# Topic 10 Solutions

1. As an investor, what factors would you consider before investing in the emerging stock market of a developing country?

There are several issues that an investor needs to be concerned with when it comes to investing in emerging markets – the depth and liquidity of the market. The investor should look at the concentration ratio – a measure of investment opportunities (market value of top 10 stocks/total market capitalisation of all stocks). The lower the ratio, the larger the investment opportunities. The market turnover ratio gives an indication of the level of liquidity of the market. The higher the turnover ratio, the easier it is for an investor to enter and exit a market without incurring excessive costs.

2. Why might it be easier for an investor desiring to diversify his portfolio internationally to buy depository receipts rather than the actual shares of a company?

A depository receipt can be purchased on the investor's home exchange. It is priced in the home currency and can be purchased from a local broker. In addition, any dividends paid are converted into local currency by the depository bank.

3. Explain the concept of the world beta of a security.

The world beta measures the sensitivity of returns to a security to returns to the world market and can be thought of as a measure that determines the amount of risk a stock contributes to the world market portfolio.

4. Explain how exchange rate fluctuations affect the return from a foreign market, measured in dollar terms.

Exchange rate volatility contributes to the risk of a foreign investment through its own volatility and in the way it covaries with local market returns. Since the covariance tends to be positive (usually small) it is likely to add to exchange risk.

5.  During the year, Toyota Motor Company shares went from ¥ 9,000 to ¥ 11,200, while paying a dividend of ¥ 60. At the same time, the exchange rate went from $1 = ¥ 145 to $1 = ¥ 120. What was the total dollar return, in percent, on Toyota stock for the year?

$$1 + R_{Local\ Currency} = \left(1 + R_{Foreign\ Currency}\right)\left(1 + g\right)$$

where  g = percent change in the dollar of the foreign currency

The total dollar return is

$$R_\$ = [1 + (11{,}200 - 9{,}000 + 60)/(9{,}000)]\ [1 + 0.2083]{-}1$$

$$R_\$ = (1.2511)\ (1.2083) - 1 = 1.17\%$$

The total dollar return on Toyota stock for the year is 51.17%


6.  Suppose you are a euro-based investor who just sold Microsoft shares that you had bought six months ago. You had invested 10,000 euros to buy Microsoft shares for $120 per share. The exchange rate was $1.15 per euro. You sold the stock for $135 per share and converted the dollar proceeds into euro at the exchange rate of $1.06 per euro. First, determine the profit from this investment in dollar terms. Second, compute the rate of return on your investment in euro terms. How much of the return is due to the exchange rate movement?

The return in dollar terms is: (135-120)/120 = 0.125 (12.5%)

The return in Euro terms is:

$$= [1+(135 - 120)/120] * [1+(0.9433 - 0.8695)/0.8695] -1$$

$$= 1.125 * 1.085 -1 = 0.22\ (22\%)$$

The part of the return due to the exchange rate movement is:

$$(0.9433 - 0.8695)/0.8695 = 0.085\ (8.5\%)$$

7. During the year the price of British gilts (UK government bonds) went from £102 to £106, while paying a coupon of £9. At the same time, the exchange rate went from £1:$1.76 to £1:$1.62. What was the total dollar return, in percent, on gilts for the year?

The one-period total dollar return on a foreign bond investment $r_\$$ can be calculated as follows:

$$Dollar\ return = Local\ currency\ return \times currency\ gain(loss)$$

$$1 + r_\$ = \left[1 + \frac{B_1 - B_0 + C}{B_0}\right] \times (1 + g)$$

where $B_{(t)}$ = local currency bond price at time t

C = local currency coupon income

g = percent change in dollar value of local currency

With an initial bond price of £102, coupon income of £9, end-of-period bond price of £106, and pound depreciation of (1.62 - 1.76)/1.76 = -7.95%, the total dollar return is 3.79%:

$$r_\$ = [1 + (106 - 102 + 9)/102](1 - .0795) - 1 = (1.1275)(0.9205) - 1 = 3.79\%$$

8. Suppose that the standard deviation of the return on Nestle in terms of the Swiss francs is 19% and the standard deviation of the rate of change in the $:Franc exchange rate is 15%. In addition, the estimated correlation between the Swiss Franc return on Nestle and the rate of change in the exchange rate is 0.17. Given these figures, what is the standard deviation of the dollar rate of return on investing in Nestle stock?

