UNIVERSITY OF GUELPH
Department of Economics and Finance
COURSE OUTLINE

ECON*3760, Fundamentals of Derivatives, W12

Instructor: Dr. Francesco S. Braga, Room 209, J.D. MacLachlan Building
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Classes: 228 MACK; 10:00-11:30 Tuesday, Thursday.
Office Hours: 209 MCLN; Mon to Thur. 12:00 – 13:00.
Also by appointment. (arranged via email; at least 24 hr notice)

It is your responsibility as a student to be aware of and to abide by the University's policies regarding academic misconduct, e-mail communication, maintaining copies of out-of class assignments, what to do when you cannot meet a course requirement and the drop date for this semester. To better understand these policies, visit:
http://www.economics.uoguelph.ca/student-responsibilities-policies.asp

Course Description

This course is about fundamentals of derivatives in the context of price risk management, an essential corporate function.

Students in this course will develop an appreciation for the fundamental aspects of derivatives and the working of derivative markets, the essential pricing behaviour of derivatives, and how to use derivatives to reduce price risk in different risk management contexts. Derivatives are considered an essential and very useful tool of modern management (please note: refrain from media's emphasis on derivatives horror stories), and we will spend a reasonable amount of time working on the appropriate structure of the risk management function, what can be asked of this function, what this function can contribute to the corporation, how to design and implement in the marketplace the appropriate strategy to secure the expected contribution.

Emphasis is placed on how this senior managerial function can be used to modify the risk exposure of the corporation according to corporate objectives and strategies and environmental as well as corporate conditions.

Appropriate consideration will be given to corporate governance and ethics principles as applicable to a price risk management function and illustrating their role in any sound price risk management corporate protocol/policy.

In this course students will acquire specific disciplinary skills and knowledge, and will be challenged to use them in order to develop a risk management policy for a client with a specific price risk exposure. In order to accomplish this, students will have the opportunity to integrate their disciplinary skills from this course and from other courses (mainly from economics, as well as marketing, and accounting and financial management), to produce a sound, precise and comprehensive recommendation which will be

presented and defended in class. This exercise will afford students an opportunity to explore the empirical application of specific disciplinary knowledge, and to develop specific communication skills using specialized language.

This course devotes a reasonable amount of time to the coverage of technical analysis in financial markets. This is presented as a forecasting tool which complements fundamental analysis resulting in an approach which is sometimes indicated as "fusion analysis". The emphasis on technical analysis is aimed at improving the timing of the trading decision (market entry / exit) in the context of a selective hedging strategy; the emphasis on timing of the trade is quite innovative and is well complemented by the comparison of the strategic differences of the various orders (limit, market, market if touched, stop etc.).

The current situation of global financial markets offers a great opportunity to learn and understand "live" challenges. For this reason, students will be expected to remain current by reading financial news daily (hardcopy or online). The purpose is to encourage a disciplined approach to access information and to the reasoned review and understanding of possible market consequences.

Course Objectives

1- The main objective is to help students develop professional disciplinary skills as well as the communication and presentation skills that, properly nourished and perfected, can support a professional career in this area of economic and financial activity.

2- A second objective of this course is to offer students the opportunity to be "infected" by both a scientific (research emphasis) as well as a professional (industry application emphasis) interest and curiosity for derivatives markets. Hopefully, this will ensure the life-long commitment to disciplinary professional development.

3- The final objective is to help students become better citizens: the development of a comprehensive appreciation of derivatives markets is complemented by an organic treatment of relevant corporate governance and ethics issues both at the retail level ("know your client") and at the corporate level ("develop proper derivatives policies and controls").

Course Conduct

The course will consist of conventional lectures, problem solving exercises, and team work. One of my key objectives is to encourage a relaxed classroom environment, where we work hard but also have a positive environment. Basic rules: mutual respect and clear, honest communication.

As set by U of G's academic regulations, students wishing to claim medical or compassionate reasons must comply with the appropriate academic regulations reported in the current University of Guelph undergraduate calendar.

Course communication

Messages and course material will be posted on CourseLink. It is your responsibility to monitor it. If I need to contact you I will use your official University email address, as listed by the Registrar in the

course class list. No changes of email address are possible. Only this address will be monitored: fbraga@uoguelph.ca. Always start the Subject line with "3760 W12", this will help my incoming email screening. I do not accept responsibility for missing subject / improperly addressed emails.

