Undergraduation in Finance

Money and Banking

Exam – 4 February 2022

1. Please consider the following data about Newport company based in Portugal:

	31.03.2020	31.01.2022
Number of shares issued (Millions)	5	5
Nominal value of shares (€)	1	1
Market Value of shares (€)	0,5	1,2
Annualized volatility of share prices (%)	70	20
Short-term Liabilities (Million €)	20	10
Long-term Liabilities (Million €)	30	30
Annualized volatility of Market Value of Assets (%)	40	15
Market Value of Assets (Million €)	30	50
1-year interest rate (%)	0,1	-0,5

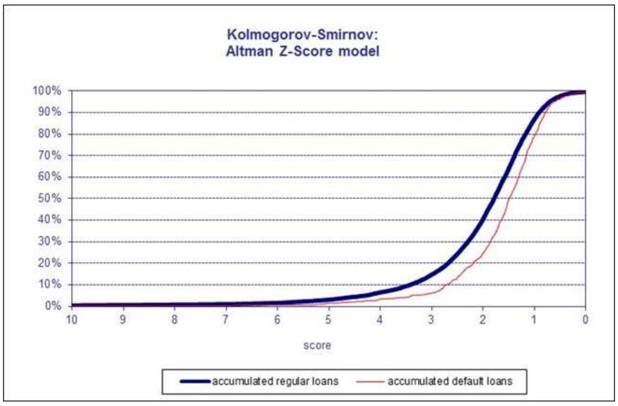
1.1. Using structural models, identify the main changes between the 2 dates regarding the credit risk of Newport, detailing your calculations and presenting any additional assumption you may be required to consider. **(3,0)**

- Market value of shares increase + debt decrease decreased PD. This must have decreased the PD.
- vol of MVA and share prices decreases the uncertainty about the MVA.
- Therefore, the PD must have decreased.

1.2. Characterize the main differences between this and alternative models to assess the credit risk of this Company, namely regarding the information required and the results obtained. **(2,0)**

- Scoring-type models do not result from a structural view behind the defaults
- Accounting information relevant in structural models is only the liabilities

2. Considering the following information about the performance of Altman Z-Score model to assess credit risk in a loan portfolio initially comprising 100 loans, as well as the portfolio performance:



Maturity (Years from today)	h_i	n_i
1	0	100
2	0	95
3	1	94
4	0	85
5	1	79

being h_i the number of defaults during each year i and n_i the number of existing loans after defaults and redemptions in each maturity.

<20 - bad

· 20-40 – fair

· 41-50 - good

· 51-60 – very good

· 61-75 - excellent

· >75 - too good to be true

2.1. Compute the cumulative observed and Kaplan-Meier probabilities of default and explain the main differences you may find between both. **(3,0/20)**

- see excel

2.2. Characterize the indicator and the model considered used in the chart and assess the predictive ability of the model mentioned according to that indicator. **(3,0/20)**

- Kolmogorov-Smirnov indicator - corresponds to the maximum difference between the cumulative % of regular and default loans according to the scores.

<20 - bad

· 20-40 – fair but fully

· 41-50 - good

· 51-60 – very good

· 61-75 - excellent

· >75 - too good to be true

This model seems to be a bad one, as KS doesn't seem >10%

2.3. Present the main features of alternative indicators to assess the predictive performance of a credit risk model **(3,0/20)**

- ROC, AR, Confusion Matrix

3. Considering the following information provided from the estimation of the Portuguese Yield Curve using the Svensson methodology:

Parameters	03/02/2022	04/11/2021
β_0	1,99	1,71
β_1	-2,52	-2,25

3.1. Characterize the parameters in the table and the main changes in the spot curve between the two dates, interpreting the meaning of these changes according to the different explanatory theories of the term structure of interest rates and proposing a hedging initiative to an investor in Portuguese Government Bonds. **(3,0)**

- increase in the long term rate, leading to an increase in the slope of the curve, illustrating expectations of higher short-term rates in the future, according to the expectations theory, or an increase in liquidity premium, according to the liquidity preference theory
- hedging: decrease duration

3.2. Using the information below for the same spot curves (interest rates as %) considered in the previous question, compute the price of a futures contract on the 3-month interest rate with a settlement date 1 year after each date, interpreting the changes occurred according to the explanatory theories of the term structure of interest rates. **(3,0)**

Maturity (Years)	03/02/2022	04/11/2021
0,00	-0,53	-0,54
0,25	-0,55	-0,59
0,5	-0,56	-0,63
0,75	-0,56	-0,66
1	-0,55	-0,67
1,25	-0,54	-0,68
1,5	-0,52	-0,68
1,75	-0,50	-0,68
2	-0,48	-0,67

- No major changes in expectations
- See excel