### **1. Defined Benefit Scheme (DBS)**

#### **1.1 What Is It?**

The DBS is a retirement plan where the benefits are predetermined based on the member's salary and years of service. It guarantees a stable income post-retirement, calculated using a specific formula.

#### **1.2 Key Features**

* **Retirement Pension**: Members receive 2% of their revalued earnings per year of pensionable service, capped at 70% of their final salary.
* **Normal Retirement Age (NRA)**: Set at 65 years.
* **Early Retirement**: Allowed from age 55, but benefits are reduced based on actuarial factors (e.g., 42.5% reduction at age 55 for staff joining after 1 June 2009).
* **Late Retirement**: Permitted up to age 70, potentially increasing the pension amount.

#### **1.3 Death Benefits**

* **Spouse’s Pension**: Provides 60% of the member’s retirement pension to the surviving spouse.
* **Children’s Pension**: Equal to 40% of the spouse’s pension for each child; doubled if no spouse’s pension is payable.
* **Former Spouse’s Pension**: Calculated based on the duration of the marriage during employment.

#### **1.4 Transfers**

* **Transfers-In**: Members can transfer pension rights from other schemes into the DBS, with the transferred amount converted to pensionable service.
* **Transfers-Out**: Allows the actuarial value of accrued benefits to be transferred to another pension scheme upon leaving ECB employment.

#### **1.5 Adjustments**

* **Pension Increases**: Annual adjustments based on inflation (Harmonized Index of Consumer Prices) or general salary increases.
* **Actuarial Reductions**: Applied for early retirement or significant age differences between the member and spouse.

### **2. Voluntary Contribution Scheme (VCS)**

#### **2.1 What Is It?**

The VCS is an optional savings plan where members can contribute a portion of their salary to build additional retirement savings. Contributions are invested and grow over time.

#### **2.2 Key Features**

* **Contributions**: Members can contribute up to 12% of their monthly basic salary.
* **Account Balance**: Contributions, along with investment returns, are credited to an individual account.

#### **2.3 Benefits**

* **Supplementary Retirement Pension**: The account balance is converted into a supplementary pension at retirement using actuarial factors.
* **Lump-Sum Withdrawals**: Members can opt to withdraw part or all of the balance as a lump sum upon leaving service.
* **Death Benefits**:
  + Spouses can receive the account balance as a lump sum or a supplementary pension.
  + If no spouse exists, the balance is paid to legal heirs.

#### **2.4 Flexibility**

The VCS offers flexibility in choosing how benefits are received, catering to individual financial needs and goals.

### **3. Retirement Options**

#### **3.1 Early Retirement**

* Available from age 55.
* Actuarial reductions apply (e.g., 42.5% reduction at age 55 for post-2009 staff).

#### **3.2 Normal Retirement**

* The default retirement age is 65.
* Full benefits are provided based on the member’s years of service and revalued earnings.

#### **3.3 Late Retirement**

* Members may work and contribute until age 70, potentially increasing their pension benefits.

### **4. Dependents and Death Benefits**

#### **4.1 Spouse’s Pension**

* 60% of the member’s pension is payable to the surviving spouse for life.
* Adjustments apply for significant age differences between the member and spouse.

#### **4.2 Children’s Pension**

* 40% of the spouse’s pension per child, doubled if no spouse’s pension is payable.

#### **4.3 Former Spouse’s Pension**

* Calculated based on the length of the marriage during the member’s ECB employment.

### **5. Transfers and Mobility**

#### **5.1 Transfers-In**

* Facilitates the integration of pension rights from previous employers, enhancing pensionable service.

#### **5.2 Transfers-Out**

* Enables the transfer of accrued benefits to another pension scheme upon leaving the ECB.
* Full transfer requires cashing out all benefits under both DBS and VCS.

### **6. Actuarial Valuations and Adjustments**

* **Periodic Valuations**: Conducted every three years to ensure the financial health of the DBS.
* **Actuarial Adjustments**: Reductions for early retirement and age differences between spouses; conversion factors for VCS benefits.

