

**Valuation of Interest Rate Guarantees on
Exempt Provident Funds**
under AS15 (Revised)

BY

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Current Issues in Retirement Benefits

08 October 2013

Agenda

- **Introduction**
- The Current Methodology
- Considerations in the Current Methodology
- An alternate approach

Introduction

- GN29 provides guidance in performing actuarial valuations and preparing actuarial reports related to interest guarantee on Exempt Provident Funds.
- The methodologies recommended in GN29 are:
 - **Deterministic Approach**
 - Option Pricing Approach
 - Stochastic Modelling Approach
- The choice of a methodology will depend upon what the actuary thinks is most appropriate under the given **circumstances** and also on the **materiality of the value of the guarantee** in the overall context.
- In this presentation, we discuss the deterministic approach.

Agenda

- Introduction
- **Looking at Current Methodology**
- Considerations in the Current Methodology
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Current Methodology - Steps

Basic Structure

Computes Present Value of interest rate guarantee under **3 interest rate scenarios**:

- **Base Case Scenario**
- **Rising Interest Rate Scenario**
- **Falling Interest Rate Scenario**

Present Value Obligation [PVO] of interest rate guarantee = **average of the present values determined under these scenarios**.

Step wise details given in following slides

Current Methodology - Steps

1

Determine Expected Investment Return

2

Compute Present Value for three scenarios

3

Determine Present Value of Obligation

Expected Investment Return = **Gov Bond Yield** + Yield Spread

Gov Bond yield is the govt. bond yield on the bond with the term ("**Appropriate Term**"):

- the **decrement adjusted remaining term** of the obligations or
- **such shorter period as the Actuary may consider to be appropriate**

Discretion given to Actuary in determining "Appropriate Term".

Current Methodology - Steps

1

Determine Expected Investment Return

2

Compute Present Value for three scenarios

3

Determine Present Value of Obligation

Expected Investment Return = Gol Bond Yield + Yield Spread

Yield Spread = **Average Historical Yield** on Investment Portfolio

less

Current Gol Bond Yield for a term equal to the **remaining term to maturity** of the investment portfolio

Current Methodology - Steps

1

Determine Expected Investment Return

2

Compute Present Value for three scenarios

3

Determine Present Value of Obligation

Compute the **present value of the interest rate guarantee** using the formula:

$$\text{Min (0, (Expected Investment Return (EIR) – Guaranteed Rate of Interest) X PF accumulation X Present Value Annuity Factor calculated for Appropriate Term)}$$

The above calculation to be done for 3 scenarios:

- Base Case Scenario
- Rising Interest Rate Scenario (**EIR = Expected Investment Return + 100 BPS**)
- Falling Interest Rate Scenario (**EIR = Expected Investment Return - 100 BPS**)

Current Methodology - Steps

1

Determine Expected Investment Return

2

Compute Present Value for three scenarios

3

Determine Present Value of Obligation

PVO of the interest rate guarantee will be equal to:

- If PF Trust **retains surplus interest earning**

Max (0, **Average of three present values** - money held in “Surplus Account”)

- If PF Trust **does not retain surplus interest earning**

Average of PV calculated for **base and falling interest rate scenario**

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Key Consideration

- *Should the value of guarantee be based on G Sec yield as on the valuation date?*

Guarantee Interest Rate & Government Bond Yield may vary in short term. However, **in medium to long-term, both are expected to be close to each other**. In such a case, **basing valuation on yields as on valuation date may not reflect the underlying reality**.

Also, government bond yields may go up and down but earnings may not fluctuate due to locked in yields.

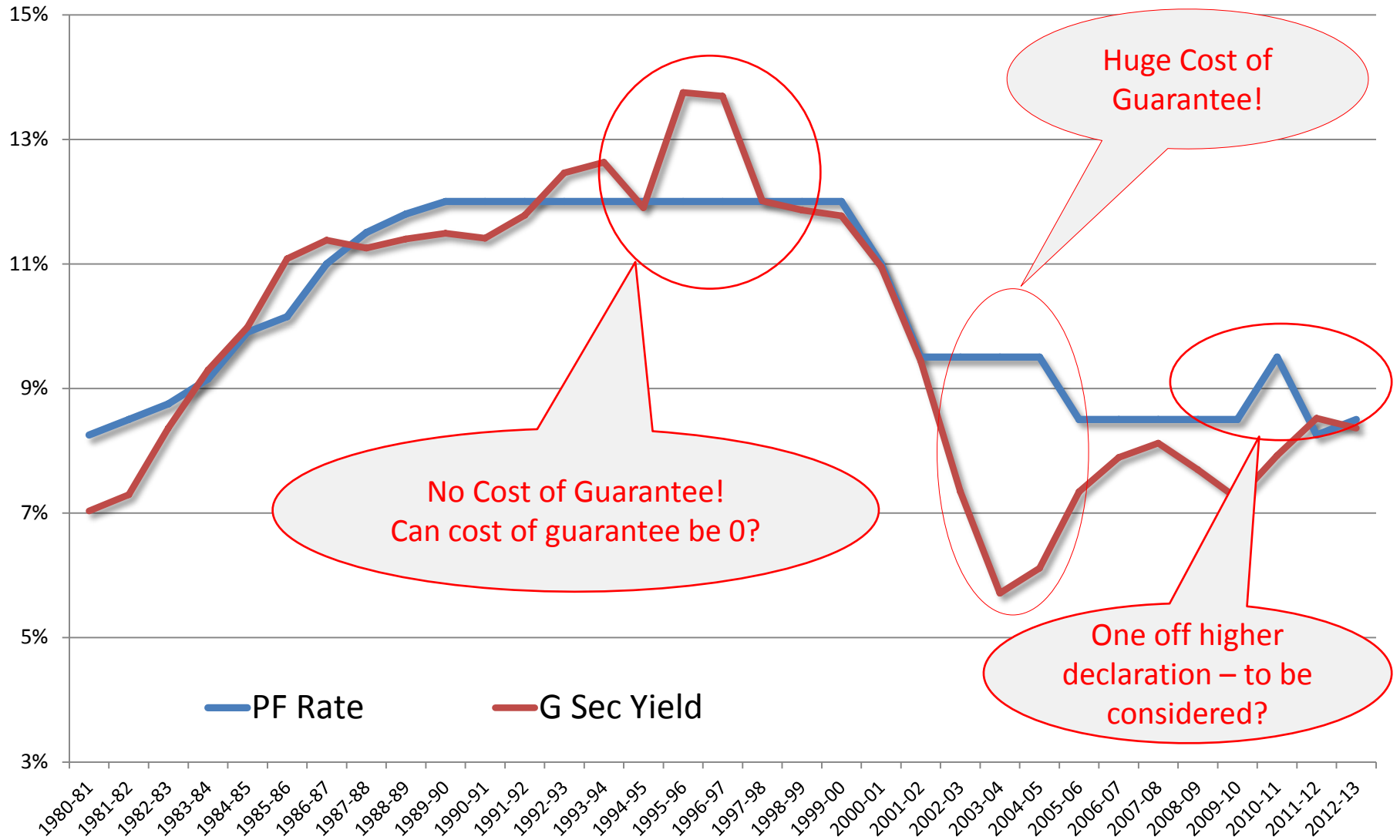
Basing value of guarantee on the historical gap between earning and guarantee interest rate may be a solution.