The standard deviation of the dollar return is given by the following formula:

$$\sigma_\$ = \left[\sigma_f^2 + \sigma_g^2 + 2\sigma_f\,\sigma_g\,\rho_{fg}\right]^{\frac{1}{2}}$$

where $\sigma_f^2$ and $\sigma_g^2$ are the variance of the foreign currency return and the variance of the exchange rate change respectively.

$$\sigma_2\ (\text{Nestle}) = (0.19^2 + 0.15^2 + 2 * 0.19 * 0.15 * 0.17)^{1/2}$$

$$\sigma_2\ (\text{Nestle}) = 0.2613 = 26.13\%$$

9. A portfolio manager is considering the benefits of increasing his diversification by investing overseas. He can purchase shares in individual country funds with the following characteristics:

| | U.S. (%) | U.K. (%) | Spain (%) |
|---|---|---|---|
| Expected return | 15 | 12 | 5 |
| Standard deviation of return | 10 | 9 | 4 |
| Correlation with U.S. | 1.0 | 0.33 | 0.06 |

(a) What is the expected return and standard deviation of return of a portfolio with 75 percent invested in the United Kingdom and 25 percent in the United States? What about 25 percent invested in the UK and 75 percent in the US?

Use the formulas $r_p = w_1 r_1 + w_2 r_2$ and $\sigma_p^2 = w_1^2 \sigma_1^2 + w_2^2 \sigma_2^2 + 2 w_1 w_2 P_{12} \sigma_1 \sigma_2$ to calculate the means and standard deviations of the portfolios.

| %US | %UK | Expected Return | Standard Deviation |
|---|---|---|---|
| 25 | 75 | 12.75 | 7.93 |
| 75 | 25 | 14.25 | 8.51 |

(b) What is the expected return and standard deviation of return of a portfolio with 75 percent invested in Spain and 25 percent in the United States? What about 25 percent invested in Spain and 75 percent in the US?

Using the same formulas as in the answer to part (a), we can calculate the means and standard deviations of the various portfolios as follows:

| %US | %Spain | Expected Return | Standard Deviation |
|---|---|---|---|
| 25 | 75 | 7.50 | 4.02 |
| 75 | 25 | 12.50 | 7.63 |

10. Why do investors invest the lion's share of their funds in domestic securities?
Home bias to some extent exists due to barriers. These barriers might be in the form of transaction costs, information costs, legal and institutional reasons, taxes, exchange and political risk.

11. Studies show that the correlations between domestic stocks are greater than the correlations between domestic and foreign stocks. Explain why this is likely to be the case. What implications does this fact have for international investing?

Domestic stocks are more highly correlated because they are all subject in one way or another to the state of the domestic economy. The lower correlations between domestic and foreign stocks reflect the lower correlations between the domestic and foreign economies. These lower correlations also imply that international investing is likely to lead to greater diversification than just investing across industries within a country. As the text shows, these lower correlations appear to be persisting despite the greater integration of the global economy.

12. Who is likely to gain more from investing overseas, a resident of the United States or of Mexico? Explain.

Mexican investors will gain much more from international investing. The size of the U.S. economy is such that the U.S. and world stock markets are highly correlated whereas the Mexican stock market, being much smaller, shows a much lower correlation with the world stock market. The result is greater diversification (and, hence, risk reduction) benefits for the Mexican investor than for the U.S. investor. In addition, the U.S. has a much greater range of industries than does Mexico, giving much more scope for industry diversification outside Mexico than would be true for a U.S. investor who has access to such a broad range of industries already.

