

# FINM3405 Derivatives and risk management

## Tutorial Sheet 9: Credit default swaps (CDS)

September 14, 2024

**Question 1.** Present the basic, intuitive no-arbitrage argument showing that the breakeven CDS spread  $k$  on a reference entity's reference asset should be approximately equal to the risk premium  $y - r$  of the yield  $y$  on the reference asset over the risk-free rate  $r$ . What is meant by the CDS spread **basis** and what are some factors that influence it over time?

**Question 2.** Calculate the breakeven CDS spread  $k$  and premium paid, and the initial upfront cashflow if the CDS spread is set to  $k = 1\%$ , for a 2 year CDS with semiannual premiums, notional principal of  $F = \$500\text{m}$ , recovery rate of  $R = 60\%$ , and the following yield curve and default probabilities:

time	survival probability	default probability	risk-free rate
t1	0.9753	0.0247	2.5%
t2	0.9512	0.0241	2.7%
t3	0.9277	0.0235	2.9%
t4	0.9048	0.0229	3.1%

**Question 3.** Suppose that the CDS in the above question is written on a sovereign nation's debt, and towards the end of the 1<sup>st</sup> 6 months there is a war and the government's remaining default probabilities spike to the following:

time	survival probability	default probability	risk-free rate
t2	0.7788	0.1037	2.7%
t3	0.6873	0.0915	2.9%
t4	0.6065	0.0808	3.1%

Calculate the new CDS value based on a fixed CDS spread of  $k = 1\%$ , the profit if you initially bought CDS protection in the above example and closed out the position, and the new breakeven CDS spread  $k$ . If the government won the war towards the end of the 1<sup>st</sup> year and its default probabilities dropped to the following, what is the breakeven CDS spread at the end of the 1<sup>st</sup> year?

time	survival probability	default probability	risk-free rate
t3	0.9851	0.0049	2.9%
t4	0.9802	0.0049	3.1%

What would be your profit or loss here if you didn't close out your position at the end of the 1<sup>st</sup> 6 months? If you held the CDS to maturity, what is the total amount of premium you'd end up paying over the whole 2 years?

**Question 4.** Consider a recovery rate of  $R = 60\%$  and the following 4 years of semiannual default and survival probabilities, and risk-free rate yield curve:

time	survival probability	default probability	risk-free rate
t1	0.9900	0.0100	3.39%
t2	0.9802	0.0099	3.63%
t3	0.9704	0.0098	3.78%
t4	0.9608	0.0097	3.86%
t5	0.9512	0.0096	3.92%
t6	0.9418	0.0095	3.95%
t7	0.9324	0.0094	3.97%
t8	0.9231	0.0093	3.98%

Calculate the breakeven CDS spread curve for CDS maturing on each date.

**Question 5.** What is the role of the **International Swaps and Derivatives Association** (ISDA)? What is the **ISDA CDS Standard Model**?

**Question 6.** Ignoring the realised profits, whose legendary CDS trade do you think was more impressive and sophisticated: Bill Ackman's **COVID19 trade** or Michael Burry's **GFC trade**?

