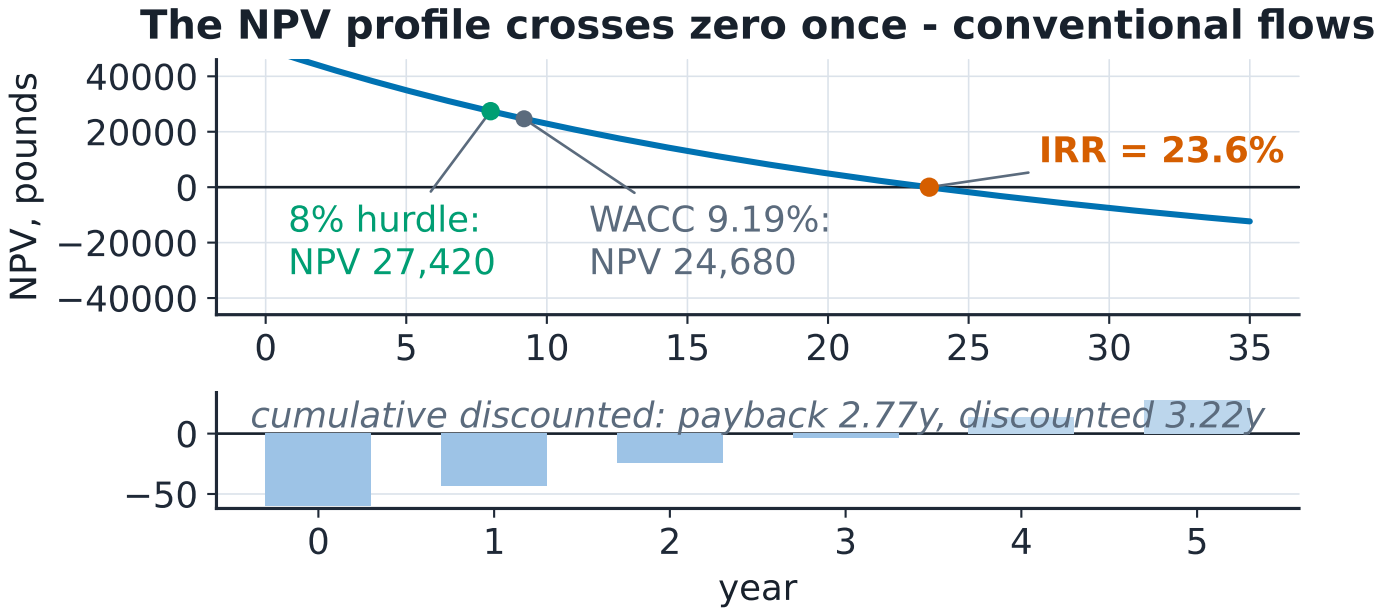
Exercise walk-through

9.4
Risk and return

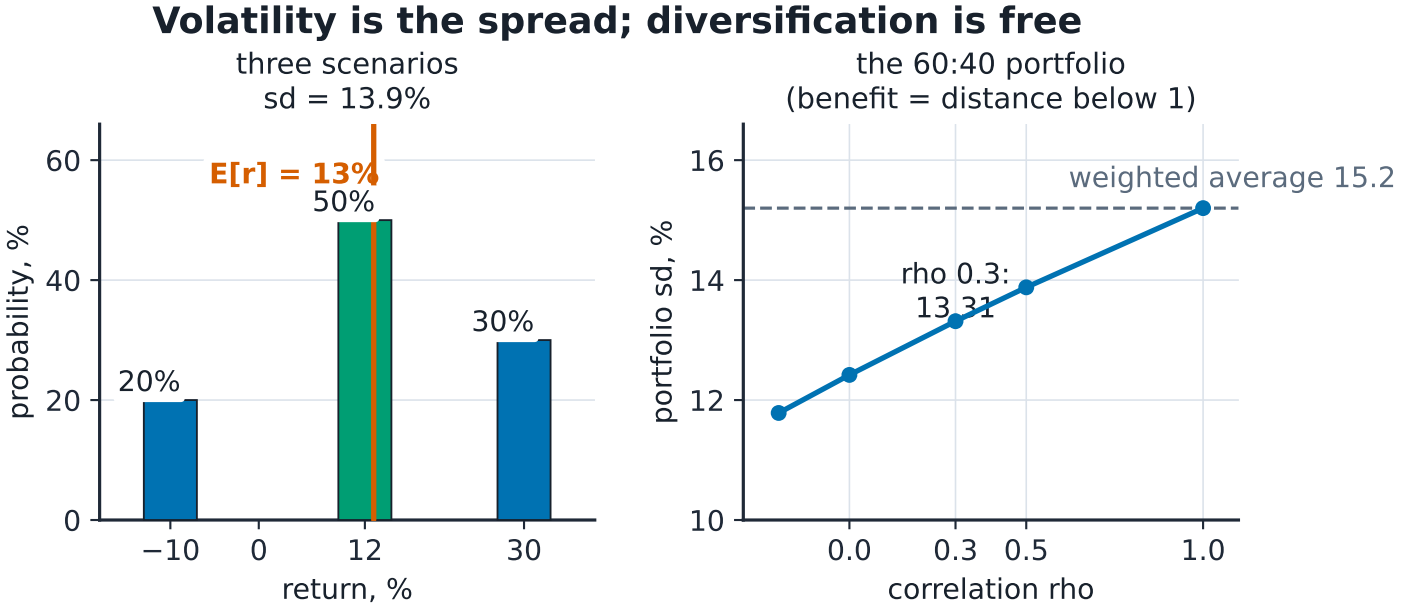
University Business

Appraisal: NPV is the referee



IRR 23.6%; NPV 27,420 at 8% and 24,680 at the 9.19% WACC.

Risk: the free lunch and its knife



E[r] 13.0%, sd 13.9%; **diversification** shrinks as correlation rises.

Risk in action: pricing the second site

1. **Feel** The founder bears everything - the chef, the lease, the location. It feels like a big premium.
2. **Portfolio** A diversified investor holds many sites: the **specific risk** sheds, and only the systematic slice remains.
3. **Price** The market pays for the slice it cannot shed - which is why the hurdle is the WACC, not the site total.

Exercises 2.1·2.2

2.1 Compute E[r] and σ (one decimal). [4]

2.2 The risk-free rate is 3.5%. The risk premium? And why does the market not pay a premium for the truck breaking down? [3]

Exercises 2.1·2.2

2.1 Compute E[r] and σ (one decimal). [4]

2.1

- $E[r] = 0.25(24) + 0.55(10) + 0.20(-8) = 9.7\%$.
- Variance $= 0.25(14.1)^2 + 0.55(0.1)^2 + 0.20(-17.9)^2 = 113.8 \rightarrow \sigma = 10.7\%$.