### **Detailed Explanation of Benefit Calculations and Methodology**

### **1. Defined Benefit Scheme (DBS) Benefit Calculations**

#### **1.1 Retirement Pension**

The DBS retirement pension is calculated using the following formula:

* **Revalued Earnings**: The average of the member's highest basic salaries over a maximum of 30 years of pensionable service, adjusted for inflation or salary changes.
* **Years of Pensionable Service**: Total years of service for which contributions were made to the scheme, including any transferred or bought-back periods.
* **Maximum Pension**: Capped at 70% of the member’s final salary.

##### **Example Calculation:**

* Revalued earnings: €100,000
* Years of pensionable service: 25

#### **1.2 Early Retirement Adjustments**

For members retiring before the **Normal Retirement Age (NRA)** of 65, reductions are applied based on age:

The following table shows the early retirement factors:

| Age |  | Scheme\_Prior\_2009 | Scheme\_Post\_2009 |
| --- | --- | --- | --- |
| 55 |  | 0.3200 | 0.4250 |
| 56 |  | 0.2800 | 0.3950 |
| 57 |  | 0.2400 | 0.3630 |
| 58 |  | 0.2000 | 0.3290 |
| 59 |  | 0.1600 | 0.2920 |
| 60 |  | 0.1200 | 0.1875 |
| 61 |  | 0.0900 | 0.1500 |
| 62 |  | 0.0600 | 0.1125 |
| 63 |  | 0.0300 | 0.0750 |
| 64 |  | 0.0150 | 0.0375 |
| 65 |  | 0.0000 | 0.0000 |

##### **Adjustment Formula:**

##### **Example:**

* Calculated pension: €50,000
* Retirement age: 60
* Reduction Factor (Scheme\_Post\_2009): 18.75%

#### **1.3 Late Retirement Enhancements**

For retirement after age 65 but before age 70, the pension may increase based on actuarial factors. The precise enhancement depends on the actuarial advice at the time.

#### **1.4 Spouse’s Pension**

* **Calculation**: 60% of the member’s retirement pension.
* **Age Adjustment**: If the spouse is more than 10 years younger than the member, reductions apply if they have been married less than xxx years:
  + 1% for each year beyond 10 up to 20 years.
  + 2% for each year beyond 20 up to 25 years.

##### **Example:**

* Member’s pension: €50,000
* Spouse’s age difference: 15 years
* Reduction: 5% (1% × 5 years)

#### **1.5 Children’s Pension**

* 40% of the spouse’s pension per child.
* If no spouse’s pension is payable, this amount is doubled.

##### **Example:**

* Spouse’s pension: €28,500
* Children: 2

#### **1.6 Projection of Revalued Earnings**

To project revalued earnings, age-based salary increment rates are applied. The table below shows the increase percentages based on the member’s age:

| From\_Age | Increase\_Percentage |
| --- | --- |
| 20 | 0.01 |
| 25 | 0.016 |
| 30 | 0.018 |
| 35 | 0.017 |
| 40 | 0.016 |
| 45 | 0.015 |
| 50 | 0.014 |
| 55 | 0.0 |

These percentages are applied annually to forecast future salary levels, which are then used to compute revalued earnings.

### **2. Voluntary Contribution Scheme (VCS) Benefit Calculations**

#### **2.1 Supplementary Retirement Pension**

The VCS benefit depends on the account balance and actuarial conversion factors:

* **Account Balance**: Total contributions plus investment returns.
* **Conversion Factor**: Actuarial factor based on the member’s and spouse’s ages at retirement.

##### **Example:**

* Account balance: €200,000
* Conversion factor: 20

#### **2.2 Lump-Sum Withdrawals**

Members may withdraw part or all of their account balance as a lump sum instead of converting it to a pension.

#### **2.3 Spouse’s Supplementary Pension**

If a spouse’s supplementary pension is elected, an additional conversion factor is applied, reducing the member’s supplementary pension proportionately.

