Assignment 1

1. Use the attached data of daily equity prices given by the Shanghai Composite Index,
   a) Calculate the mean annualized return since 2000
   b) Calculate the annualized volatility since 2000
   c) Calculate the skewness and kurtosis over the same period. Is there evidence of fat tail?
   d) Test the efficient market hypothesis by looking at the first 10 autocorrelations. What do you conclude?
   e) Test for volatility clustering by looking at the first 10 autocorrelations of squared returns.

2. Calculate annualized historical volatilities for each day over the whole sample period. Do it once with monthly window and again with annual window.
   a) Which has the greatest differences between high and low volatility?
   b) Which has the biggest mean, standard deviation and kurtosis? (Use the common sample)
   c) Draw the histograms of volatilities.
   d) What events correspond to these volatilities?

3. Calculate the exponentially weighted annualized volatilities using .06 and .02 as weights.
   a) Plot these series on the same graph and attach it.
   b) What is the maximum volatility over this sample period and when does it occur?

4. If a tax were put on stock market transactions, it would probably substantially reduce trading. What do you expect it to do to volatility of individual stocks and stock indices? Explain.