

1.

- What are the differences between *profit and loss* and *cash flow* statements? [5 marks]
- What are the differences between *debt* and *equity* finance? [5 marks]
- What is an *option* and how might it be valued? [5 marks]
- Comment on the current prices of high-tech stocks. [5 marks]

Answer:

a)

A cash flow statement shows debits and credits at the time they are paid.

A profit and loss statement shows debits and credits at the time they are incurred, for example at invoice date.

For small start-up companies cash-flow is more important than profitability

b)

Equity finance, represented by shares, is where a proportion of the ownership of the company is sold to investors. They usually, but may not, include voting, dividend and other rights

Debt equity is a loan to the company, for example a debenture or a bond. It may be accompanied by periodic interest payments, and may have conversion rights to shares in the company if the debt is not paid or under other conditions.

c) (Adapted from <http://bradley.bradley.edu/~arr/bsm/model.html>) The idea of options is not new. Ancient Romans, Grecians, and Phoenicians traded options against outgoing cargoes from their local seaports. When used in relation to financial instruments, options are generally defined as a "contract between two parties in which one party has the right but not the obligation to do something, usually to buy or sell some underlying asset". Having rights without obligations has financial value, so option holders must purchase these rights, making them assets. This asset derives their value from some other asset, so they are called derivative assets. These derivative instruments are tradable in their own right. Call options are contracts giving the option holder the right to buy something, while put options, conversely entitle the holder to sell something. Payment for call and put options, takes the form of a flat, up-front sum called a premium.

European exercise terms dictate that the option can only be exercised on the expiration date. American exercise term allow the option to be exercised at any time during the life of the option, making American options more valuable due to their greater flexibility. Options can also be associated with bonds (i.e. convertible bonds, where payment occurs in instalments over the entire life of the bond. However, most analytical work has been done for European style options for assets with a single payment, such as shares, although it may be adapted for more complex cases.

Share options in the company can form a tax-efficient part of the remuneration package for key employees of high-tech companies, in the expectation of rapid growth.

Modern option pricing techniques, with roots in stochastic calculus, are often considered among the most mathematically complex of all applied areas of finance. The best known option pricing model is that which Fischer Black and Myron Scholes, introduced in 1973 and for which they were awarded the 1997 Nobel prize.

The Model:

$$C = SN(d_1) - Ke^{-rt} N(d_2)$$

C = Theoretical Call Premium

S = Current stock price

t = time until option expiration

K = option striking price

r = risk-free interest rate

N = Cumulative standard normal distribution

e = exponential function (2.7183)

$$d_1 = \frac{\ln(S/K) + (r + \sigma^2/2)t}{\sigma\sqrt{t}}$$

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

σ = standard deviation of stock returns

ln = natural logarithm

In order to understand the model itself, we divide it into two parts. The first part, $SN(d1)$, derives the expected benefit from acquiring a stock outright. This is found by multiplying stock price $[S]$ by the change in the call premium with respect to a change in the underlying stock price $[N(d1)]$. The second part of the model, $Ke^{-rt}N(d2)$, gives the present value (NPV) of paying the exercise price on the expiration day. The fair market value of the call option is then calculated by taking the difference between these two parts.

The model is not perfect, as for example the collapse of the Magellan Hedge fund demonstrated, and makes a number of assumptions, such as that of a perfect, efficient market. Some variables, such as the future volatility of the stock, may be hard to estimate.

d) This is written in Feb 2000, when high-tech stocks are at an all time high.

Points to make:

High tech stocks at very high levels, for example ARM with P/E of around 2000. Implies market expectation of 100 fold growth of profits.

While centered on new internet "dot com" stocks, similar effects are in related industries, such as semiconductors and bio-tech, but by no means universal.

Although led by US stocks, the effect is global, with UK stocks following the US lead.

Many companies are still in early stages, and yet to report any profit, so pricing is on expectations, which may not be realised. However, some early Internet companies nearing the end of their honeymoon period, and reaching the time when their original prospectus promised profitability.

While the Internet may introduce efficiencies, the "New Economy" may be over-hyped

Little effect on traditional stocks

Distorting effects of high Internet stock prices, such as where the internet division is valued many times more than the original company, such as Dixons/Freeserve or where the US Internet steel trading exchange is valued at more than the whole of the underlying steel production industry

Many Internet millionaires created, at least on paper

Analogies with other financial bubbles, such as the South Sea Bubble, Tulipmania, and the speculation in radio and airline shares preceeding the 1920 Wall St crash. Some stocks floated as investment vehicles without clear purpose; direct analogy with the South Sea company.