13. Comment on the following statement: "On October 19, 1987, the U.S. stock market crashed. As the globe turned the following day, the devastation spread from New York to Tokyo, Hong Kong, Sydney, and Singapore, and on to Frankfurt, Paris, and London, then back to New York. The domino-style spread of the crash from one market to the next accelerated as international investors attempted to outrun the wave of panic selling from Tokyo to London and back to New York. It is difficult to imagine that some investors thought they had been able to diversify their investment risks by spreading their money across different stock markets around the world, when in fact their downside risks were multiplying as one market followed another into decline." (October 19, 1987 is known as "Black Monday". The US market dropped approx. 22% in one day)

The fact that markets move in sync with each other does not mean that there are no benefits to international diversification. As long as market movements are ***not*** perfectly correlated, international portfolio diversification can deliver a higher level of expected return for the same degree of risk or a lower level of risk for the same expected return. Thus, the real issue is an empirical one: Are market movements perfectly correlated? The answer is a resounding no.

Here is an important piece of evidence: the performance of the various stock markets around the world during the year 1987. Despite the claim put forth in the statement, there was wide variation in returns among the different markets. This is precisely why international diversification works.

### 1987 WORLD STOCK MARKET PERFORMANCE
Change from 12/31/86 to 12/31/87 (%): in U.S.$

| | | | |
|---|---|---|---|
| Japan | 42.4 | Mexico | 3.2 |
| Spain | 32.6 | Singapore/Malaysia | 0.8 |
| U.K. | 31.5 | United States | 0.6 |
| EAFE* | 23.2 | Austria | 0.4 |
| The World | 14.3 | Sweden | 0.4 |
| Canada | 11.6 | Hong Kong | -7.2 |
| Denmark | 11.3 | Switzerland | -10.7 |
| Australia | 6.7 | France | -15.0 |
| Belgium | 4.3 | Italy | -22.5 |
| Norway | 3.6 | West Germany | -26.0 |
| Netherlands | 3.5 | | |

Source: Morgan Stanley Capital International Perspective (Geneva)

* Europe, Australia & Far East Index

14. Because ADRs are denominated in dollars and are traded in the United States, they present less foreign exchange risk to U.S. investors than do the underlying foreign shares of stock. Comment.

The answer to this question depends on the distinction between the currency of denomination and the currency of determination. Although the ADR currency of denomination is the dollar, the currency of determination is the local currency (or whatever currency determines the cash flows of the stock). More specifically, the price of an ADR is the price of the share of stock in its foreign currency multiplied by the spot dollar value of the foreign currency. As the spot exchange rate changes, the dollar price of the ADR will also change (unless the foreign

currency value of the stock changes in inverse proportion to the change in the spot price, an unlikely scenario). Hence, ADRs are as subject to exchange risk as the underlying shares of foreign stock.

15. Will increasing integration of national capital markets reduce the benefits of international diversifications?

Despite increasing integration of national capital markets, they still don't march in lock step. Some economies and, hence, their markets will do better than others at any given time, so having stakes in several countries still spreads risks. Nonetheless, increasing integration could lead to more co movement in common risk factors (e.g., real interest rate changes). If so, this will increase the correlation of national markets and decrease the risk-reducing benefits of diversifying internationally. Ultimately, it's an empirical issue, and one that should be addressed, as to whether the benefits of international investing are declining. My sense is that international investing can still reduce portfolio risk but the degree of risk reduction is less today than in the past.

16. According to one investment advisor, "I feel more comfortable investing in Western Europe or Canada. I would not invest in South America or other regions with a record of debt defaults and restructuring. The underwriters of large new issues of ADRs of companies from these areas assure us that things are different now. Maybe, but who can say that a government that has defaulted on debt won't change the rules again?" Comment on this statement.