2.2 The risk-free rate is 3.5%. The risk premium? And why does the market not pay a premium for the truck breaking down? [3]

2.2

- Premium $= 9.9 - 3.5 = 6.4$ points.
- The breakdown is specific risk – a diversified holder sheds it for free, so it earns no premium.

Exercises 2.3·2.4

2.3 A fund holds the truck venture (σ 10.7%) and a bond sleeve (σ 6%) at 50:50, $\rho = 0.25$. Compute σ_p (one decimal) and the weighted average it beats. [4]

2.4 In one line: why does adding a second food truck ($\rho \approx 0.9$) barely help the portfolio? [2]

Exercises 2.3·2.4

2.3 A fund holds the truck venture (σ 10.7%) and a bond sleeve (σ 6%) at 50:50, $\rho = 0.25$. Compute σ_p (one decimal) and the weighted average it beats. [4]

2.3

- $\sigma_p^2 = 0.25(0.107)^2 + 0.25(0.06)^2 + 2(0.5)(0.5)(0.25)(0.107)(0.06)$
- $= 0.00286 + 0.0009 + 0.0008 = 0.00456 \rightarrow \sigma_p = 6.8\%$.
- Weighted average of the risks: $0.5(10.7) + 0.5(6) = 8.35\%$.
- The portfolio's 6.8% beats it by about 1.6 points: diversification.

2.4 In one line: why does adding a second food truck ($\rho \approx 0.9$) barely help the portfolio? [2]

2.4

- Its risk is nearly the same bet again ($\rho \approx 0.9$): the covariance term barely shrinks, so the sd barely falls.