APPENDIX 16A: 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 return KVA and have an associated capital requirement $K(0)$. Note that the return and capital are fungible which may not be the case in practice. 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.

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

In a IRR approach, we look for the return R that solves the above. Alternatively, integration by parts allows the above to be written as:

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

Which gives:

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

With R interpreted as a return on capital. Discretising this integral leads to the expression in Equation (16.2).

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