Mergers and Acquisitions

Types of Mergers

1) Horizontal – same industry
2) Vertical – different steps of the production process
3) Conglomerate

Reasons for Mergers

1)

When to do a merger – When the PV of the benefits outweighs the cost of the acquisition.

Synergy

$$\text{Synergy} = V_{AB} - (V_A + V_B)$$

$$\Delta CF_t = \Delta Rev_t - \Delta Costs_t - \Delta Taxes_t - \Delta \text{Capital requirements}_t$$

Sources of Synergy

1) Revenue enhancement
   Marketing gains, Strategic benefits (beachhead), Market or Monopoly power
2) Cost reduction
   Economies of scale, Economies of vertical integration, Technology transfer, Elimination of inefficient management
3) Lower taxes
   Net operating losses, Increased debt capacity
4) Lower capital requirements
   Consolidation of duplicate facilities, R&D, etc.

Bad reasons for mergers

1) Earnings growth
2) Diversification

Options

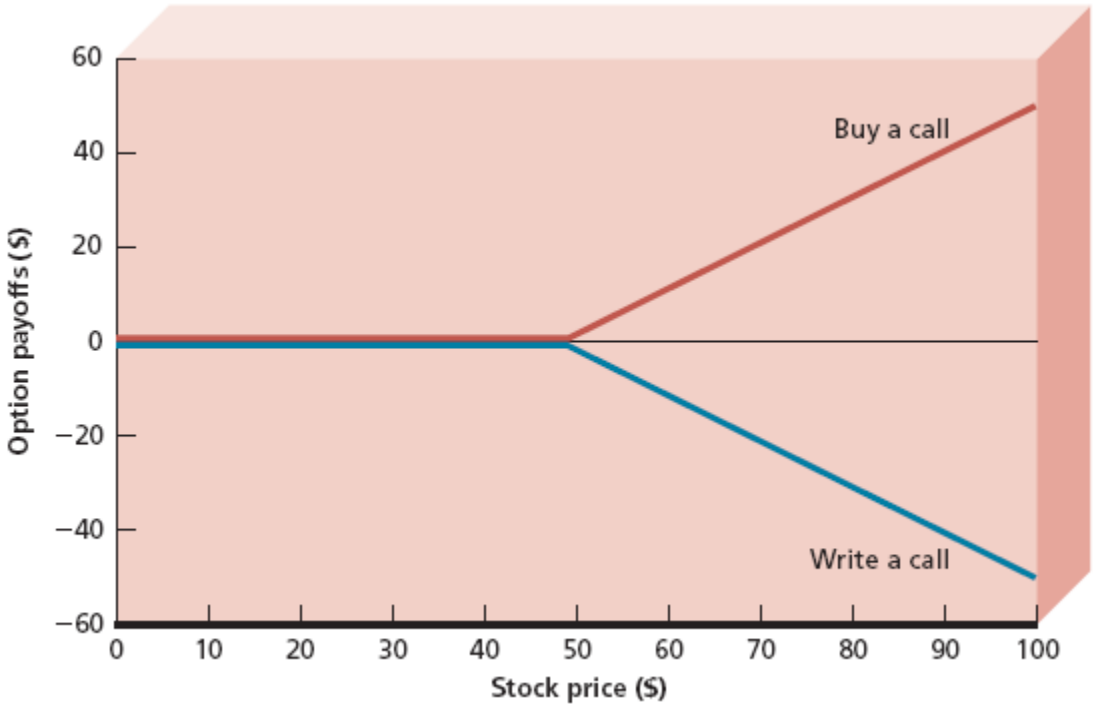
Call – The right, but not the obligation, to buy an asset at a specified price.

Strike price
Expiration date
Maturity

American
European

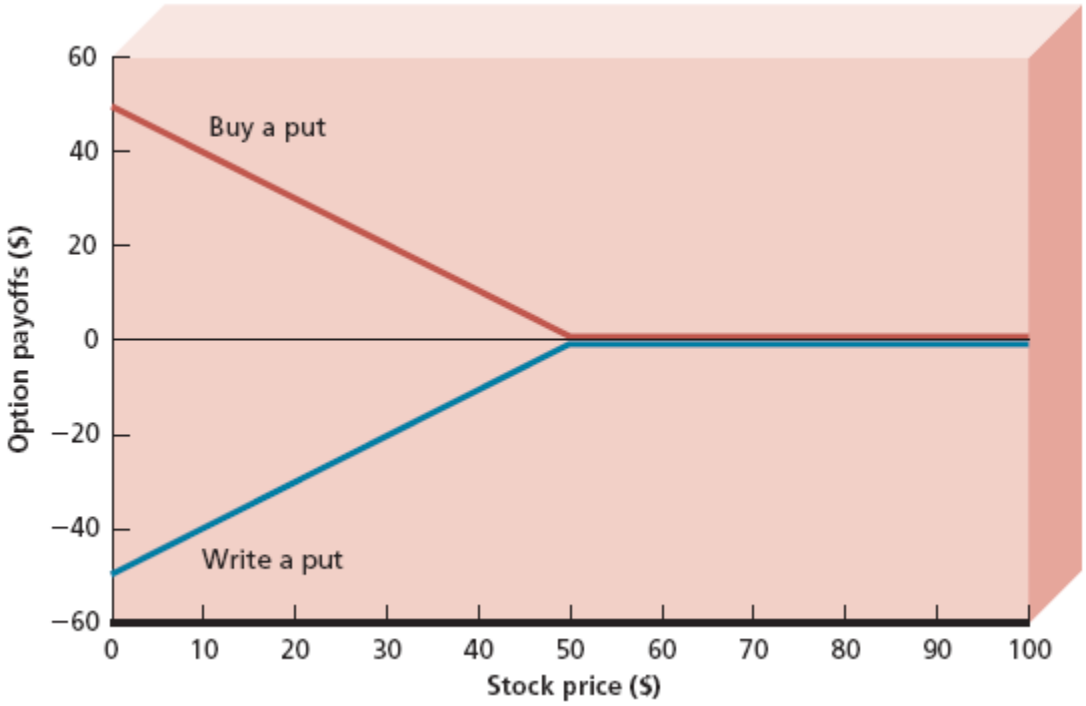
Buying an option (long)
Selling an option (writing or short)

