MSc. Finance/CLEFIN
2015/2016 Edition

Advanced Tools for Risk Management and Asset Pricing

June 2016 Exam for Attending Students

Time Allowed: 55 minutes

Family Name (Surname)	First Name	Student Number (Matr.)

Please answer all questions by choosing the most appropriate alternative(s) and/or by writing your answers in the spaces provided. You need to carefully justify and show your work in the case of "open" questions. There is only one correct answer(s) for each of the multiple choice questions. Correct answers not selected and questions that have been left blank will receive zero points. Only answers explicitly reported in the appropriate box will be considered. No other answers or indications pointing to potential answers will be taken into consideration. In the case of "open" questions, the maximum number of points is indicated.

Question 1 (2 pts). Which of the following statements about compound correlations is FALSE?

☐ (A) Typically, it presents a skew
☐ (B) It may not exist
☐ (C) It is consistent at the level of single tranche
☐ (D) Two tranches on the same pool (same maturity) may yield different values of compound correlation

Question 2 (2 pts). Consider a standard CDS's Index (e.g. i-Traxx). Which of the following statements is TRUE?

☐ (A) The copula is parametrized by a matrix of 7750 pairwise correlation values
☐ (B) The copula is parametrized by a matrix of 125 pairwise correlation values
☐ (C) The copula is parametrized in terms of a unique pairwise correlation value
☐ (D) At the level of single tranche, it is market practice to infer a unique base correlation parameter from the tranche price

Question 3 (2 pts). Which of the following statements about diffusion processes is FALSE?

☐ (A) The Vasicek and the CIR processes have the same mean
☐ (B) The Vasicek process is distributed as a Gaussian
☐ (C) The CIR process is distributed as a χ^2 distribution
☐ (D) The Vasicek process, given to its mean reverting nature, is a good modeling choice for the stochastic intensity variable

Question 4 (2 pts). Which of the following statements about Analytically Tractable First Passage (AT1P) models is FALSE?

☐ (A) Both the barrier and the volatility of the asset are time-dependent
☐ (B) The barrier is modelled as a time-dependent stochastic variable
☐ (C) AT1P models may lead to inconsistent calibration results for short term credit spreads
☐ (D) The number of parameters to calibrate exceeds the number of market quotes

Question 5 (2 pts). Which of the following statements about CVA is TRUE?

☐ (A) The close-out amount and the exposure are the same thing
☐ (B) CVA is defined as: $CVA = LGD\ \mathbb{E}_0[\mathbb{I}_{\tau<T}\ (V(\tau))^+]$
☐ (C) CVA is defined as: $CVA = LGD\ \mathbb{E}_0[\mathbb{I}_{\tau<T}\ (V(\tau))]$
☐ (D) None of the above

Question 6 (2 pts). The following table shows, at different times (columns 1 to 5), the values of five trades as well as the future exposures to the counterparty, with and without netting.

Trade ID	1	2	3	4	5
1	10	-7	8	-6	-2
2	9	0	4	-2	2
3	7	7	5	10	-8
4	-7	-6	3	-6	-6
5	-5	-5	3	6	-6
Exposures					
No Netting	26	7	23	10	2
Netting	14	-12	23	2	0

Which of the following statement is TRUE?

☐ (A) All exposures are calculated correctly
☐ (B) Exposures with netting at $t = 5$ are correct, but not those without netting
☐ (C) There are two mistakes
☐ (D) There are three mistakes

Question 7 (3 pts).

1. Consider the Gaussian copula approach. Which kinds of inconsistencies/issues affect it? (1 pt)

2. Briefly describe the correlation surface and how it is built, including comments on interpolation. (2 pts)

Question 8 (2 pts). Considering that the Bonus Cap certificates listed below have been equally priced when issued in the past and that all of them have the FTSE MIB as their underlying asset, which one is likely to be the cheapest today, after issuance?

☐ (A) Bonus Cap with American Barrier at 70%
☐ (B) Bonus Cap with American Barrier at 80%
☐ (C) Bonus Cap with European Barrier at 70%
☐ (D) Bonus Cap with European Barrier at 80%

Question 9 (2 pts). You would like to exploit leverage but, because the market is really volatile at present, you are afraid of the negative impact/risks of "compounding effect". Which of the following statements is correct?

☐ (A) You will buy a Turbo certificate, because it does not imply dynamic leverage and it is not plagued by the "compounding effect"
☐ (B) You will buy a Leverage certificate, because it implies dynamic leverage and it is not plagued by the "compounding effect".
☐ (C) You cannot avoid the "compounding effect"
☐ (D) None of the above

Question 10 (2 pts). Bea has bought an Equity Protection certificate with 100% protection and 50% participation to the positive performance of a basket of stocks. She has paid it 100 Eur. After a while, the correlation among the stocks increases. If all the other conditions remain unchanged, what is likely to happen to the price of the Equity Protection?

☐ (A) The price will decrease. The Equity Protection consists of a ZCB and a long call on the underlying. Therefore, when the correlation increases, the price of the call decreases and so the price of the certificate decreases
☐ (B) The price will decrease. The Equity Protection consists of a ZCB and a short call on the underlying. Therefore, when the correlation increases, the price of the call increases and so the price of the certificate decreases
☐ (C) The price will increase. The Equity Protection consists of a ZCB and a long call on the underlying. Therefore, when the correlation increases, the price of the call increases and so the price of the certificate increases
☐ (D) The price will increase. The Equity Protection consists of a ZCB and a short call on the underlying. Therefore, when the correlation increases, the price of the call decreases and so the price of the certificate increases