



LISBON  
SCHOOL OF  
ECONOMICS &  
MANAGEMENT  
UNIVERSIDADE DE LISBOA

## **Case Studies in Financial Engineering**

### **CASE 3**

### ***SOLID ROCK – INSURANCE COMPANY***

**Sept. 2019**

## SOLID ROCK – INSURANCE COMPANY

Solid Rock decided to invest in a bond portfolio, in order to hedge the risk of some of its customers exercising their insurance contracts. The portfolio has the following composition:

<b>Bonds</b>	
Germany 30-year Government Bond Benchmark	1.600.000€
Euro Area 10-year AA-Corporate Bond Benchmark	1.300.000€
France 5-year Government Bond Benchmark	800.000€
US 30-year Government Bond Benchmark	\$1.000.000
US 10-year Government Bond Benchmark	\$500.000,00
US 10-year AA-Corporate Bond Benchmark	\$700.000

The Board is concerned about the potential impacts of interest rate shifts. Assuming that you were selected to assess the problem, please answer to the following questions:

1. Compare the residual maturity to the duration of the portfolio, interpreting the results obtained and assessing the corresponding interest rate risk.
2. Assess the convexity of each bond in the portfolio and its relevance for risk management purposes.
3. Estimate the relevant yield curves, using at least two different methodologies and considering additional bonds, if necessary.
4. Compare the main features, as well as pros and cons, of the methods considered in the previous question.
5. Please detail how could you decrease the portfolio's duration by using different types of derivatives, discussion the corresponding pros and cons.
6. What would you decide if expectations pointed to the reduction of the spreads between the yields of the Portuguese and the German Government debt?
7. How would you use the data presented to extract relevant information on inflation expectations?