It's true. A nation that has already defaulted on its debt is less trustworthy than one that never has. However, this possibility has already been factored into the prices of that nation's bonds and stocks in the form of a large discount to what they would sell for absent that past experience. The real--and important--question is whether the discount is high enough to provide an expected return high enough to compensate for those risks. If so, then Latin American stocks and bonds would be a reasonable investment since they would provide additional diversification benefits.

17. From 1949 to 1990, the Japanese market rose 25,000 percent.

(a)   Given these returns, does it make sense for Japanese investors to diversify internationally?

Note that the same argument could be made as to why non-Japanese investors should also invest all their money in Japan. Implicit in this argument is the expectation that historically high returns will persist into the future. Such an expectation is an unreasonable one in efficient markets. Thus, unless one unrealistically expects these superior returns to persist into the future, diversification would make sense for both Japanese and non-Japanese investors. The benefits of this diversification were pointed out in 1990, when the Tokyo Stock Exchange fell 35% in dollar terms (39% in yen), while the Morgan Stanley Capital International World Index fell by "just" 18.6% in dollar terms.

(b) What arguments would you use to persuade a Japanese investor to invest overseas?

Here are two arguments. First, you can't expect stock markets to keep going up in a straight line. All markets entail risk, and one way to counter that risk is through diversification. This argument should by now be bolstered by the crash of the Japanese stock market in 1990. Second, to the extent that the Japanese investor consumes foreign goods and services, international investing can reduce the risk associated with the investor's consumption stream by matching foreign currency inflows with foreign currency outflows. For example, if the yen depreciates, the higher yen cost of buying foreign goods and services will be offset by the higher yen value of foreign assets.

18. The Brazilian stock market rose by 165% during 1988. Are American investors likely to be pleased with that performance? Explain.

These returns are stated in nominal cruzeiro terms. American investors are interested in dollar returns. Thus, American pleasure with the Brazilian market's performance depends on how much the cruzeiro devalued during the year. In fact, the cruzeiro (the cruzado then) devalued by about 90% during the year. Hence, the dollar return on the Brazilian market was approximately -74%. Not good enough to keep investors happy.

19. Suppose that over a ten-year period the annualized peseta return of a Spanish bond has been 12.1%. If a comparable dollar bond has yielded an annualized return of 8.3%, what cumulative devaluation of the peseta over this period would be necessary for the return on the dollar bond to exceed the dollar return on the Spanish bond?

The answer to this question can be found by solving the following equation:

$$(1.121)^{10}(1 - d) = (1.083)^{10}$$

where d is the cumulative peseta devaluation over the ten-year period. In other words, the dollar return on investing in the Spanish bond just equals the dollar return on investing in the comparable dollar-denominated bond. The solution to this equation is d = 0.2917, or a cumulative peseta devaluation of 29.17%.

20. In an attempt to diversify your portfolio internationally, you must decide how to invest in Brazil. You can invest in an index fund that replicates the Brazilian stock market, or you can buy shares of the Brazil Fund traded on the New York Stock Exchange. The covariance of dollar returns on the index with the S&P 500 is 0.02; the covariance of dollar returns on the Brazil Fund with the S&P 500 is 0.03; the variance of the S&P 500 index is 0.035; and the beta of the Brazil Fund with respect to the Brazilian index is 0.90. In addition, the Brazil Fund and the Brazilian index are expected to yield annual dollar returns of 21 percent and 19 percent, respectively, in contrast to expected annual returns of 18 percent from investing in the S&P 500. Ignoring other considerations, should you buy the Brazil Fund or the Brazilian index fund?

