

A CRO at an investment bank has asked the risk department to evaluate the bank's 3-year derivative exposure position with a counterparty. The 1-year CDS on the counterparty is currently trading at a spread of 180 bps. The table below presents trade and forecast data on the CDS spread, the expected exposure, and the recovery rate on the counterparty:

	Year 1	Year 2	Year 3
Expected exposure (AUD million)	15	15	15
Marginal probability of default	11.31%	10.03%	8.89%
CDS spread (bps)	180	300	420
Recovery rate (%)	85	75	65

Additionally, the CRO has presented the risk team with the following set of assumptions to use in conducting the analysis:

- The investment bank and the counterparty have signed a credit support annex to cover this exposure, which requires collateral posting of AUD 13 million throughout the life of the contract.
- The current risk-free rate of interest is 2% and the term structure of interest rates remains flat over the 3-year horizon.
- Collateral and exposure values remain stable as projected over the life of the contract.

Given the information and the assumptions above, what is the correct estimate for the credit valuation adjustment for this position?

- A. AUD 0.140 million
- B. AUD 0.172 million
- C. AUD 0.442 million
- D. AUD 1.051 million

Correct Answer: A

Explanation: A is correct. To derive the credit valuation adjustment (CVA), we use the standard formula:

$$CVA = \sum_{t=0}^n (1 - RR_t)(EE_t)(PD_t)(DF_t)$$

Where (at any time t),

The discount factor (DF_t) is determined from the risk-free rate of 2%.

Collateral amounts of AUD 13 million for each of the years 1, 2 and 3 are considered.

	Year 0	Year 1	Year 2	Year 3
Marginal probability of default [PD(t)]		11.31%	10.03%	8.89%
Discount factor (DF)		0.9802	0.9608	0.9418
Recovery rate (RR)		85%	75%	65%
Expected exposure (EE) (AUD million)		15	15	15
Collateral (C) (AUD million)		13	13	13
EE (netted) (AUD million)		2	2	2
(1-RR)*(EE)*PD(t)*(DF) (AUD million)		0.0333	0.0482	0.0586

$$CVA = \sum_{t=0}^n (1 - RR_t)(EE_t)(PD_t)(DF_t) = 0.0333 + 0.0482 + 0.0586 = 0.1401$$

C is incorrect. AUD 0.442 million is the result obtained when the recovery rate and not the LGD is used.

D is incorrect. AUD 1.051 million is the result obtained when collateral is not considered.

EE (netting)

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$$\begin{aligned}
 CVA &= \frac{15 \times 11.31\% \times 0.15}{(1+2\%)} + \frac{15 \times 10.03\% \times 0.15}{(1+2\%)^2} + \frac{15 \times 8.89\% \times 0.15}{(1+2\%)^3} \\
 &= 0.2495 + 0.3615 + 0.4398 = 1.051 \\
 &= 0.0333 + 0.0482 + 0.0586 = 0.140
 \end{aligned}$$