Grading Scheme

Course component (for dates see a complete schedule in Appendix A)	Marks
3 Assignments (3 x 5),	15
Mid Term 1, Feb. 9th, individual exam, open book	20
Mid Term 2, Mar 31st, individual, open book	30
Major paper report and presentation, team, with peer evaluation	25
Class participation (CP), instr. discretion (*)	10

(*)CP marks normally will revert to the average of other course components, but instructor reserves the right to mark to market for outstanding or poor performance, as appropriate. Instructor will also base this assessment on the results from THM.

Course Content & Deliverables

A detailed synopsis of Course Content and Deliverables is presented in Appendix A at the end of this outline. This schedule may be modified as appropriate given specific class requirements and market developments.

Market developments

During this course, Students must follow newspapers and / or online news feeds of their choice, and be current on main economic and market developments. Students will be randomly asked to comment on "mainstream" economic / business news developments. The objective of this exercise is to impress on the students the absolute need to remain current on market conditions and developments, and reflect on the same in order to gradually develop broader analytical skills. Common sense will be used in selecting important "mainstream" developments, not obscure narrow details. For illustration purposes, students consulting the Financial Post, Globe and Mail and similar sources will be adequately prepared for this exercise. For illustration purposes alone, a suggested format for a comment: what is the news; why is it news, what is its scope, context and time domain; who is impacted, what it means to impacted parties, what can / should they do about it. We will focus on major commodities (financials, energy, precious metals, ag & food, carbon markets, and so on), as well as regulatory and political events with relevant market impact (ex: ongoing EU crisis). This is an effort to convince students of the importance of remaining current on market developments and to gradually develop critical analytical skills. Here as always in the course we will work to build information from raw data, and produce intelligence from information, and professional wisdom from intelligence: from numbers to their meaning, to understanding the implications of information, to deciding what to do about it.
Always refer to this process: Raw data ➔ Information➔ Intelligence ➔ Professional wisdom.

The Team Project

The objective of team project is to allow students an opportunity to develop advanced disciplinary skills, while integrating skills acquired in other courses, and develop better communication skills. Specific risk

management challenges are proposed below. These are examples and students are encouraged to select one of the proposed problems, or develop their own project, in consultation with the instructor (who reserves the right to approve a different proposal, or to assign one of the proposed projects). First come - first served principle: not more than two teams will be allowed to work on the same / slosely similar topic. If more than 2 teams elect the same topic, only the first two teams will be allowed to work on it. Dropbox time stamping will decide the issue. Please note: the final report will be structured as a consulting report on the specific problem.

Suggested topics:

1) TO TRADE A COMMODITY OR TO TRADE COMMODITY PRODUCERS?
   The practical aspects of cross hedging investment opportunities. Three projects: one focussed on grains and oilseeds; one on energy; the last one on precious metals.

   a) An independently wealthy investor wants some exposure to coarse grains and oilseeds (wheat, corn, soybeans). A broker has suggested this investor to go long Potash (POT on the TSE) Corp. of Saskatchewan. The investor has retained your team to provide some strategic and quantitative advice. The investor is in fact quite interested in this choice, but first wants you to assess how well POT (and other fertilizer producers) tracks the price of these commodities. In essence, the investor wants the answer to this question: How well can you track commodities by trading POT (and other fertilizer producers)? Minor number-crunching (regression) will be required. Data will be largely provided by instructor; you will search the market fundamentals, estimate the regression and prepare a report to this investor. Emphasis on the explanation of the findings

   b) Same as (1.a) above, only now the investor wants exposure to energy markets, and considers investing in Royal Dutch Shell, British Petroleum, Suncor and Encana. Commodity considered: West Texas Intermediate Crude Oil, Brent Crude Oil, and North American Natural Gas.

   c) Same as (1.a) and (1.b) above, only now the investor wants exposure to precious metals and is considering investing in large, established Canadian producers: Goldcorp, Kinross, Yamana. Commodity considered include Gold and Silver.

2) Pricing Carbon. Carbon markets are fast developing (or at least planning to be developed). CO2 trading is expected to become one of the "hottest" commodities.

   a) The University of XYZ (i.e. your choice other than Guelph) wants to reduce its overall carbon footprint: (a) map different (proposed) carbon policies in North America; (b) Indicate what organized markets exist to trade CO2; (c) Explain how these derivatives markets could be used by the university to achieve its footprint reduction objectives.

   b) You may change this for Toronto Transit Commission; or

   c) You may change this for any large user such as a School Board.

