FINC 402-01: Derivatives Securities (CRN: 23639)
Spring 2020
Thursdays, 5:30 - 8:15PM
TCFE 132

Professor: Joanne M. Hill
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Office Hours: 3:30 – 5:30 on Thursdays and also available by appointment.

Catalog Course Description:
This course covers the quantitative underpinnings of derivative design and valuation, particularly options, forwards, and futures. Specific course coverage includes the study of option pricing theory and strategies most commonly used in the market for options. Particular focus will be given to portfolio and risk management.

Prerequisite(s):
MATH 120, FINC 303, FINC 400, or permission of the instructor.

Extended Course Description:
Successful investing requires more than just picking stocks and bonds given the wide array of products available. The Derivatives Course will cover how Indexes, ETFs, Options, Swaps, Futures, ETFs, Structured Notes, and Convertible Bonds are valued, traded, and used in portfolio strategies by institutional and retail investors for enhancing returns and managing risk. Although the majority of the course relates to Equities, there will be a few classes on Fixed Income and Commodities Derivatives.

The emphasis will be on practical applications drawing from real investing examples over the last two decades along with a look at future trends. Students will be evaluated based on class discussion, two tests and a project where they follow options, indexes, futures and ETFs that they select and report on how they work in a portfolio over current market conditions.

Course Objectives:
The course is designed from the perspective of an investor who is seeking to learn how the derivatives can improve the return and/or reduce the risk of his/her portfolio. This involves the quantitative underpinnings of derivative design and valuation, particularly options, forwards, and futures. It also will provide an understanding of the differences between different types of investors who may use derivatives-pensions and endowments, hedge funds and active traders, bottom-up stock and bond portfolio managers and individual investors. It also involves understanding liquidity, trading costs, and market structure for derivatives and their underlying securities or commodities. An understanding of the risks of derivatives and index products is critical to their effective use, including a study of historical market disruptions where derivative products played a part.
Course Topics:

• Background for Derivatives and Index Products
  o Investment Policy and Strategy Backdrop
  o Indexes and ETFs
  o Liquidity and Trading Costs
  o Regulatory Environment

• Futures and Swaps

• Volatility, Correlation and Risk Management Concepts

• Equity Options and Option Strategies
  o Valuation and Performance
  o Option Strategies and Investment Fund Products
  o Index vs Stock Option
  o Exotic Options

• Fixed Income, Currency, and Commodity Derivatives

• Structured Note and Convertible Bonds

• Performance and Risk Analysis of Derivatives Strategies

• Case Studies of Derivatives Strategies by Investors Type – Pension Funds, Hedge Funds, RIAs.

• Learning from Market History – The Role Derivatives in Market Disruptions

School of Business Objectives:

Consistent with the goals of the School of Business, this course includes instruction in:

Communication Skills: Students will be expected to participate in class discussions and to complete numerous written assignments that test their ability to effectively relate their understanding of the performance, risk and valuation of derivatives securities. Assignments will require the student to accurately and effectively use their knowledge in simulated trading situations. Examples include trading explanations accompanying investment activity in simulated trading accounts and written explanations to discuss how and why the derivative strategies are used in portfolios. Successful completion will require a high level of grammatical and expositional ability, as well as an understanding of the business style of writing.

Quantitative Fluency: This course requires a working knowledge of quantitative finance including valuation of fixed income securities, performance and risk measurement. They should also have had exposure to portfolio construction and diversification concepts, interest rate mathematics, regression and volatility measurement.

Global and Civic Responsibility: Students will be asked to solve problems related to ethical dilemmas, encapsulated in problems related to the role indexes and derivatives have played in helping investors manager risk, but also in market crisis. Issues such as disclosure of hidden risk and liquidity issue will be covered. They will be asked to view issues through difference lenses and gain an appreciation for the complexities involved in addressing financial situations in a global economy. Derivatives are
traded in global markets and have many cross-border investors. Examples will include effective use of derivatives to access global exposure in both stocks and bonds.

Intellectual Innovation and Creativity: Careful attention will be devoted to placing students in a position where they must utilize resourcefulness and creativity in solving problems related to the investing in and managing derivative securities. Students will be able to choose investment options to follow and be expected to explain how they behave in the context of global financial market developments.