To answer this question, we need to determine which investment provides a better risk-return trade-off in the context of the U.S. market, which is represented here by the S&P 500. This means that we must calculate the beta for the Brazilian index with respect to the S&P 500, $\beta_{\text{Brazilian index}}$, and the corresponding beta for the Brazil Fund, $\beta_{\text{Brazil Fund}}$ (the Brazil Fund's beta relative to the Brazilian index is irrelevant). By definition, $\beta_{\text{Brazilian index}} = 0.02/0.035$, or 0.57, and $\beta_{\text{Brazil Fund}} = 0.03/0.035$, or 0.86. Given these betas and the 5% Treasury bill rate mentioned in Part b, the CAPM predicts an expected return on the Brazilian index of 5% + 0.57(18% - 5%) = 12.43% and an expected return on the Brazil Fund of 5% + .86(18% - 5%) = 16.14%. Given their actual expected returns 19 percent and 21 percent, respectively, both investments appear to offer excess risk-adjusted returns, but the excess return for the Brazilian index of

6.57% (19% - 12.43%) exceeds the Brazil Fund's excess return of 4.86% (21% - 16.14%). Hence, the Brazilian index fund appears to provide a better risk-return trade-off than the Brazil Fund.

21. On 31/8/97 the French stock index price was FF213.67, the FF/$ exchange rate was 6.0973 FF/$, and the ¥/$ exchange rate was ¥118.86/$. One month later, on 30/9/97, the French stock index price was FF223.03, the FF/$ exchange rate was FF5.9322/$, and the ¥/$ exchange rate was ¥120.73/$.

**(a)** What was the return on the French index during the month of September 1997 from an American investor's point of view?

Return on French index in FF terms = (223.03 – 213.67)/213.67 = 0.0438

Return on the $/FF exchange rate = [1/FF 5.9322/$ - 1/FF 6.0973/$]/1/FF 6.0973/$ = 0.02783

$1 + R^{\$US} = (1 + R^{FF}) (1 + R^{\$/FF}) = (1.0438)(1.02783) = 1.0729 (7.29\%)$

(b) What was the return on the French index during the month of September 1997 from a Japanese investor's point of view?

Return on French index in FF terms = (223.03 – 213.67)/213.67 = 0.0438

Need to calculate the ¥/FF cross rate for both periods

t = 0:        ¥118.86/$/FF6.0973/$ = ¥19.4939/FF
t = 1:        ¥120.73/$/FF5.9322/$ = ¥20.3516/FF

Return on the ¥/FF exchange rate = (¥20.3516/FF - ¥19.4939/FF)/ ¥19.4939/FF = 0.044

$1 + R^{yen} = (1 + R^{FFindex}) (1 + R^{yen/FF}) = (1.0438) * (1.044) = 1.0897 - 1 = 8.97\%$

(c) If the return on the French index during the month of September 1997 from a Swedish investor's point of view was 3%, did the Swedish krona appreciate or depreciate against the French Franc in September 97? How do you know?

Because the $R^{Krona}$ (3%) < $R^{French\ index}$ in Francs (4.38%), it must be that the krona appreciated against the FF (or that the FF depreciated against the krona).

22. What vehicles for international equity investment are available to an individual investor? Please provide a very brief explanation of some of the instruments.

Mutual funds, American Depository Receipts and the like. See textbook for details

23. What characteristics of foreign securities lead to diversification benefits for Australian investors?

The two basic characteristics are:

(a) Many foreign securities are issued by companies that produce goods and services not available from Australian companies, and these goods and services have huge global markets. More than half of the world's stock market capitalisation is in non - Australian companies. Diversification allows access to these hugely profitable manufacturers.

(b) All Australian companies are more or less subject to the same cyclical economic fluctuations. Foreign securities by contrast involve claims on economies whose cycles are not perfectly in phase with the Australian economic cycle. Thus, just as movements in different stocks partially offset one another in an all- Australian portfolio, so also movements in Australian and non- Australian. stocks cancel out each other somewhat. [note: you could substitute just about any country in this question and the answer would be the same]

24. Suppose Mexican bonds are yielding more than 100% annually. Does this high yield make them suitable for American investors looking to raise the return on their portfolios? Explain.

These returns are denominated in nominal peso terms, subjecting them to currency risk. Nonetheless, holding a small percentage of your portfolio in Mexican bonds will reduce its risk, without sacrificing expected return. This is because arbitrage will equilibrate expected returns across countries at the same time that the actual returns from the Mexican peso bonds are relatively uncorrelated with returns on the U.S. stock market. Hence, the primary reason for holding Mexican bonds is to reduce risk, not raise expected return.

