

### Development Process & Objective

The objective of this study is the establishment of a pan-European Pay-As-You-Go pension system PAYG. The following steps were performed at this stage of the study:

- Study of population groups based on employment & insurance characteristics.
- Scope of the analysis: Euro-zone (EU-19).
- Overview of the Euro-zone total population.
- Layout of the Member States based on their population size.
- Definition of sub-populations and development of correlation indicators of their size using actuarial projection methods.
- Processing and diagrammatic depiction of this data.
- The objective is the calculation of the following index for the next 50 years.

### Age distribution - Calculations

The age distribution was calculated based on the average age among the Member States using the following calculation formula:

$$\bar{y}_j = \frac{\sum_{i=1}^{101} y_i^m \times N_{i,j}}{N_j} = \frac{\sum_{i=1}^{101} y_i^m \times N_{i,j}}{\sum_{i=1}^{101} N_{i,j}}$$

### Population Development Calculation Methodology

EU-19 active and retired populations were defined as sub-populations. The ratio of active / retired was calculated with a projection of 50 years based on actuarial projections.

### Methodological Tools

The development of active and retired was estimated based on the chances of survival (Table EAE2012A\_P (unisex)).

#### Population dynamics calculation formulas:

$$Re(x, t + 1) = Re(x - 1, t) * p_{x-1}^{rr} + Act(x - 1, t) * q_{x-1}^{ar}$$

$$Re(x, t) = Re(x - 1, t - 1) * p_{x-1}^{rr} + Act(x - 1, t - 1) * q_{x-1}^{ar} + N(x, t) * q_{x-0.5:0.5}^{ar}$$

$$Act(x, t + 1) = Act(x - 1, t) * p_{x-1}^{aa}$$

$$W(x, t) = Re(x - 1, t - 1) * p_{x-1}^{rr} * q_x * w_x$$

$$Act(x, t) = Z(x, t) + Act(x - 1, t - 1) * p_{x-1}^{aa}$$

$$Ratio_t = \frac{Act(x, t)}{Re(x, t) + W(x, t)}$$

### Next Steps

Our aim is the calculation of an average single monthly contribution for the whole of the EU-19 in order to provide a sufficient amount of pension to future pensioners so as the Member States to be relieved of their pension expense.