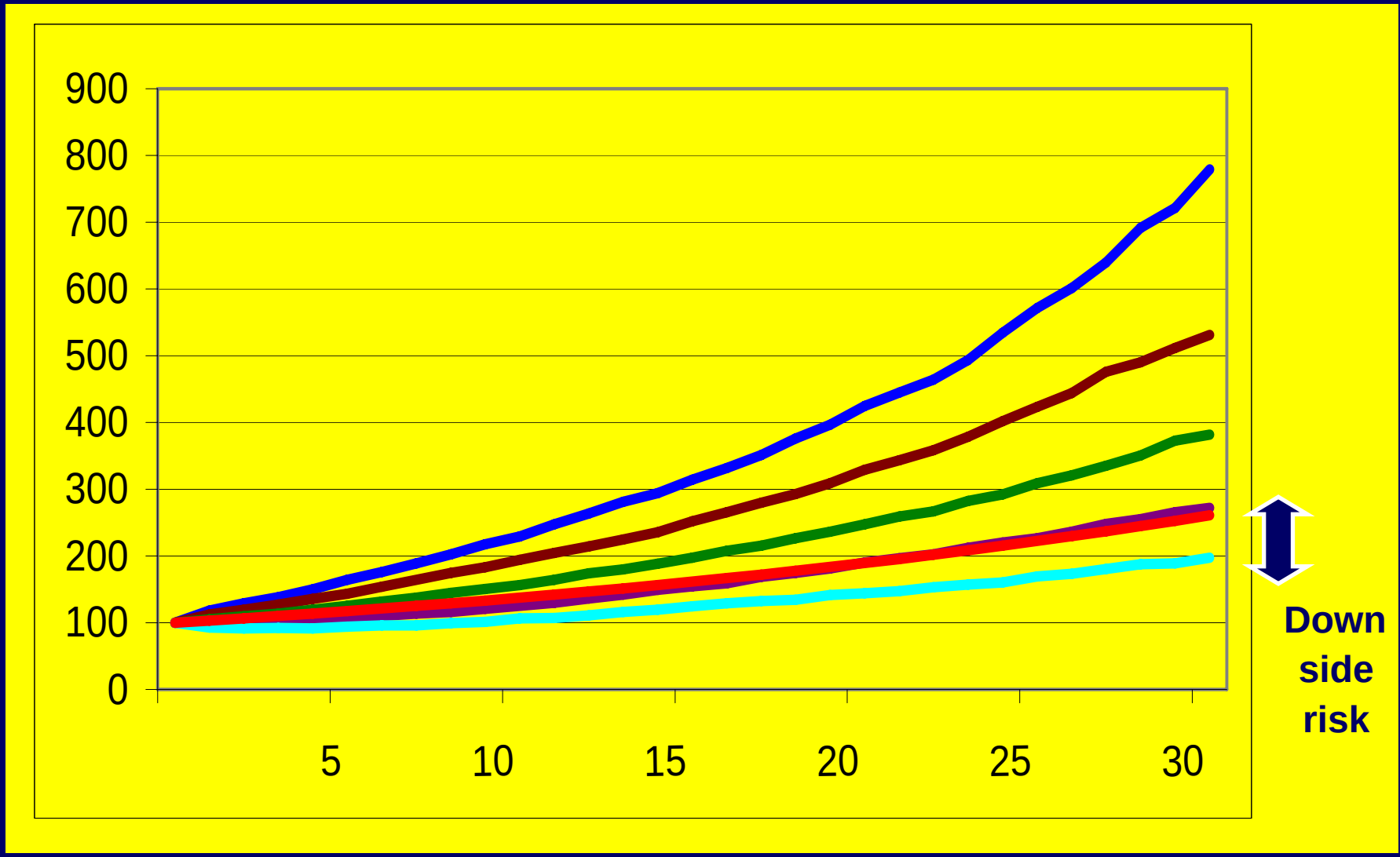
Embedded Guarantee – Empirical Analysis

- Over long periods, the impact of the minimum guaranteed return would not have been material as periods of bad returns have been compensated by subsequent periods of good returns
- Nevertheless, over certain short periods, impact could have been material
- Since deficits tend to occur over shorter periods, the amounts involved are relatively smaller (which explains the relatively low “deficit ratios”)

