

Innovation & Business Exercise, IB3, SOLUTIONS

Crypto as an Asset Class, the 5% Sleeve

Digital Finance, BSc Course

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Facilitator key | illustrative figures, the method is the point

(a) **New expected return.**

$$\mu_{\text{new}} = 0.95(6\%) + 0.05(20\%) = 5.7\% + 1.0\% = \mathbf{6.7\%}$$

(b) **New volatility** (work in %, i.e. variance in $\%^2$).

$$\begin{aligned}\sigma_{\text{new}}^2 &= w_p^2 \sigma_p^2 + w_b^2 \sigma_b^2 + 2w_p w_b \rho \sigma_p \sigma_b \\ &= (0.95)^2 (10)^2 + (0.05)^2 (60)^2 + 2(0.95)(0.05)(0.2)(10)(60) \\ &= 90.25 + 9.0 + 11.4 = 110.65 \\ \sigma_{\text{new}} &= \sqrt{110.65} = \mathbf{10.52\%}\end{aligned}$$

(c) **Read it.** Return 6% \rightarrow 6.7% (+0.7pp); volatility 10% \rightarrow 10.52% (+0.52pp). Crude ratio $\frac{6}{10} = 0.60 \rightarrow \frac{6.7}{10.52} = 0.637$: **risk-adjusted return improves.**

A 60%-vol asset adds little volatility here for two reasons: (1) the weight is **squared**, so $0.05^2 = 0.0025$ shrinks BTC's variance contribution (3600 \rightarrow 9); (2) the **low correlation** ($\rho = 0.2$) keeps the covariance term (11.4) modest. Diversification, not BTC's standalone risk, is what the portfolio feels.

(d) **Decision.** For a typical investor: the **spot-BTC ETF**. It removes key-management and custody risk, sits inside a normal, tax-reported brokerage account, and its small annual fee is trivial against the operational and security cost of self-custodying a 5% sleeve. Self-custody is defensible only for an investor who already runs institutional-grade custody and wants to avoid the fee and issuer counterparty.

The point. "Crypto as an asset class" is a portfolio-construction argument: a small, weakly-correlated, high-return sleeve can raise risk-adjusted return, and the ETF wrapper is what makes that allocation operationally boring enough for an institution to actually hold.