# Risk Management Analysis

## Scenario 1: Hedging Market Risk

- \*\*Futures Contracts\*\*: Lock in the purchase price of coffee at a future date using futures contracts. This strategy protects against rising prices caused by adverse weather conditions, as outlined in the cost of carry model $F\_t = S\_t e^{(r-d)T}$.

- \*\*Options Contracts\*\*: Purchase call options on coffee, giving the right to buy at a specified price. Use the Black-Scholes model to calculate option prices $C = S\_t N(d\_1) - X e^{-rT} N(d\_2)$, where $d\_1$ and $d\_2$ are derived parameters.

- \*\*Diversified Suppliers\*\*: Source coffee from multiple regions to spread the risk of weather-related price fluctuations.

## Scenario 2: Credit Risk with a New Supplier

- \*\*Credit Default Swaps (CDS)\*\*: Use CDS to transfer default risk to another party. The CDS compensates for financial losses if the supplier fails to fulfill their obligations.

- \*\*Creditworthiness Assessment\*\*: Evaluate the financial health of the supplier using models like the Altman Z-score $Z = 1.2X\_1 + 1.4X\_2 + 3.3X\_3 + 0.6X\_4 + 0.999X\_5$, where $X\_i$ are financial ratios related to the supplier’s performance.

- \*\*Collateral Management\*\*: Require the supplier to post collateral (cash or securities) to mitigate potential losses from defaults. Use margin requirements or potential future exposure (PFE) models to determine the appropriate amount.

## Scenario 3: Operational Risk in Trade Execution

- \*\*Process Automation\*\*: Implement automated trading systems to minimize human errors. For instance, a moving average crossover strategy can optimize trade execution and risk management.

- \*\*IT Infrastructure\*\*: Strengthen IT systems to ensure reliability, with measures like cybersecurity protocols and performance monitoring to reduce downtime and operational disruptions.

- \*\*Training and Development\*\*: Regularly train staff on risk management practices, compliance protocols, and the use of new trading technologies to reduce manual errors and improve process efficiency.