Risky Arbitrage

One of the most interesting topics in finance is how to profit from mis-priced assets. This is called arbitrage.

As the saying goes, ‘buy low, sell high’. So if an asset is under-priced, buy it. If it’s over-priced, sell it. But there can be problems with this simple strategy.

Systematic Risk Problem: If an asset is under-priced, then eventually its price should rise, relative to the rest of the market. But what if the market crashes? The asset’s price is likely to fall even further. If we simply buy the under-priced asset and wait, we run the risk of losing money in a market downturn.

Capital Problem: If an asset is under-priced and should be bought, we will need cash to buy it. But what if we don't have any spare cash?

Waiting or Patience Problem: If an asset is under-priced and should be bought, we will have to wait until the price finally rises before we can collect the cash profits. But wouldn't it be better to gain the positive expected cash flow now?

Risk-free Arbitrage

Thanks to financial engineering and derivatives, we can achieve:

- Zero systematic risk;
- Zero capital requirements; and
- Reap profits now.

This is possible when markets are 'complete', which means it's possible to buy or sell (including short sell) all assets.

Arbitrage tables provide the easiest way to design the ideal zero-risk, zero-capital portfolio that makes profits now.

Arbitrage Tables

Arbitrage tables generally feature three or more columns and four or more rows.

When designing an ideal risk-free arbitrage of a mis-priced:

- Future, the futures valuation equation is often used;
  $V_{T,LF} = S_T - K_T = -V_{T,SF}$ and
  $F_{0,T} = (S_0 - D_0).e^{r.T}$ or
  $F_{0,T} = S_0.e^{(r-q).T}$

- Option, the put-call parity equation is often used.
  $(S_0 - D_0) + p_0 = c_0 + K_T.e^{-r.T}$ or
  $S_0 e^{-q.T} + p_0 = c_0 + K_T.e^{-r.T}$