Course Materials:

Textbooks (Required - supplied by professor)

- *Fundamentals of Futures and Options* by Clarke, de Silva, and Thorley, CFA Institute Research Foundation, November 2013
- *Trading and Electronic Markets* by Harris, CFA Institute Research Foundation, October 2015

Readings

Selected readings from CFA Program exams, Index material from index provider and exchange (Cboe and CME) websites, research papers from the Cboe Options exchange and publications from practitioner journals.

Optional Reference Books (for students who want a more in-depth understanding of valuation, a wider range of strategies and products):

- *Options, Futures, and Other Derivatives*, John Hull, 10th edition, Pearson

Course Policies:

Attendance Policy

It is expected that each student attend and participate in all class periods, with the exception of College-supported excused absences. The instructor reserves the right to include this information in determining the student’s participation in the course and the corresponding grade impact (see “Assignments”).

Honor Code

Lying, cheating, attempted cheating, and plagiarism are violations of our Honor Code that, when identified, are investigated. Each incident will be examined to determine the degree of deception involved. Incidents where the instructor determines the student’s actions are related more to a misunderstanding will handled by the instructor. A written intervention designed to help prevent the student from repeating the error will be given to the student. The intervention, submitted by form and signed both by the instructor and the student, will be forwarded to the Dean of Students and placed in the student’s file.
Cases of suspected academic dishonesty will be reported directly by the instructor and/or others having knowledge of the incident to the Dean of Students. A student found responsible by the Honor Board for academic dishonesty will receive a XF in the course, indicating failure of the course due to academic dishonesty. This grade will appear on the student’s transcript for two years after which the student may petition for the X to be expunged. The student may also be placed on disciplinary probation, suspended (temporary removal) or expelled (permanent removal) from the College by the Honor Board.

Students should be aware that unauthorized collaboration--working together without permission-- is a form of cheating. Unless the instructor specifies that students can work together on an assignment, quiz and/or test, no collaboration during the completion of the assignment is permitted. Other forms of cheating include possessing or using an unauthorized study aid (which could include accessing information via a cell phone or computer), copying from others’ exams, fabricating data, and giving unauthorized assistance.

Research conducted and/or papers written for other classes cannot be used in whole or in part for any assignment in this class without obtaining prior permission from the instructor.

Students can find the complete Honor Code and all related processes in the Student Handbook at [http://deanofstudents.cofc.edu/honor-system/studenthandbook/](http://deanofstudents.cofc.edu/honor-system/studenthandbook/)

**Students with Disabilities**
The College will provide reasonable accommodations for persons with documented disabilities. Students should apply at the Center for Disability Services/SNAP, located on the first floor of the Lightsey Center, Suite 104. Students approved for accommodations are responsible for notifying me as soon as possible and for contacting me one week before accommodation is needed.

**Inclement Weather Contingency**
If the College of Charleston closes and members of the community are evacuated due to inclement weather, students are responsible for taking course materials with them in order to continue with course assignments consistent with instructions provided. In cases of extended periods of institution-wide closure where students have relocated, a plan will be articulated that allows for supplemental academic engagement despite these circumstances.

**Assignments and Method of Evaluation:**
Since this an advanced course, the students will be evaluated on a combination of Class Participation, Exams and Special Projects. From time to time there will homework related to the topic covered. This will to help students prepare for Exams.

**Class Participation**
Students are expected to come prepared with the readings assigned and with commentary on the index/derivative positions they are following. This means students must have an awareness of what has gone on in the markets for the underlying index or security over the prior week. A portion of the class devoted to talking about current themes and trends in financial markets and how they have affected indexes and derivatives students are following. Students are expected to participate in this discussion and learn from one another’s experience with the index/derivatives they are following.
Exams
There will be a mid-term given in class that will be a combination of short answer and essay questions. The Final Exam will be a take-home exam, due the week following the last class.

Special Project
The Special Portfolio Project is a report on the indexes/derivatives the student has been following over the course of the semester. Approximately 30 minutes of each class will be devoted to students discussing the performance and background for their positions. Students should come with updated pricing on their holdings and be prepared to discuss the market factors that impacted their positions in the last week. The Final Project will be a presentation on their portfolio construction, performance, risk, performance attribution and fit in investment strategies.

Students can form teams of 2 for this project if desired or work on their own. Results will be presented to the class for feedback on April 16, but then can be edited and refined before the final submission, due on April 17.