3) Natural gas prices are low, in particular when compared to crude oil prices: based on energy content the price of crude oil futures should be about 6 times that of natural gas... the ratio is actually around 25 – 30. How long will this last? If we only knew... we'd be rich.
   You are the natural gas procurement manager for a pool of Ontario universities. Develop a procurement strategy with a reasonable risk management component. Your reference time frame is

the 3 year period from Jul 1, 2012 to Jun 30 2016.

4) Two crude oil contracts trade on large organized exchanges: West Texas Intermediate (WTI) is traded in NY and Brent Crude (North Sea) is traded in London.
   WTI is a lighter crude and it used to have a higher price than North Sea Crude.
   Recently this has changed, with a WTI – Brent spread of about -20 USD/ barrel. Why? The team will search public info sources to complete fundamental analysis that will be used to explain (a) what factors drive the spread; (b) what has changed and forced a reversal in the spread (ie from a +ve to a –ve spread); (c) whether the spread is likely to remain in place short term (next 3-5 years) and / or how to trade the spread if one expected the same to narrow first and eventually reverse back to a +ve value.

5) Develop a comprehensive risk management plan for a corporate client purchasing commodity inputs and selling processed / manufactured products world-wide. Examples may include an oil refinery; an auto parts manufacturer or a goldsmith. What are the key price risks faced by this company? How can they be hedged? Develop a set of written policies to detail your risk management strategy and secure its discussion and approval by the Board of Directors.

6) Precious metals have had a terrific run in the recent years. According to some analysts each investor should hold between 5% and 10 % of their portfolio in bullion or "quasi-bullion". Explore available trading alternatives to holding physical bullion, and illustrate how you would execute this portfolio exposure, and based on your reading of markets recommend a 5% or a 10% exposure. Your client is a 35 year old professional couple with reasonable income and economic prospect for the future.

7) Interest rates have been quite low in the developed world, and QE2 in the US may have reduced the odds of near term rates increases. Problems in Greece, Ireland and ... (that is it, hopefully) are complicating interest rates and exchange rates management world-wide. You lead a team of investment bankers responsible for developing a plan to cover a local real estate developer from interest rates risk. The developer is currently borrowing at a variable rate indexed to the US Eurodollar 3- month rate increased by 2.5%. You must manage interest rates risk for the next 3 years. Please detail how you would proceed in this important task. Initial investments are 50 million USD, and you expect an additional 10 million invested each Dec 31st. Your specific reference dates are March 1 for the invested period from June 1st 2011 to May 31st 2014.

<u>Team project deliverables</u>

The main deliverable of this exercise is the final report to your client, to be presented and discussed in class. The report should be professionally sound and sufficiently complete to be the base for a "case" to be used in a context equivalent to this course.

Different steps and deliverables in preparing the final report.

a- The mandate: selection of the topic, one of the 11 suggested above or your own. This is subject to instructor's approval, and it is written up as a consulting mandate agreement between a client and the team of consultants. The mandate is to be filed in the dropbox in CourseLink by the date indicated in Appendix A.
   Missing this deadline will cost 5% of final project marks per day or fraction thereof.

b- The first draft (up to 10 pages) should consist of a progress report to the client, showing the results of the work completed and work planned to meet the scheduled deadline. Client may

ask for modifications within a week of filing this report (in case you wondered about this, I will be the "client" to all teams). This first draft should also outline any modification to the original mandate that was adopted by the team; it is understood that major modifications must be negotiated with and agreed upon by the client. This first draft is to be filed in the dropbox in CourseLInk by the date indicated in Appendix A.
Missing this deadline will cost 10% of project marks per day or fraction thereof.

c- The final report (15-20 pages) builds on and completes the progress report. The final report should be properly "formatted", and it should start with an Executive Summary stating the key objectives of the work and its key empirical findings and recommendations (1 – 2 pages). This is followed by the Mandate / Problem Statement (recommended size: 1.5 to 2 pages) which should define the team's mandate, establish market context, and state the objectives of the work that will be completed. The body of the report follows, with: methodological choices and their rationale (1 page); data used (0.5-1 page); results, discussion of their meaning and implications (5-7 pages); conclusions (1-2 pages); exhibits; references. Add a proper table of contents, list of tables, and list of figures. This final report is due to be filed in the dropbox in CourseLInk by the date indicated in Appendix A. (only Word files will be accepted). Missing this deadline will cost 20% of project marks per day or fraction thereof.

All available reports will be posted in CourseLink for all students to read before the final presentations of Apr 5, 7.