Payoff of a long call = S – X
Payoff of a short call = –(S – X)



Put – The right, but not the obligation, to sell an asset at a specific price.

Payoff of a long put = X – S
Payoff of a short put = –(X – S)



Valuing a call option
1. The current price of the underlying stock.
2. The strike price of the option.
3. The risk-free rate over the life of the option.
4. The volatility of the underlying stock.
5. The time to expiration.
6. The dividend yield of the stock.

	Sign of Input Effect	
Input	Call	Put
Underlying stock price (S)	+	–
Strike price of the option contract (K)	–	+
Time remaining until option expiration (T)	+	+
Volatility of the underlying stock price (σ)	+	+
Risk-free interest rate (r)	+	–
Dividend yield of the underlying stock (y)	–	+

Black-Scholes-Merton Option Pricing Model

S = Stock price
X = Strike price
t = Time to maturity
r = Risk-free rate
y = Dividend yield
σ = Stock price volatility (standard deviation)

$C = Se^{-yt}N(d_1) - Xe^{-rt}N(d_2)$

$$d_1 = \frac{\ln\left(\frac{S}{X}\right)+\left(r-y+\frac{\sigma^2}{2}\right)t}{\sigma\sqrt{t}}$$

$d_2 = d_1 - \sigma\sqrt{t}$

1. e^x, or $exp(x)$, denoting the natural exponent of the value of x.
2. $ln(x)$, denoting the natural logarithm of the value of x.
3. $N(x)$, denoting the standard normal probability of the value of x.

$P = Xe^{-rt}N(-d_2) - Se^{-yt}N(-d_1)$

Note: $-d_x = 1 - d_x$

Calculate call and put option prices, given the following inputs to the Black-Scholes-Merton option pricing formula.

Stock price = $50
Dividend yield = 2%
Strike price = $45
Time to maturity = 3 months
Stock volatility = 25%
Interest rate r = 6%

$$d_1 = \frac{\ln\left(\frac{50}{45}\right)+\left(.06-.02+\frac{.25^2}{2}\right)(3/12)}{.25\sqrt{(3/12)}}$$

$$d_1 = \frac{.10536+.07125(.25)}{.125}$$

$d_1 = .98538$

$d_2 = .98538 - (3/12)\sqrt{.25}$
$d_2 = .86038$

Exact standard normal probabilities provided in this example are obtained from Excel using the function NORMSDIST(x). The following standard normal probabilities are provided:

$N(d1) = N(.98538) = .83778$ $N(-d1) = 1 - N(d1) = .16222$
$N(d2) = N(.86038) = .80521$ $N(-d2) = 1 - N(d2) = .19479$

So, the call price is:

$$C = \$50e^{-.02(.25)}(.83778) - \$45e^{-.06(.25)}(.80521)$$
$$C = \$50(.99501)(.83778) - \$45(.98511)(.80521)$$
$$C = \$5.985$$

And the put price is:

$$P = \$45e^{-.06(.25)}(.19479) - \$50e^{-.02(.25)}(.1622)$$
$$P = \$45(.98511)(.19479) - \$50(.99501)(.1622)$$
$$P = \$0.565$$

Option Strategies

Note: All of the strategies below require the options to have the same expiration date.

Straddle:
- Long call at X_1
- Long put at X_1

Strangle:
- Long put at X_1
- Long call at X_2
- $X_2 > X_1$

Bull spread:
- Long call at X_1
- Short call at X_2

Bear spread:
- Long put at X_2
- Short put at X_1

Questions for General Mills Acquisition by Diageo

1. What are General Mills motives for this deal? What is the expected value of the synergies?

2. Why was the contingent payment included in this deal? How does the claw-back affect the attractiveness of the deal from the standpoint of General Mills and Diageo?

3. How does the contingent payment work? Draw a payoff diagram from General Mills' perspective.

4. What is the contingent payment worth in early December 2000? Make sure to outline your assumptions and specific findings.

5. If the shareholders approve the deal, what must be their "key bet"? As an investor in General Mills, what would you monitor closely after the acquisition?

6. As a shareholder in General Mills, how would you vote?