##### **Example:**

* Account balance: €200,000
* Member-only conversion factor: 20
* Member-and-spouse conversion factor: 15

#### **2.4 Death Benefits**

* Spouse can opt for a lump sum or convert the account balance into a supplementary pension using the applicable conversion factor.
* If no spouse exists, the account balance is distributed to the legal heirs.

### **3. Actuarial Assumptions and Adjustments**

#### **3.1 Pension Conversion Factors**

* Net present value of an actuarial annuity
* Periodically reviewed to account for life expectancy and economic conditions.
* Higher conversion factors reduce the annual pension.

#### **3.2 Pension Adjustments**

Pensions under both schemes are adjusted annually

#### **3.3 Sensitivity Analysis**

Actuarial valuations include sensitivity analyses to ensure the sustainability of the pension schemes under various economic scenarios.

### **4. Summary of Key Calculation Formulas**

1. **DBS Retirement Pension**:
2. **Early Retirement Adjustment**:
3. **Spouse’s Pension**:
4. **VCS Supplementary Pension**:

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**Implementation of DBS Calculations: High-Level Explanation**

### **Objective of the Framework**

The primary goal is to ensure accurate and transparent calculation of pension benefits under the DBS. The framework:

* Accounts for both historical and projected earnings.
* Applies revaluation and inflation adjustments as per scheme rules.
* Computes benefits for retirement scenarios, including early and standard retirement.
* Incorporates the impact of leave periods and partial work years.

### **Key Components of the DBS Calculations**

#### **1. Historical and Projected Salaries**

* **Historical Salaries**: Collected from the member's salary history, adjusted for periods of service.
* **Projected Salaries**: Future earnings are estimated based on inflation rates, salary increments, and the assumption of full-time work up to retirement.

#### **2. Revaluation Factors**

* **Purpose**: Adjust historical salaries to current value by accounting for inflation and revaluation factors.
* **Compounded Matrix**: A dynamic table of factors is created to ensure consistent adjustments for both past and future years.

#### **3. Pensionable service**

* Salaries are adjusted for years where members worked part-time or took leave.
* Ensures that only the actual time worked/transferred in contributes to the pension calculation, as per scheme rules.

### **Processes in the DBS Calculation Framework**

#### **Step 1: Data Collection and Preparation**

* Load personal data (date of birth, joining date, salary history).
* Identify key milestones like the year the member turns 65 (normal retirement age).

#### **Step 2: Historical and Future Salary Consolidation**

* Combine past salaries with projected earnings to create a complete salary table from the start of service to retirement.

#### **Step 3: Application of Revaluation Factors**

* Use the compounded revaluation matrix to adjust historical salaries to current value.
* Apply inflation rates to project future salaries.

#### **Step 4: Retirement Scenarios**

* Calculate pension benefits for retirement ages 55 to 65.
* For early retirement, apply reduction factors based on the member's age and scheme rules.

#### **Step 5: Final Adjustments**

* Incorporate adjustments for leave periods, worked percentages, and any applicable salary caps.
* Calculate the revalued and adjusted pensionable earnings for each retirement scenario.

### **Outputs of the Framework**

1. **Revalued Salary Tables**:
   * Show yearly earnings, adjusted for inflation and revaluation.
   * Separate tables for each potential retirement age.
2. **Retirement Benefit Calculations**:
   * Pension amounts for each retirement age.
   * Transparent breakdown of calculations, including reductions for early retirement.
3. **Comprehensive Reports**:
   * Summary of total pensionable earnings.
   * Clear documentation of factors, adjustments, and rules applied.

### **Alignment with DBS Rules**

The framework adheres to key provisions of the DBS, including:

* **Revaluation of Earnings**: Ensures salaries are adjusted to reflect current value.
* **Early Retirement Reductions**: Applies scheme-specific reduction factors for members retiring before 65.
* **Service Periods**: Considers only actual service years, with adjustments for part-time work or leave periods.
* **Maximum Pension Cap**: Enforces the rule that pensions cannot exceed 70% of final salary.

### **Conclusion**

This framework operationalizes the DBS rules systematically, ensuring accurate and fair pension calculations. It provides members with a transparent view of how their pensions are computed and facilitates informed decision-making regarding retirement options