APPENDIX 19A: KVA calculation

A simple way to define KVA is within an internal rate of return (IRR) calculation with deterministic cashflows. At time zero, a transaction will give rise to a certain profit $R(0)$ and have an associated capital requirement $K(0)$. The required capital at the maturity of the transaction (T) will become zero $(K(T) = 0)$ and so there will be cashflows from the change in capital, $dK(t)$, over time.

$$R(0) - K(0) + \int_0^T \exp(-Rt)\, dK(t)$$

Integration by parts allows the above to be written as:

$$R(0) - K(0) + \exp(-RT)\, K(T) - \exp(-Rt)\, K(0) + \int_0^T R \exp(-Rt)\, dK(t)$$

Which gives:

$$R(0) = R \int_0^T K(t) \exp(-Rt)\, dt$$

Discretising this integral leads to the expression in Equation (19.4).

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