Quantitative Corporate Finance
B7421 – Summer 2018

Instructors
Ken Kitkowski, kgk2112@columbia.edu
Managing Director, Corporate Finance
Wells Fargo Securities

Hans Tallis, ht2109@columbia.edu
Managing Director, Corporate Finance
Wells Fargo Securities

Course Description
This course explores risk-aware techniques for corporate finance (CF) decision making.

Standard practice for CF analysis includes benchmarking and static projection modeling. “Risk” may be proxied by downside scenario analysis. This ignores several important considerations:

- Likelihood and timing of downturns (of various severities)
- Interplay between business cycles and market rates (credit yields, commodity prices)
- Dynamic reallocation of capital – investment, return to investors, external raises

Students in this course will develop a variety of tools to optimize corporate financial policies relative to operating risks and financial constraints, and to quantify the tradeoffs between specific financial risks and strategic objectives. Students will produce fully functional simulation models in Excel, allowing Monte Carlo-based corporate modeling and analysis of various risk management strategies. In addition, students will be asked to think critically about modeling results and how they inform corporate decision-making.

Course Objectives
This course will enable you to do the following:

- Develop a quantitative framework for evaluating capital structure and corporate financial policy changes
- Build basic Monte-Carlo simulation models
- Critically evaluate the output of quantitative simulation models
- Make judgments about what assumptions to make when building or evaluating a model
Prerequisites

This course is intended to introduce state-of-the-art techniques in quantitative corporate finance. The entering student should have completed the following coursework:

- Capital Markets
- Core Corporate Finance
- Core Managerial Statistics
- Core Business Analytics

We expect students to finish the course comfortable in applying the learned techniques to new situations. This will require significant work outside the classroom, as we believe much of the material is best learned through individual practice.

Software

Excel will be used extensively for modeling work.

Grading

- Attendance and class participation compose 10% of the overall grade
- Seven assignments will be set throughout the course and compose 90% of the final grade.
- There is no final examination

Administration

- Office hours on request
- Email is usually the best way to reach us
- Please display your name cards
**Lesson Plan**

6 sessions, each comprising 2 lessons:

<table>
<thead>
<tr>
<th>Lesson</th>
<th>Date</th>
<th>Title</th>
<th>Description</th>
<th>Lesson Reading</th>
<th>Assignment</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>11 May</td>
<td>Admin</td>
<td>Welcome to QCF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>11 May</td>
<td>Modern risk measures</td>
<td>Risk; utility and insurance; common risk measures; VaR and ETL</td>
<td>MSFRM pp 142-152</td>
<td>1 - VaR and ETL 2 - Leverage and RAROC</td>
<td>18-May</td>
</tr>
<tr>
<td>3</td>
<td>12 May</td>
<td>Optimal Leverage I</td>
<td>Theories of optimal debt level; key risk-return tradeoffs for corporates</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>12 May</td>
<td>Monte Carlo Simulation 1</td>
<td>Calibrating and simulating AR(1) processes; seasonality and tuning</td>
<td>MSFRM ch 11</td>
<td>3 - AR(1) time series simulation</td>
<td>18-May</td>
</tr>
<tr>
<td>5</td>
<td>18 May</td>
<td>HW review</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>18 May</td>
<td>Optimal Leverage II</td>
<td>Rating agency and market constraints; market data</td>
<td>4 - Simulating EBITDA volatility</td>
<td>1-Jun</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>19 May</td>
<td>WACC</td>
<td>Enterprise cost of capital; CAPM theory and limitations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>19 May</td>
<td>Monte Carlo Simulation 2</td>
<td>Simulating multiple processes: multiple approaches</td>
<td>MSFRM pp 165-166</td>
<td>5 - Correlated scenario generation</td>
<td>1-Jun</td>
</tr>
<tr>
<td>9</td>
<td>01 Jun</td>
<td>HW review</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>15 Jun</td>
<td>HW review</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>15 Jun</td>
<td>Robust Regression</td>
<td>Statistics refresher; spurious correlation; outlier management; multifactor models</td>
<td>MSFRM ch 10</td>
<td>7 - Valuation Drivers</td>
<td>22-Jun</td>
</tr>
</tbody>
</table>