

## Exercise 1

1. Import in MATLAB all the data contained in the file STOCKINT\_2010.XLS and described in the lecture notes.
2. Let the stock market indices be denoted as  $P_{1t}$  for the US,  $P_{2t}$  for UK,  $P_{3t}$  for the Germany and similarly for the dividend yields as  $DP_{1t}$ ,  $DP_{2t}$  and  $DP_{3t}$ . For each country create 1-quarter, 4-quarter, 8-quarter, 12-quarter annualized stock market total returns (hint: log return series as  $\Delta p_{it} = \ln P_{it} - \ln P_{it-1}$ ). Construct the dividend series for each country as  $D_{it} = P_{it} * (DP_{it}/100)$ , dividend growth series as  $\Delta d_{it} = \ln D_{it} - \ln D_{it-1}$  and log dividend yield series as  $d_{it} - p_{it} = \ln(DP_{it}/100)$ . Plot these series and carry out a cross-country comparison for each investment horizon.
3. Consider the following AR(1) model of log returns for each of the countries:

$$\Delta p_{it} = \phi_{0i} + \phi_{1i}\Delta p_{it-1} + \varepsilon_{p,it} \quad (1)$$

Estimate the parameter vector  $\gamma_i = (\mu_i, \phi_i)'$  for  $i = 1, 2, 3$  via OLS in MATLAB. Compute the corresponding  $t$ -statistics and  $R^2$ . Plot your results. Are stock returns predictable from past returns (i.e. is  $\phi_{1i}$  statistically significant)?

4. Consider the following MA(1) dividend growth model for each of the countries:

$$\Delta d_{it} = \eta_{0i} + \eta_{1i}\varepsilon_{d,it-1} + \varepsilon_{d,it} \quad (2)$$

According to your results is dividend growth predictable from past dividend growth innovations?

5. Consider the following ARMA(1,1) dividend growth model for each of the countries:

$$\Delta d_{it} = \mu_{0i} + \mu_{1i}\Delta d_{it-1} + \mu_{2i}\varepsilon_{d,it-1} + \varepsilon_{d,it} \quad (3)$$

Repeat the analysis outlined above and comment your results.

6. Consider the log dividend yield to predict 1-quarter, 4-quarter, 8-quarter, 12-quarter annualized log returns for each of the countries. Hint:

$$\Delta p_{it+1} = \alpha_{0i} + \alpha_{1i}dp_{it} + \varepsilon_{it+1} \quad (4)$$

Where  $dp_{it} = \ln(DP_{it}/100)$ . Define the model above at different horizons and plot your results. Make comparisons across countries (i.e. given the horizon) and within country (i.e. given the country). Are stock returns predictable from dividend yield?

7. Consider US data and four alternative portfolio allocation strategies in the period 1997Q1:2009Q4:

- safe strategy;
- buy and hold strategy;
- econometric strategy (i.e. optimal ex ante);
- ex-post strategy (i.e. optimal ex post) .

Forecast your returns at the end of each year. Which strategy would you choose to invest your money at 1997Q1?