Course Content
The most fascinating aspect of financial market prices is how they change. Students will learn how to measure and forecast financial volatility. They will become proficient with ARCH/GARCH models, exponential smoothing and historical volatilities. These tools will be used to measure risk and analyze alternative approaches to calculating Value at Risk. Implied volatilities from options will be introduced and compared statistically and economically. Then the course will turn to the multi-asset problem and discuss traditional and new approaches to measuring and forecasting correlations. These tools will be applied to the problem of dynamic portfolio selection and risk control.

The course will be run on NYU Classes; all assignments and course materials will be posted there. The course will have four homework problems. These will be submitted electronically. There will be a final exam and in-class QuickQuizzes. These QQ's will take about 5 minutes at the beginning of every class and cover the previous lecture. There are no make-ups.

Prerequisites:
Foundations of Finance and a familiarity with simple probability and statistics including least squares regression. There will be substantial use of the EViews econometric software which is available in the computer labs and on the Stern server.

Topics - One per Class
1. Financial Volatility - Causes, Consequences, and Global Patterns
2. ARCH/GARCH Models and their extensions
3. Value at Risk Estimation, Downside Risk and Credit Risk
4. Options Implied Volatility and its properties. And now Variance Swaps
5. Correlation Models – Applications to Portfolio Choice
6. High Frequency Volatility and Trading
Class Schedule

This course will meet in KMC 4-80 at the following times:

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Location</th>
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<tbody>
<tr>
<td>T 03/27</td>
<td>06:00pm - 09:00pm</td>
<td>KMC 4-80</td>
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<tr>
<td>T 04/03</td>
<td>06:00pm - 09:00pm</td>
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<td>T 04/10</td>
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<td>T 04/17</td>
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<td>T 04/24</td>
<td>06:00pm - 09:00pm</td>
<td>KMC 4-80</td>
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<td>T 05/01</td>
<td>06:00pm - 09:00pm</td>
<td>KMC 4-80</td>
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Lab

Location: KMC 4-80

*Attend one session for each lab

Lab 1: Tues 3/27, 9-10 pm OR TBD
Lab 2: Tues 4/3, 9-10 pm OR TBD
Lab 3: Tues 4/10, 9-10 pm OR TBD
Lab 4: Tues 4/17, 9-10 pm OR TBD
Lab 5: Tues 4/24, 9-10 pm OR TBD

Grading Policies

Final Exam: 50%
Homework Assignments: 40%
QuickQuizzes: 10%

TF’s

Scott Hampson (sah715@stern.nyu.edu)

Michael Ruddy (mfr336@stern.nyu.edu)

Readings
**CLASS 1:**


*Homework 1 assigned, will be available on NYU Classes after class*

**CLASS 2:**

*Due: Homework 1*


Engle, Robert, and Andrew Patton,(2001) “What good is a volatility model?” *Quantitative Finance*


*Homework 2 assigned, will be available on NYU Classes after class*

**CLASS 3:**

*Due: Homework 2*

Hull, John and Alan White (Fall 1998)“Incorporating Volatility Updating into the Historical Simulation Method for Value-at-Risk”, *Journal of Risk*


Engle, Nobel Lecture op.cit.


*Homework 3 assigned, will be available on NYU Classes after class

CLASS 4:

*Due: Homework 3


“VIX White Paper”(2003), CBOE


*Homework 4 assigned, will be available on NYU Classes after class

CLASS 5:

*Due: Homework 4


*Final Exam Review in Lab after class.

CLASS 6:

*In-class Final Exam
