SOLUTIONS ASSIGNMENT 3

1) The purpose of this question was (primarily) to get you to read the article and think about their framework. There are as many factor models out there as there are consultants, so this model is not definitive, but it does give you as sense of how such a framework could be used.

   a) To calculate the risk exposure of the portfolio, just calculate the portfolio beta's for each of the different types of risk. The portfolio betas are just a linear combination of the betas or exposures of the individual stocks. So: Confidence Risk: 0.73*0.25+0.27*0.75=0.385, where 0.25 is the weight of Reebok in the portfolio, 0.73 is the Reebok exposure, 0.75 is the SP500 weight in the portfolio and 0.27 is the SP500 exposure. (All this info in on page 12). Similar calculations yields the *Time Horizon* risk exposure as 0.613, the *Inflation* exposure is -0.397, the *business cycle* exposure as 2.43 and the *Market timing* exposure as 1.125.

   b) The contribution of business cycle risk to the portfolio expected return is just the exposure multiplied by the price of risk (or the reward for bearing it) —- So, 2.43*1.49=3.621. Where, the 2.43 comes from above and the 1.49 comes from page 9.

   c) The expected return on the portfolio is just the combination of all the exposures times the price/reward for those exposures plus the risk free rate:

5 + 0.385*2.59+ – 0.66*0.613+4.32*0.397+1.49*2.43+3.61*1.125=14.99

   d) The effect to the unanticipated inflation would depend on you inflation risk exposure: 2*–0.397=–0.794% reduction in your return.

2) There are different ways of interpreting their ranking system – I'm suggesting one, there could of course be others.

   a) One way to think about this is to consider increasing or decreasing the exposure to stocks the same as decreasing or increasing the exposure to the cash or the risk–free security. This means that for any portfolio, the MS index increases or decreases the risk–free security until the volatility is just equal to the market volatility, or the standard deviation of the portfolio you are trying to rank is just equal to that of the market index. The Sharpe ratio looks at the slope of such lines. They all come from the same point which is the risk–free rate and so if one fund gives a higher return at the market volatility then it must also lie on a higher line and so have a higher Sharpe Ratio.

b) The Treynor index is defined as

$$T_p = \frac{r_p - r_f}{\beta_p}.$$

Suppose you have two portfolios with the same Treynor ratio, they can have different Sharpe ratios — specifically if they both have the same covariance with the market portfolio, but one fund has a really high idiosyncratic shock (i.e. it is not well diversified). So, you can have two portfolios that have the same ranking by the Treynor index, but different rankings with the Sharpe Ratio. If this new system gives the same rankings as the Sharpe index, then this means that you can get different rankings with the Treynor index and this new measure.