- Similarly, *should any one-off or political decision to declare a higher or lower rate be ignored?* (e.g. 9.5% per annum declaration in FY 2010-11)

Comparison of PF Interest Rate and Government Bond Yields for last 30 years given in following slide demonstrate above points.

PF Rate vs. Govt. Bond Yields (30 years)

PF Rate vs. G Sec Yields – last 33 years



Further considerations / Possible refinements

1

Determine Expected Investment Return

2

Compute Present Value for three scenarios

3

Determine Present Value of Obligation

1. Discretion in determination of Appropriate Term

'Appropriate Term' used at two places:

- In determination of GoI bond yields for Expected Investment Return
- **In determination of PV Annuity Factors in step 2**

Appropriate Term may be **argued to be very short e.g. 3 years** reflecting the fact that the enterprise will go back to EPF in case consistently not able to meet guarantee.

Allowing discretion to use a shorter term **may result in lower valuation of guarantee**, given us of "Appropriate Term" in determination of PV factor.

Possible refinement

In determination of PV Annuity Factors, no discretion over appropriate term may be allowed.

Further considerations / Possible refinements

1

Determine Expected Investment Return

2

Compute Present Value for three scenarios

3

Determine Present Value of Obligation

2. Computation on Yield Spread

Yield spread is computed by **comparing average historical yield with the current Gov bond yields.**

This may result in yield spread not only representing efficiency in investment management but also current volatility in Gsec market, resulting in aberration in calculation of yield spread.

Possible refinement

In determination of Yield Spread, **average historical yield** on investment portfolio should be compared against **average government bond yields**, both computed over the **same historical period.**

Further considerations / Possible refinements

1

Determine Expected Investment Return

2

Compute Present Value for three scenarios

3

Determine Present Value of Obligation

3. Others areas of consideration

- How will yield spread be determined in case of **investment in equities**? Rule 67(2) of Income Tax Rules, 1962 allow the same.
- Yield spreads depend, inter alia, upon prevailing economic scenario and **historical yield spreads may not be earned in future**.
- Average historical yield to be computed **over what period**? Different past periods may result in different yield spreads.
- Change in **past period for calculation of historical yield** should not be allowed, unless necessitated by circumstances.

Further considerations / Possible refinements

1

Determine Expected Investment Return

2

Compute Present Value for three scenarios

3

Determine Present Value of Obligation

4. Negative Present Values set to zero

Setting negative values to zero (i.e. setting present value where expected investment return is higher than guaranteed interest rate to zero) may result in a higher valuation of guarantee.

It may not be appropriate where the surplus interest earning is retained by the fund.

Possible refinement

In determination of present values for all three scenarios, the floor of zero may be removed.

Further considerations / Possible refinements

1

Determine Expected Investment Return

2

Compute Present Value for three scenarios

3

Determine Present Value of Obligation

5. +/- 100 BPS and equal weight to both

Flat spread of 100 bps may not be appropriate measure of risk, particularly in certain economic scenarios and / or level of bond yields.

Similarly, assigning **equal weight to both upside and downside risk** may not be appropriate.

Possible refinement

May consider prescribing, at each valuation date, a **range of deterministic scenarios around the bond yields at the valuation date** with probabilities assigned to the same.

These could be based on summary statistics of stochastic analysis based on real-world scenarios and should factor short term aberrations in bond yields.

Further considerations / Possible refinements

1

Determine Expected Investment Return

2

Compute Present Value for three scenarios

3

Determine Present Value of Obligation

6. Others

- As per Income Tax Rules under which approval is given to PF trusts, any surplus investment income earned should be passed on to employees.

In light of above, can a surplus arising in certain years be used to offset deficits arising in the other?

- What should be the **information** provided for the value of guarantee **in case of** Companies requiring **full disclosures**?

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An Alternate Approach

Value of interest rate guarantee could be determined using following formula:

$$\text{PF Accumulation} - \text{PF Accumulation} \times \frac{(1 + \text{Gol Bond Yield} - \text{COG})^{\text{Term}}}{(1 + \text{Gol Bond Yield})^{\text{Term}}}$$

ALTERNATE APPROACH TO DISCUSS

Thank You