Please note: the final written report should include a review of relevant market fundamentals, an analysis of current technical factors, and an overall assessment of market conditions, all resulting in logical and precise recommendations to the client. It is therefore essential to position your report in relation to the current market context. The final report will be presented and discussed in class. Your client is fast paced and sophisticated. So they do not have time to waste. You must drive your key points effectively! Each group will have 10 minutes for the presentation of the final report and 5 minutes for a Q&A session.

Teams

Ten teams of 5 students each have been randomly formed. Please note: a late course drop would clearly disrupt a team. This would not be fair to the remaining students. As a sign of respect for their colleagues, to the extent possible, students are invited to make up their mind regarding their commitment to this course within the first week of classes.
The Instructor reserves the right (but does not have to) to merge two teams that had experienced a significant decline in membership. Consider this a normal risk of doing business in a competitive environment. Talent suddenly may disappear and you have to make up for this loss.

Assignments

Three written assignments will be released as illustrated in the timetable and must be uploaded to the CourseLink drop box by the deadline listed in Appendix A. Students are free to work on them alone or with their team. Free riding is discouraged, as these assignments are important learning opportunities. Please note that if working in a partnership, all partners must clearly be indicated on first page of teh assignment. Only one assignment for the team is then submitted. Please be precise: the Instructor will not credit ex post team members whose name is missing from the list. Due to the precise timing of course deliverables, the submission deadline (as specified in Appendix A) cannot be modified.

Special accommodation

Students needing special accommodation are encouraged to contact CSD and comply with their policies and procedures. This contact should be completed not later than the first week of classes to ensure that the best attention is given to each case. Please do not forget to advise me if you need special consideration. Late contacts may not be accommodated as effectively. I am personally proud of my commitment to helping all students in a fair and effective manner, but may not be able to change the consequences of delays by the interested individual.

University Policies and Protocols

All relevant policies and protocols set by the University and detailed in the relevant sections of the Undergraduate Calendar are hereby included in this outline. Explicit reference to university policies on academic integrity and plagiarism: http://www.academicintegrity.uoguelph.ca/ . Cases of Academic Misconduct will not be tolerated.

Use Common Sense

My personal preference is to establish a class environment which builds on trust and mutual respect. Granted the difference in roles, I like to think of senior students as junior professional peers. This means that I will listen carefully to you, I will trust you, and will extend as much flexibility as professionally reasonable and possible. I expect a similar professional commitment. Do not mistake my constructive flexibility with naïve behaviour; I despise and cannot accept any attempt to free-ride; misrepresentation of any kind does upset me! More importantly, it constitutes academic misconduct. I will not police you, I will offer you occasions to grow as learners, occasions I believe worth of your attention. I will present to you these opportunities once only, will not issue orders, nor will I police your compliance with a reasonable timeline. Of course consequences will apply if you do not deliver what is appropriate, when it is expected. In short: I will assume you are responsible grown-up. Please note: I commit to flexibility and common sense, I do know that special personal situations may arise, if this is needed…let's talk. That stated, proper rigour will be used to deal with any and all academic misconduct situations.

Textbook

1- **Fundamentals of Futures and Options Markets**, 7th ed., John Hull, ISBN 978-0-13-610322-6, Prentice Hall, 2011.
2- **Chart Patterns,** Bruce M. Kamich, ISBN-13: 978-1576603000, Bloomberg Press, 2009
3- **How Technical Analysis Works**, Bruce M. Kamich, ISBN-13: 978-0735202702, New York Institute of Finance, 2003.

These three books are vastly different and their choice is consistent with my own professional perspective. These are recommended. Note that (2) and (3) are similar. Amazon.ca and other online retailers are significantly price competitive, and may ship for free. Consider their services (I have nothing against on campus retailers, but support the healthy competition proper of a free market). Quite simply, Hull's book is the gold standard of derivatives courses, and it covers the fundamental theory. Any analyst can choose to be as applied as desired and appropriate but cannot function

professionally without a good understanding of this theory. Kamich's work offers an introduction to technical analysis (TA), which I consider an essential tool for every analyst, even if only to help with the timing of execution of market entry and exit decisions. Purists tend to ignore TA. Pity, they do so at their own peril. To be clear: TA is in addition to, not in replacement of more mainstream tools.

You should consider purchasing the books if you are seriously interested in the material covered by the course. Specialized material developed by the instructor for this course will be delivered electronically, via CourseLink after its classroom use.

Use of Top Hat Monocle

Top Hat Monocle will be used in this course. It is your responsibility to purchase a semester membership (in case you did not have one already) and have it up and running from class 1. Course will be listed as "ECON3760W12" and will be open on Thursday Jan 5th 2012. Please refer to www.tophatmonocle.com.