Embedded Guarantee - Put Option

- Minimum guaranteed rate of return is somewhat comparable with a **put option** provided by the plan sponsor to the plan participant with
  - current share price equal to contribution
  - a **strike price** equal to contribution projected to expected date of payment at minimum guaranteed rate of return
  - the expected volatility based on the asset allocation of the fund
- Hence, the fair value of the embedded guarantee could also be estimated using the **Black- Scholes** formula

Belgian “DC” Plan : Put Option



Belgian “DC” Plan : Put Option

	Low risk portfolio	**High risk portfolio**
Initial contribution	100	100
Expected term	20 years	20 years
Strike price	100 x 1.0325**20	100 x 1.0325**20
Risk-free interest	4%	4%
Expected volatility	5%	20%
Value of put	3	26

Monte Carlo Simulations

- The fair value of the embedded guarantee can be measured using Monte Carlo simulations
- This approach consists of the following steps :
  - simulate investment return scenarios taking into account asset allocation of the fund
  - calculate future contributions, account balance, minimum reserves, deficit by plan participant
  - determine **expected** deficit taking into account turnover, mortality, assumed retirement age by plan participant
  - calculate the (actuarial) present value of the expected deficits

Monte Carlo Simulations : Rates of Return

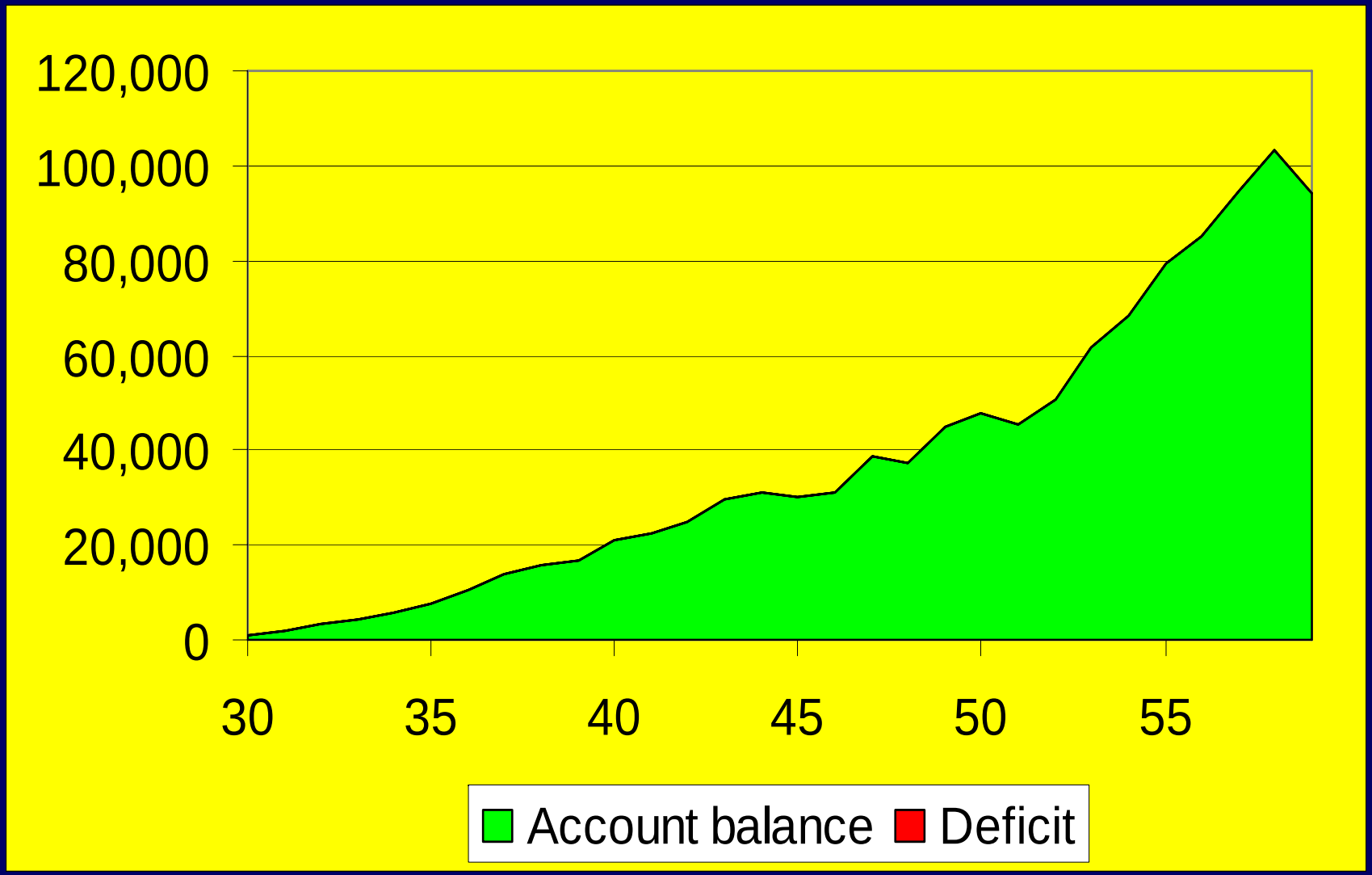
Assumptions

expected rate of return : 5.00%

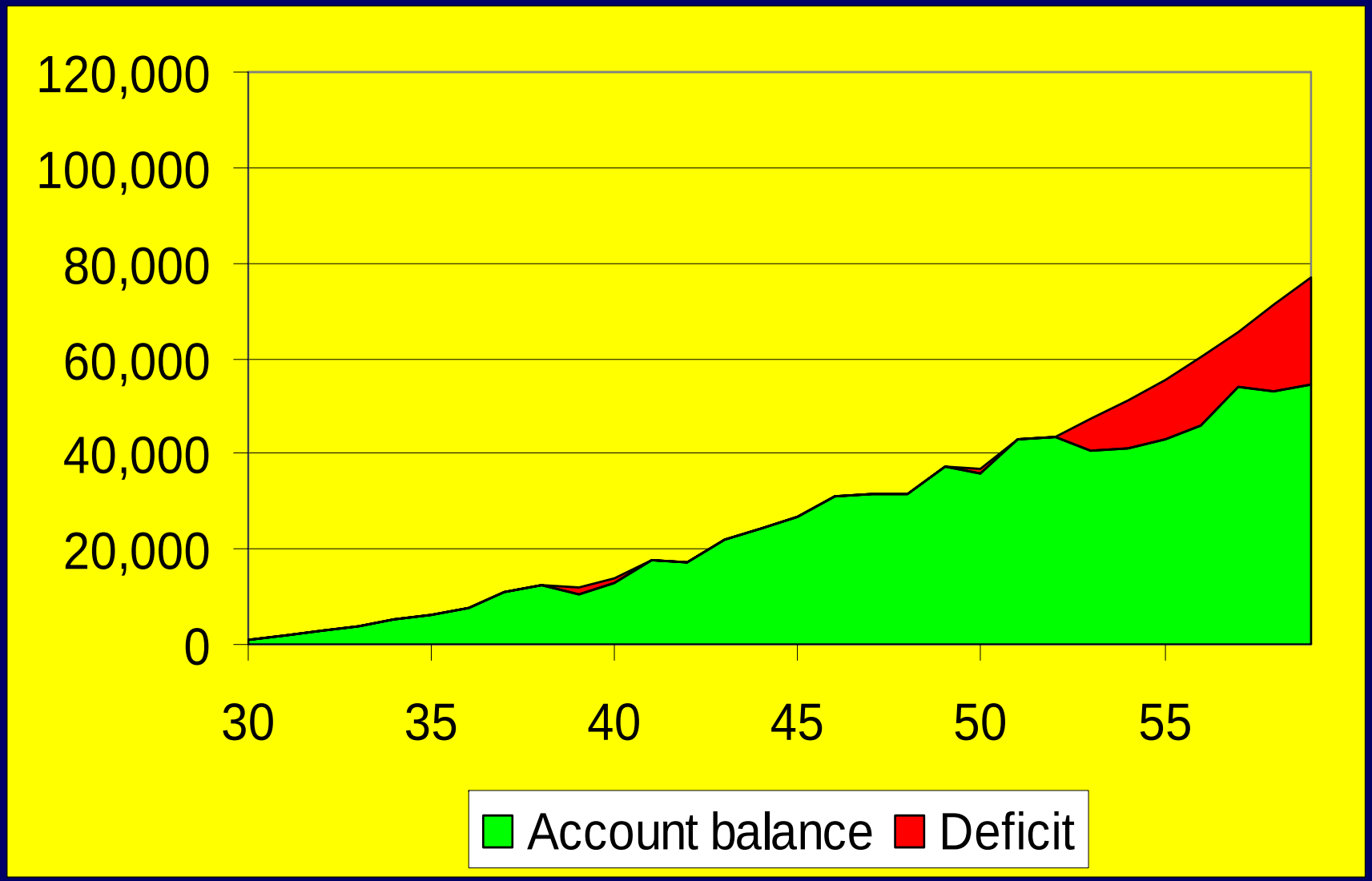
standard deviation : 10.00%

Scenario	Year					
	1	2	3	4	5	...
1	34.25%	6.01%	11.03%	24.09%	23.25%	...
2	6.71%	14.29%	0.57%	0.49%	-3.61%	...
3	2.46%	-3.85%	10.15%	4.26%	8.62%	...
4	2.67%	14.63%	5.02%	8.14%	-5.61%	...
5	15.25%	12.75%	14.04%	-2.65%	0.23%	...
...	...	...	...	...	...	...

