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**Interest Rate and**

**Credit Risk Models**

**Master in Mathematical Finance**

**2023/2024**

**Exercise 1**

1. Assess the behaviour of the Portuguese yield curve since the beginning of the pandemic, by using the Nelson-Siegel, Svensson and polynomial methods for three different dates. (7/20)

1. Assess the estimated overnight forward curves using Nelson-Siegel and Svensson methodologies and interpret the main changes in the parameters. (3/20)
2. Compute the price of a futures contract on the 3-month Euribor rate, expiring in December 2024. (4/20)

Futures price = 100 – f (m=12; n=3)

1. Identify the pros and cons of each methodology, as well as your preferred methodology, stating the reasons behind your preference. (3/20)

* Svensson employs a higher No. parameters, but allows for 2 inflection points, providing more flexible estimates. Both methodologies provide smooth estimates, allowing for sound forward rates and including parameters with economic meaning.
* NS – provides sound estimates for the spot and forward rates, though it struggles with curves characterized by more than one inflection point.
* Polynomials – overfitting and explosive behavior out-of-sample.

1. How would you interpret the changes in the yield curve according to the main explanatory theories of the term structure of interest rates? (3/20)