



**ECONOMIC AND FINANCIAL  
SUB-COMMITTEE ON EU SOVEREIGN DEBT MARKETS**

THE CHAIR

Brussels, 14 January 2022

ecfin.cef.cpe(2021)8653189

## Formula for ESDM risk indicators

Disclaimer: Members of the ESDM Committee provide data on a voluntary basis. Divergences in calculation might concern products, which represent a small amount in respective debt portfolios.

### AVERAGE LIFE

The Average Life is the weighted average time to maturity of the debt portfolio (currency swaps and FX swaps included):

- Determine for every principal cash flow the time to maturity
  - ( Maturity date – Evaluation Date ) / 365
- Multiply for every principal outstanding the amount with the time to maturity
- Sum these
- Divide this sum by the total gross debt

$$\frac{\sum_i^N \text{TimeToMaturity}_i \times \text{Capital}_i}{\sum_i^N \text{Capital}_i}$$

*Where:*

*TimeToMaturity<sub>i</sub> = time, expressed in years, within which the capital will be reimbursed*

The time to maturity of the following financial products is determined as follows:

- Bond callable: the time to maturity is determined by contractual maturity date;
- Bond puttable: the time to maturity is determined by next exercise date;
- Bond perpetual: the time to maturity is put at 50 years;
- Retail FRN bond: the time to maturity is determined by statistical analysis ;
- Bond EFSM programme: a fixed add-on is added to the current time to maturity of the programme loan;
- Swaps<sup>1</sup>: the time to maturity is determined by the maturity of the swap and is calculated for each leg ;
- Cash collateral: the time to maturity is determined by the timing of the margin process or by an assumption of the redemption profiles of the collateral ;

---

<sup>1</sup> Under swaps are meant: currency swaps and FX swaps

## REFINANCING RISK 1 YEAR

Refinancing Risk 1 Year:

- Determine the amount of debt maturing within the year
- Divide this amount by the total gross debt

$$\frac{Capital_1}{\sum_{i=1}^N Capital_i}$$

where:

$Capital_i$  = is the amount of capital maturing in year  $i$

The time to maturity is needed to determine when an instrument matures. For the time to maturity of certain specific instruments we refer to the list under Average Life.

## REFINANCING RISK 5 YEARS

Refinancing Risk 5 Years:

- Determine the amount of debt maturing within the first five years
- Divide this amount by the total gross debt

The Refinancing Risk 5 years thus includes the Refinancing Risk 1 year.

$$\frac{\sum_{i=1}^5 Capital_i}{\sum_{i=1}^N Capital_i}$$

where:

$Capital_i$  = is the amount of capital maturing in year  $i$

The time to maturity is needed to determine when an instrument matures. For the time to maturity of certain specific instruments, we refer to the list under Average Life.

## AVERAGE TIME TO NEXT REFIXING

The calculations for the Average Time to Next Fixing are similar to that of the Average Life, except for floating debt cash flows. These are weighted by the shortest relevant horizon.

Average Time to Next Fixing:

- Determine for each existing contract the next fixing date :
  - for contracts with a fixed rate this is the maturity date

- for contracts with a floating rate this is the next reset date of the floating rate or the maturity date in case of the last interest coupon
- Determine for each of these cash flows the time to the next fixing date
  - ( Next Fixing Date – Evaluation Date ) / 365
- Multiply for each of these cash flows the principal amount times the time to the next fixing date
- Make the sum of these amounts
- Divide this sum by the total gross debt

$$\frac{\sum_i^N \text{TimeToNextFixing}_i \times \text{Capital}_i}{\sum_i^N \text{Capital}_i}$$

The time to next refixing of the following financial products is determined as follows:

- Bond callable: the time to refixing is determined by the contractual maturity date;
- Bond puttable: the time to refixing is determined by the time of the next exercise date;
- Bond perpetual: the time to next refixing is put at 50 years;
- Retail FRN bond: the time to refixing is determined by the next rate refixing ;
- Bond EFSM programme: the time to next refixing is the maturity of the programme loan.
- Cash collateral: the time to refixing is determined by the timing of the margin process ;
- Swaps<sup>2</sup>: the time to next refixing is determined for the fixed leg by the maturity of the swap and for the floating leg by the next rate resetting or by the maturity date in case of the last floating interest period ;
- Swaptions: the time to next refixing is determined by the exercise date of the swaption, weighted by the probability of exercise ;

REFIXING RISK 1 YEAR
----------------------

Refixing Risk 1 Year:

- Determine the amount of debt, maturing within the next year
- Determine the amount of floating debt with a maturity greater than one year (and having a reset within the year )
- Sum these
- Divide this sum by the total gross debt

The Refixing Risk 1 year thus includes the Refinancing Risk 1 year.

$$\frac{\text{Capital}_1 + \sum_{i=1}^N \text{Floating Capital}_i}{\sum_{i=1}^N \text{Capital}_i}$$

*Where:*

---

<sup>2</sup> These are all swaps: currency swaps, FX swaps and interest rate swaps.

*Capital<sub>i</sub>* = the amount of capital maturing in year *i*

*Floating Capital<sub>i</sub>* = the amount of capital with floating rate coupon resetting in year 1 and a maturity date higher than 1

The time to refixing is needed to determine when an instrument refixes. For the time to refixing of certain specific instruments, we refer to the list under Average Time to Next Refixing.

REFIXING RISK 5 YEARS
-----------------------

Refixing Risk 5 Year:

- Determine the amount of fixed debt maturing within the first five years
- Determine the amount of floating debt with a maturity greater than the first five years and having a reset within the first five years
- Sum these
- Divide this sum by the total gross debt

The Refixing Risk 5 years thus includes the Refinancing Risk 5 years.

$$\frac{\sum_{i=1}^5 Capital_i + \sum_{i=1}^N FloatingCapital_i}{\sum_{i=1}^N Capital_i}$$

Where:

*Capital<sub>i</sub>* = the amount of capital maturing in year *i*

*Floating Capital<sub>i</sub>* = the amount of capital with floating rate coupon resetting between year 1 and 5, and having a maturity date higher than 5 years

The time to refixing is needed to determine when an instrument refixes. For the time to refixing of a certain specific instruments, we refer to the list under Average Time to Next Refixing.

RATIO FOREIGN TO TOTAL DEBT
-----------------------------

Ratio foreign to total debt:

- Determine the total of debt in a foreign currency, converted to the local currency, using the exchange rate of the evaluation date
- Divide this sum by the total gross debt

$$\frac{\sum_{i=1}^N ForeignCapital_i}{\sum_{i=1}^N Capital_i}$$

The ratio can be calculated before and after derivatives (currency swaps, FX swaps). The foreign debt is converted to the local currency using the exchange rate of the evaluation date.

RATIO FLOATING TO TOTAL DEBT
------------------------------

Ratio floating to total debt:

- Determine the total of debt with a floating rate, floating rate debt also includes inflation-linked bonds
- Divide this sum by the total gross debt

$$\frac{\sum_{i=1}^N \text{FloatingCapital}_i}{\sum_{i=1}^N \text{Capital}_i}$$

The ratio can be calculated before and after derivatives (all swaps, FX swaps).

FAQ
-----

- 1. Should the metrics generally be calculated net of assets or should we only consider liabilities. For example, should we include government-owned funds' holdings bonds and/or loans to government-owned companies (relending)?**

The calculation should only include liabilities.

- 2. As regard inflation linked bonds, should we use inflation-adjusted principal or just nominal principal value?**

The calculation should be based on inflation-adjusted principal.

- 3. What does "EA - NO ESM/EFSF" stand for?**

"EA - NO ESM/EFSF" stands for "Euro-Area average weighted according Total Debt Outstanding, excluding EFSF, ESM, and EU as an issuer.