25. Suppose during the first half of the year, Swiss government bonds yielded a local-currency return of -1.6%. However, the Swiss franc rose by 8% against the dollar

over this six-month period. Corresponding figures for France were 1.8% and 2.6%. Which bond earned the higher U.S. dollar return? What was the return?

The dollar return on Swiss bonds equalled $(1 - 0.016) \times (1 + 0.08) - 1 = 6.27\%$.

The return on French bonds was lower at $(1.018) \times (1.026) - 1 = 4.45\%$.

In this case, Swiss franc appreciation more than offset the lower local currency return on Swiss bonds.

26. What are the likely impediments to International Diversification?

(a)   Legal systems vary from country to country. Some countries may impose currency controls and specific tax regulations. Different legal rules also make legal battles difficult or all together impossible, especially in instances where investors have been cheated.

(b)   Economic impediments include monetary and fiscal policies that could impact investments negatively, further the lack of liquidity is a major obstacle in some markets, in others the markets abroad maybe less developed.

(c)   Informational impediments arise because of lack of readily accessible and comparable information. Information may not be collected at all; its quality may not be reliable or it may have to first be translated.

(d)   Political instability in some countries leads to volatile markets and ever-changing rules and regulations, making investments very risky.

27. Suppose that the dollar is now worth €0.7423. If one-year German bunds are yielding 9.8% and one-year U.S. Treasury bonds are yielding 6.5%, at what end-of-year exchange rate will the dollar returns on the two bonds be equal? What amount of euro appreciation or depreciation does this equilibrating exchange rate represent?

To begin, given that German bunds are yielding more than U.S. Treasuries, for dollar returns on these two securities to equilibrate, the euro must depreciate against the dollar by about the interest differential, which is 3.3%. Using Equation 13.4, the expected dollar return on investing $1 in a bund (after first converting it into €0.7423) for a year can be found as

$$0.7423(1.098) \; e_1 = 0.8150 \; e_1$$

where $e_1$ is the unknown end-of-year exchange rate ($/€). Note that ex ante, one cannot anticipate any capital gains or losses on investing. Setting this figure equal to the $1.065

expected dollar return from investing one dollar in a Treasury bond yields the solution $e_1$ = $1.3067, which converts into a direct quote for the dollar of €0.7653. This exchange rate entails a euro depreciation of (0.7423 – 0.7653)/0.7653 = -3.01% against the dollar. Alternatively, the dollar has appreciated against the euro by (0.7653 – 0.7423)/0.7423= 3.10%.

28. You are an Australia based investor considering an investment in a European company. The Euro is currently at €1.08/dollar. In one year, you believe the Euro will be at €1.03/dollar. European investors believe they will earn a 15% return on the stock during the next year (these investors use Euros as their home currency).

(a) What percent return can an Australian investor expect on this stock in the next year, taking into account effects from the Euro/dollar exchange rate changing during the holding period?

$r_\$$    $= (1 + r_€) \times (1 + \Delta S) - 1$
       $= 1.15 \times (1.08 / 1.03) - 1 = 0.2058$

(b) Now assume that the Australian investor would like to invest in a portfolio of Australian and European stocks. The Australian portfolio has an expected return of 0.12 (twelve percent) and a variance of 0.06. Assume that the investor expects, *on a dollar basis*, the European stock market to generate an average return of 0.20 (twenty percent) with a variance of 0.09. The European stock market has a correlation of 0.4 with the Australian portfolio. Note: *Ignore your answer in (a) and use these numbers instead!*

Suppose the investor wants to construct a portfolio comprising of European and Australian stocks) that has an expected return of 14 percent. What are the portfolio weights?