Content is deliverable in a PowerPoint form and will include a minimum of the following:

A. Description of the index/derivatives selected and the rationale for selection
B. Discussion of how the index/derivative fit into the portfolio construction and portfolio objectives
C. Analysis of the risks of these derivatives on their own and as part of the portfolio.
D. Review of their performance and performance attribution over the course of the semester – this should include a discussion of the factors driving the returns and risk of the underlying index, security or commodity.

Method of Evaluation for Class Grade:

<table>
<thead>
<tr>
<th>Class Participation and Assignments</th>
<th>30%</th>
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</thead>
<tbody>
<tr>
<td>Mid-Term Exam</td>
<td>20%</td>
</tr>
<tr>
<td>Final Take-Home Exam</td>
<td>25%</td>
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<tr>
<td>Final Project</td>
<td>25%</td>
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</tbody>
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Course Outline

Section 1 – Investment Products

1. **Course Introduction/Index Assignment (1/9)**

   Discussion of Syllabus and assignment on index selection and methodology readings. Assignment is to select 3 indexes (one broad-based, asset class index, one factor/smart beta index, and one commodity, specialty fixed income, commodity or currency index for following for the semester). These indexes may be the basis of derivatives used in the Portfolio Project or may be benchmarks for ETFs. Students should read material related to the Index Policies, Methodology, and Fact Sheet from in the index provider.

   *Assignment:*

   Be prepared to discuss the index components and methodology at the next class. Create 3-5 PowerPoint slides showing methodology highlights, performance and risk metrics, and comparison to a competitive index.

   *Readings:*

   Index Policy and Methodology Reports along with Fact Sheets from at least 2 index providers.

   CFA Program: Security Market Indexes (Level 1, Readings 35 and 36)

2. **Indexes/Basics of ETFs, Trading Concepts (01/16)**

   Indexes as a building block of derivatives. Importance of liquidity, measurement of trading costs, a concept that will be used throughout the course. This is followed by a discussion of Indices, focusing on the ways they are constructed and traded.

   *Readings:*

   Trading and Electronic Markets: Chapters 1-4

   Comprehensive Guide to ETFs: Chapters 1 – 4.


3. **Exchange Traded Funds (01/23) and (1/30)**

   - Fit of ETFs into the Evolution of Investment Strategies and Markets in the 21st Century
   - ETF Institutional Strategy Trends and Implications for the Investment Process and Distribution
   - Active and Dynamic Investing – *Smart Beta and Risk Modification*
   - Fixed Income and Non-Transparent ETFs
   - Issues in ETF Growth – Impact of growth of passive investing, systemic risk implications
   - Selection and Construction of ETF Portfolio – Discussion

   *Readings:*

   - A Comprehensive Guide to ETFs – Chapters: 5, 6, 7
• The Evolution and Success of Index Strategies in ETFs, Financial Analysts Journal 2016 (Hill, Joanne M.)
• Active Indexing with ETFs, Journal of Index Investing, 2019
• Non-Transparent ETFs (ETF.com)
• Review of ETF Flows and Trends for 2019 (To be assigned)

4. Futures and Swaps (01/30) and (02/06)
Market structure, pricing, strategies. Differences between equity, fixed income, commodity futures/swaps. Rolling positions. Compare the cost, return, and risk of futures, ETFs, and swaps. Connections to financing/lending.
Readings:
• CFA Program: Derivative markets and Instruments, Basics of Derivatives Pricing and Valuation
• Fundamentals of Futures and Options, Chapters 1 – 3.
• CME Institute Course on Futures, Clearing, Market Regulation Trading
• Selection of Future to Follow - Discussion

5. Introduction to Volatility & Options Valuation/Performance Drivers (02/13)
Review of return distributions, risk metrics, factors driving option value. Analysis of options across strikes and term. Index, stock, fixed income options. Commonly used Options Models like the Binomial and Black-Scholes Models.
Readings:
• Volatility in Perspective (Article in Journal of Index Investing)
• Volatility Blogs (From Volatility Analysts on Wall Street)
• Fundamentals of Futures and Options: Chapters 4, 5, and 6
• VIX – Materials from the Cboe

6. Options – Strategy Basics, Indexes and Fund Products, (02/20)
• Review of options strategies for income, risk reduction, and reshaping returns
• Performance Analysis of Option Strategy Indexes
• Basic Option ETF and Mutual Fund Products
• Dynamics of the VIX
• Implied vs. Historical Volatility
Readings:
Option Strategy Index Articles from the Cboe Web Site
TBD
Section 2 – More Products and Strategies