Monte Carlo Simulation : 1 “good” Scenario



Monte Carlo Simulation : 1 “bad” Scenario

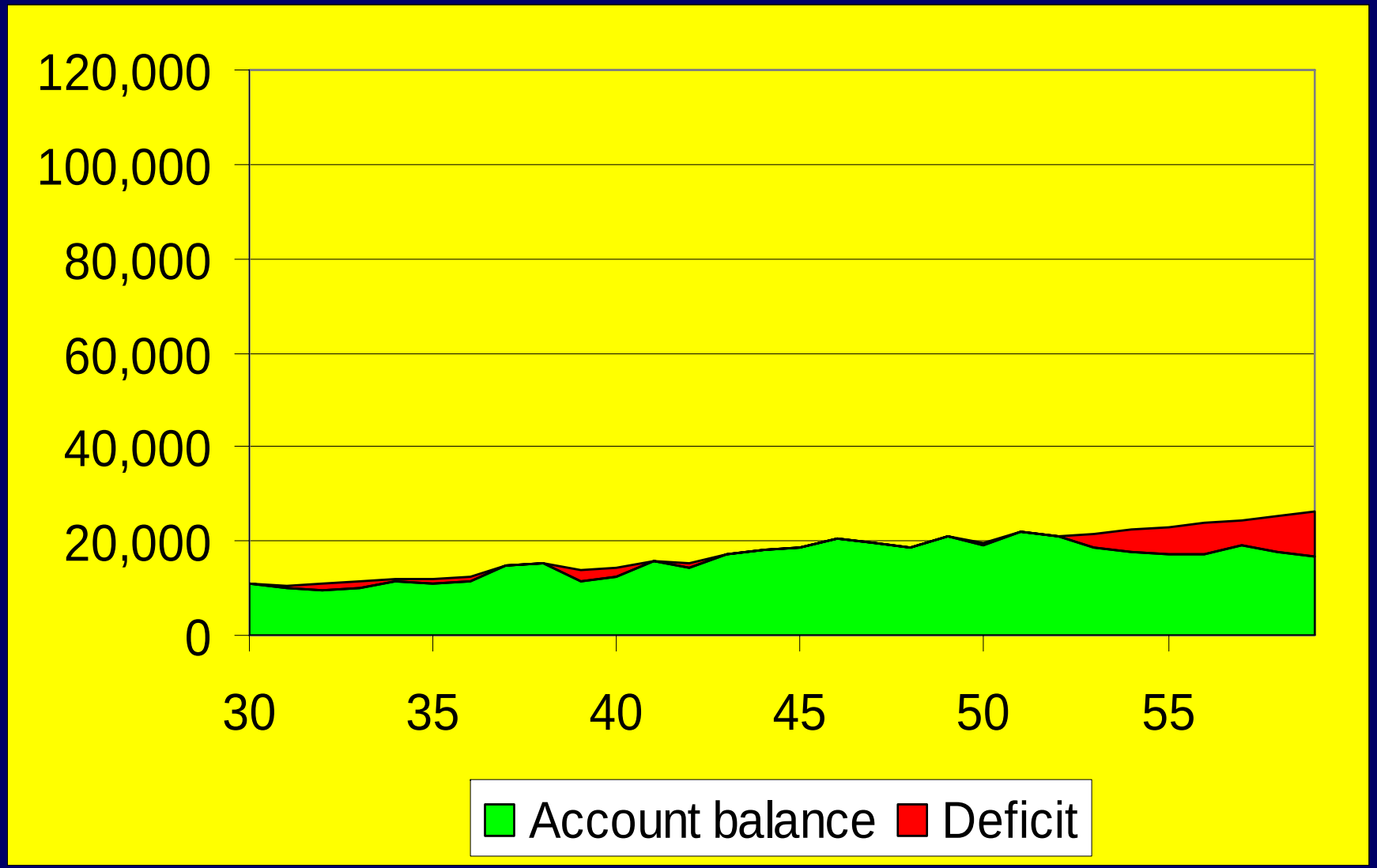


Belgian “DC” Plan : Example of In/Output

- Simulation of 1,000 scenario’s of expected rates of return for the next 30 years
- 1 plan participant, aged 30, with a starting salary of 30,000 €
- Employer contribution equals 3% of salary up to a breakpoint (40 k€) plus 15% of excess salary
- Various assumptions about salary increase, turnover, …

- **Average present value of expected deficit : 896 €**
- **Present value of future contributions : 26,268 €**
- **Ratio : 3.4%**

Monte Carlo Simulations : No future Contributions



Monte Carlo Simulations

- How to attribute any deficits over periods of service?
- Does a past service liability (assuming no future contributions) make sense if a minimum rate of return is guaranteed "**on average**" over the employee's **entire** career?

  In this case, the fair value of the embedded guarantee equals the average present value of the expected deficit
- For example, if the initial account balance and minimum guaranteed reserves equals 1,000 € :

Average present value of expected deficit : 44 €

Ratio : 4.4%

Monte Carlo Simulations

- This approach allows to handle **complex benefit plans**, which are based on a combination of benefits and involve several parameters
- But : more assumptions to be made and larger diversity in methodology to be expected (cf. link between inflation, salary increase and expected rates of return)
- Similar techniques are already used by actuaries in asset / liability modelling (ALM) studies

Belgian “DC” Plans - Deconstruction Approach

	DC element	DB element	Embedded guarantee	Total
Funded status at 31/12/2006				
DBO at 31/12/YY	1,000	200	50	1,250
Plan assets	-1,000	-180	0	-1,180
Under/(over)funded DBO	0	20	50	70
2007 benefit expense				
Service cost	100	0	5	105
Interest cost		8		8
Expected return		-9		-9
Total expense	100	-1	5	104

Belgian “DC” Plans – Deconstruction Approach

- Comments
  - **DC element** : the benefit obligation equals the sum of the account balances under the DC plan
  - **DB element** : the benefit obligation reflects the discounted value of future pension payments towards retirees (who opted to commute their lump sum into a pension)
  - **Embedded guarantee** : the benefit obligation reflects the fair value of the minimum guaranteed rates of return (e.g. based on Monte Carlo simulations)