Suppose the Australian weight to be $\omega$ and the European weight to be $(1- \omega)$

For a given weight $\omega$ for the AUS portfolio, the return on the overall portfolio is:
$r_P = \omega \times r_\$ + (1 - \omega) \times r_{€\$}$.

This implies that $\omega$ must satisfy $0.14 = \omega \times 0.12 + (1 - \omega) \times 0.2$.

Solving this equation, we get $\omega = 0.75$ which implies that 75% of the funds are to be invested in the Australian portfolio, and 25% in the European portfolio.

(c)   What is the variance of the portfolio constructed using the weights determined in (b)?

Since the variance ($\sigma_P{}^2$) is the square of the volatility we have

$= (0.75)^2 \times 0.06 + (0.25)^2 \times 0.09 + 2 \times 0.75 \times 0.25 \times 0.4 \times 0.06^{1/2} \times 0.09^{1/2}$

$= 0.0504$


29.   Your uncle, an avid international investor, just sold shares of IKEA, a Swedish firm, for Skr50. The shares were bought for Skr42 a year ago. The exchange rate is Skr5.8 per AUD now and was Skr6.65 per AUD a year ago. He received SKr4 as a cash dividend immediately before the shares were sold. Compute the rate of return on this investment in Australian dollar terms.


1) Convert initial investment and liquidation into $A - $6.32 and $9.31

2) Then calculate returns


a)   Mr. Thorwald needs your input on the price-range for the roadshow. He strongly believes that this should be based on DCF analysis. What NOK price-range would you recommend based on the pro forma above? You may assume that the price should reflect the DCF as of 31/12/2024 and that all cash flows arrive at the end of each calendar year. Please clearly state and motivate additional assumptions you make for your analysis.

*Assuming that BT will be about as risky as the average Norwegian stock ($\beta$=1):*
**NOK Discount rate:     $R_i = r + \beta \times$ (risk premium) = 5%+1.0 x (6%) = 11% (GIVEN)**

**500 million shares represent a 17% stake => 2.9 billion shares overall**

*The DCF value of BT is:*

| | |
|---|---|
| *NOK 56.1 billion at g= 4% in perpetuity* | ***NOK 19.34/share*** |
| *NOK 65.30 billion at g= 5% in perpetuity* | ***NOK 22.52/share*** |
| *NOK 78.10 billion at g= 6% in perpetuity* | ***NOK 26.93/share*** |
| *NOK 97.40 billion at g= 7% in perpetuity* | ***NOK 33.59/share*** |

*Thorwald should push for a price range of NOK 23.00 - 28.00/share. He would like to capture as much as the upside potential as possible.*

b) Colonial Asset Management (CAM) calls you up and wants you to tell them what they should be willing to pay for BT's ASX listed shares. The manager for CAM's European Index portfolio is adamant that the valuation should be made based on DCF analysis. She tells you that based on recent historical data, the correlation between the Norwegian and the Australian stock market is 0.75 and that the annualized standard deviation of returns in Norway is 0.18 and in the Australia is 0.15. Should you simply send them the one you did for Thorwald and be done with it? Why? Why not?

The issue is whether you should adjust the DCF to reflect the fact that primarily Australian investors are going to buy CAM's European Index fund.

BT will **covary less** with the AUS market portfolio than with the Norwegian portfolio. This follows from the approximation $\beta = 0.75 \times 0.18/0.15 = \mathbf{0.9} < 1.0$:

**AUD Discount rate:**   $R = r + \beta \times (\text{risk premium}) = 6\% + 0.9 \times (7\%) = 12.3\%$

However, if we are going to use this rate the DCF should be translated into AUD.

c) What three major risks would you suggest should be disclosed in the IPO prospectus?

- Future regulation.
- Increased competition.
- Uncertainty about success of cost-cutting plans when it comes to lay-offs.
- Raising of adequate capital (has huge debt)
- Geopolitical risk

Currency risk for the firm is small (5%) and at the time of the IPO mostly in the form of dividends which are easy to predict and therefore hedge.