Course Evaluation

You will be asked to complete an evaluation of this course at some time during the last two weeks of the semester. The Department of Economics policy regarding the conduct and use of these evaluations will be found at

http://www.economics.uoguelph.ca/courses-evaluation.asp

Please Note

"The electronic recording of classes is expressly forbidden without the prior consent of the instructor. This prohibition extends to all components of the course, including, but not limited to, lectures, seminars, and lab instruction, whether conducted by the instructor or a seminar leader or demonstrator, or other designated person. When recordings are permitted they are solely for the use of the authorized student and may not be reproduced, or transmitted to others, without the express written consent of the instructor."

APPENDIX A

ECON376 W12. Course content and deliverables by week.		
Week	Date	Content, deadlines, events
W1	09-Jan	Team assigned. Membership posted in Course Link
	10-Jan	Presentation of the course: objectives and their rationale; structure and content. Traditional classes; discussing problems; current events reporting; nature of and expectations for major project. Team formation. Summary of Course Deliverables and key course dates. Basic derivatives: futures contracts options contracts, basis contracts, forward contracts (initial part).
	12-Jan	Basic derivatives completed. Definition of risk, hedging, risk management, basic derivatives.
W2	17-Jan	Hedge example for buyer of commodity, for seller of commodity: size, side, timing (using futures).
	19-Jan	Risk profiles of derivatives instruments: meaning, how to build and how to use them. Derivatives markets working, margin accounts, marking to market, clearing process, account management, principle of substitution, delivery process, cash settlement process.
W3	23-Jan	Project selection decision due. Drop box closes at 4:00 pm.
		Assignment 1 released
	24-Jan	Components of cash price risk: their operative importance. How to manage these components, common derivatives normally available to deal with different components of price risk.
	26-Jan	Price risk management as corporate function. Corporate role and responsibilities.
W4	30-Jan	Assignment 1 due on Monday Jan 30, drop box closes at 4:00 pm.
		Assignment 2 released
		Project selection confirmed. Feedback posted on CourseLink at 5 pm.
		Assignment 1 solutions posted on CourseLink at 5:00 pm.
	31-Jan	Options and the Greeks Synthetic instruments: mixing and matching basic derivatives to obtain the desired risk profile
	02-Feb	Technical analysis. Illustration of basic tools and their practical application by inspecting current market conditions for main commodities
W5	06-Feb	Assignment 2 due on Monday Feb 6, drop box closes at 4:00 pm.
		Assignment 2 solutions posted on CourseLink at 5:00 pm.
		Assignment 1 returned. Feedback posted on CourseLInk at 5 pm.
	07-Feb	Review and additional exercises. Preparing MT1
	09-Feb	**Mid Term 1 to and including Options class of Jan 31, open book.**
W6	13-Feb	Assignment 2 returned. Feedback posted on CourseLInk at 5 pm.
	14-Feb	Teams work on their own project. No formal classes this week. Possibility to consult via email on project-related matters (budget 2 working days turn around time)
	16-Feb	
W7	21-Feb	Reading Week
	23-Feb	
W8	27-Feb	Term project progress report due on Monday February 27, drop box closes at 4:00 pm.
	28-Feb	Orders, their practical meaning. Using TA to time order placement and market entry / exit decisions.
	02-Mar	Advanced basis, rational determination for storable commodities.
W9	06-Mar	Term project feed back posted to dropbox.
		MT1 results posted in CourseLInk
	07-Mar	Dealing with currency risk: exchange rate derivatives
	09-Mar	Managing a portfolio: Stock market derivatives
	13-Mar	Assignment 3 posted
W10	14-Mar	Managing interest rate risk: short term and long term interest rate derivatives
	16-Mar	Managing energy risk: energy complex, crude oil, natural gas, distilled products
W11	20-Mar	Assignment 3 due on Monday, March 20, drop box closes at 4:00 pm.
		Assignment 3 solutions posted on CourseLink at 5:00 pm.
	21-Mar	Manging air quality: carbon market derivatives; Precious metals; bullion vs. ETF. Other Metals.
	23-Mar	Managing scarcity: traditional ag and food derivatives. Fireworks vs starvation.
W12	27-Mar	Assignment 3 returned. Feedback posted on CourseLInk at 5 pm.
	28-Mar	Course review
	30-Mar	**Mid Term 2 - comprehensive, open book.**
		Final team project due, dropbox closes at 4:00 pm.
W13	04-Apr	Team presentation, team 1-5
	06-Apr	Team presentation, team 6-10