7. **Mid-Term Exam & More on the Volatility Dimension of Options Pricing and Strategies (02/27)**
   - Index Volatility, Skew, Term Structure and Dispersion
   - VIX Futures and ETFs

   In the index options market, there are historical relationships between implied and historical volatility, implied volatility for options with different strike prices (skew) and terms (term structure), as well as stock versus index options (dispersion). Relying on historical data, this class discusses those relationships. VIX and VIX futures case studies. A look at episodes of extremes in the VIX (students will present on specific episodes building on assigned readings).

8. **Option Applications by Investor Type (2/27) – Institutional Uses of Derivatives, Single Stock Options Strategies Integrated into Active Portfolio Management, Target Outcome Investment Strategies**

   In this class we will discuss motivations and applications by pension funds, hedge funds, RIA, how Active Asset Managers tie their knowledge of the underlying company to develop options strategies on individual stocks. Also, performance measurement and benchmarking with derivative strategies

   **Readings:**
   - Tutorial on Using Options in Active Strategies (Tsu, Maria E.) (PDF)
   - Covered Call Strategies: One Fact and Eight Myths (Israelov, Roni) (LR)
   - Income with Growth Solution: Converting Futures Dividend Growth into Current Income (Sood & Hill)
   - Buffer Protection ETF Material

9. **Option-Based Strategies in a Portfolio and Trading Context (03/05) – Performance Aspects of Asymmetric Strategies, Comparison to Benchmarks and Other Strategies, Targeted Option Strategies for Short-term Trading, Hedging a Volatility Book**

   **Readings:**

10. **Fixed Income and Currency Derivatives, and Credit Default Swaps (03/12)**

11. **Structured Notes, and Convertibles and Exotic Equity Derivatives (03/26)**

   Structured Notes are fixed income securities that combine bonds issued by an investment bank with options to provide equity exposure with different risk than conventional equities.

12. **Commodity Indices and Futures, Portfolio Hedging (04/02)**

   Commodity indexes and derivatives – history and current applications. Risk Management strategies in portfolios – designing, benchmarking and rolling strategies

   Portfolio Hedging Tax Considerations in Using Equity Derivatives
Investors before using index products and derivatives need to be well versed in tax issues related to their overall strategy. In this class we cover the tax laws most relevant to Equity Derivatives transactions and introduce strategies to enhance After-Tax returns.

Section 3 – Learning from Market History

13. Portfolio Hedging, Learning from Market Disruptions Part 1 (04/09)

Risk Management strategies in portfolios – designing, benchmarking and rolling strategies. Derivatives and index products have been associated with turbulent periods in markets. Investors can learn how liquidity and market sentiment interact to make derivative notorious in volatile periods. To help project the future impact of Equity Derivatives on the Equities Market it is useful to understand history. In this class we discuss situations in history where Equity Futures and Options were misused.

- Stock Market Crash of 1987 and Portfolio Insurance
- Nick Leeson and Barings 1995

Readings:
- The Demons of ’87 - PDF

13. Learning from Recent History Part 2 (04/09)

We will discuss events in 2008, the Flash Crash of 2010, and the ETF Mini-Crash on August 24, 2015.

Readings:
- Enhancing Our Equity Market Structure (White, Mary Jo) (LR)
- From Free Lunch to Black Hole: Credit Default Swaps at AIG (PDF)

14. Student Portfolio Presentations Final Project; Distribution of Take-Home Exam (04/16)

Each group will present their Index and Derivative Portfolio Performance Analysis to the class for feedback. They will include a discussion of how it fits in a broader portfolio context.

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Effective Date: 3 December 2019 Material: 2020 CFA Program, Level I, Volume 4, Reading 37; 2020 CFA Program, Level I, Volume 5, Reading 48; 2020 CFA Program, Level I, Volume 5, Reading 49; 2020 CFA Program, Level II, Volume 5, Reading 48; 2020 CFA Program, Level I, Volume 6, Reading 43; 2020 CFA Program, Level III, Volume 3, Reading 15; 2020 CFA Program,
Level III, Volume 3, Reading 16 (the “Material”). Term: This term shall continue in force until 3 December 2020 (the “Term”).

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