Financial Econometrics
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TP 2

Estimation of Densities

Question 1

Same data as in TP1: 5 series of daily US$ prices from 25/10/1992 to 24/10/2002 corresponding to the stocks of MICROSOFT, CREDIT SUISSE, ASST.MAN., BOEING, COCA COLA and NIKE. As in TP1, we suppose that there are no weekends.

1. For each stock compute the daily arithmetic returns.
2. For each stock compute the centered moments of order 1 to 4.

Question 2

1. For each stock, estimate the marginal density with the kernel method, using the Gaussian Kernel.
2. Choose several values for the bandwidth and observe the differences on the densities.
3. Divide the sample in two and estimate the density on each part. See the evolution.

Question 3

1. Simulate 1000 observations from a normal distribution with standard parameters (0,1).
2. Estimate the marginal density using a Gaussian kernel on this new dataset.
3. Repeat the two preceding questions using a beta distribution with parameters (1.5, 4).

Question 4

1. For a given stock's returns, plot on the same graph, the parameterized normal distribution, and the distribution estimated using a gaussian kernel.
2. Estimate a bivariate density on two stocks of your choice with Gaussian kernels.
3. Estimate a conditional density on two stocks of your choice with Gaussian kernels.

Once again, you can see that the normal distribution is not suitable to model financial returns. The kernel method provides a nice way to obtain an unknown density, as it doesn't require to assume a particular function for the density. In empirical work, it is recommended to have a look at the non-parametric density before postulating any underlying distribution.

Loading a BAS file into Microsoft Excel

In order to solve this problem set in Excel, use the function Kernel. **KERNEL(observations;point;bandwidth)** returns the density function at **point**, estimated using a Gaussian kernel. Follow the steps below to load the file *Kernels.bas* into your Excel book:

1. In Excel, open the Visual Basic Editor (Tools menu → Macro → Visual Basic Editor).
2. In the VB editor: File menu → Import File... and select *Kernels.bas*.
3. Save your Excel book (File menu) and quit the VB editor.