AECN 436 – Commodity Price Forecasting

Syllabus

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Organization of the course

Lectures — Mondays, Wednesdays and Fridays, 11:00–11:50am
Filley Hall, room 105

Office hours — I am usually in my office and you are welcome to come see me anytime. You can also set up an appointment by email.

Readings — No textbook is required. We will use booklets, handouts, and several chapters from different books. All readings, along with other course material, will be available on Canvas or the library website.

Prerequisites:

o ECON 212 (Princ. Microeconomics) or AECN 141 (Intro. Economics of Agriculture)

o ECON 215 (Statistics) or STAT 218 (Intro. Statistics)

Overview and motivation

Participants in commodity markets are constantly trying to forecast prices. A sound analysis of expected prices in the future is important in many dimensions. For example, it is useful for producers and merchandisers as they develop their marketing and risk management strategies during the crop year. It is also relevant to financial institutions providing loans to the agricultural industry as they assess financial performance and credit risk of their clients.

Another aspect of market analysis is the short-run trajectory that prices follow until they reach their long run forecast. This information is also important as it relates to the timing of decision-making in commodity markets. For example, it is relevant for producers and merchandisers not only to define a marketing or risk management strategy, but also to determine the best time to implement it.

Two methods have been widely used to forecast prices and their trajectories: fundamental analysis and technical analysis. Fundamental analysis focuses on economic data (such as production and consumption) to forecast prices, while technical analysis studies patterns in price data. Market participants have long debated which method is better, but it is as easy to find successful practitioners who rely on fundamental analysis as it is to find successful practitioners who use technical analysis. The purpose of this course is to discuss how fundamental and technical analysis have developed and are used in commodity market analysis, their strengths and weaknesses, and whether these methods can complement or substitute each other.

Course objectives

The overall objective of this course is to teach students how to analyze commodity markets using fundamental and technical approaches. The most common techniques from each approach will be discussed, focusing on how they can be implemented, their advantages and disadvantages, how they differ and how they can complement each other in commodity market analysis. At the completion of this course, students should be able to:

- have a thorough and workable knowledge of the forces that affect commodity markets

- apply different techniques in fundamental and technical analysis, along with critical thinking, to evaluate and solve real-world problems in commodity markets

- discuss and support their opinions using fundamental and technical tools

- appreciate the importance and complexity of fundamental and technical analysis in commodity markets and understand that nobody can consistently make accurate predictions about market movements

- realize that no technique is complete and unfailing

- understand that commodity markets are dynamic and different scenarios and circumstances require different approaches to analyze commodity prices

- realize that fundamental and technical tools are useful to organize their thoughts when analyzing commodity markets, and not a set of facts to memorize

- understand the consequences of decisions based on market forecasts and be mindful of those consequences in their professional activities

- recognize that market analysis is a combination of science and art; i.e. effective market analysis requires knowledge of scientific techniques as much as human judgment based on institutional understanding about markets

The figure below shows pairs of charts with daily prices (left) and their corresponding price changes (right) over time. Daily prices represent observed prices for a given asset, while price changes represent how much the price of the asset changed over one day. Two of the pairs come from actual assets and correspond to "real" prices. The other two pairs are fake prices generated by a computer. Which ones are real and which ones are fake? (This exercise was presented by Mandelbrot and Hudson in "The (mis)Behavior of Markets").
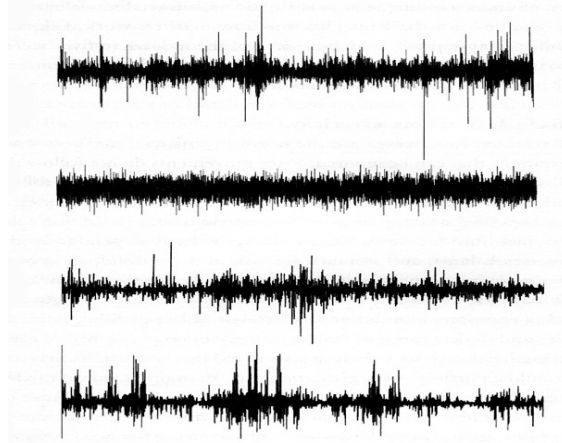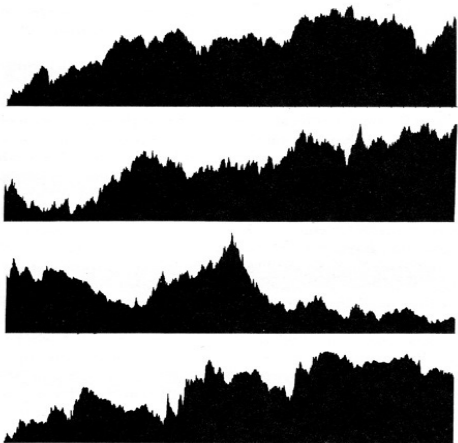
The table below shows data on supply (e.g. production and imports) and demand (e.g. crushings and exports) for the soybean market in the U.S. provided by the United States Department of Agriculture (USDA). Soybean price, which is shown at the bottom of the table, should be determined based on supply and demand conditions. How can we use the information below to find the relationship between supply-demand and prices, and then use this relationship to forecast soybean prices?

U.S. Soybeans and Products Supply and Use (Domestic Measure) 1/

SOYBEANS	2012/13	2013/14 Est.	2014/15 Proj. Dec	2014/15 Proj. Jan
	Million Acres			
Area Planted	77.2	76.8	84.2	83.7
Area Harvested	76.1	76.3	83.4	83.1
	Bushels			
Yield per Harvested Acre	40.0	44.0	47.5	47.8
	Million Bushels			
Beginning Stocks	169	141	92	92
Production	3,042	3,358	3,958	3,969
Imports	41	72	15	15
Supply, Total	3,252	3,570	4,065	4,076
Crushings	1,689	1,734	1,780	1,780
Exports	1,317	1,647	1,760	1,770
Seed	89	97	92	92
Residual	16	0	23	24
Use, Total	3,111	3,478	3,655	3,666
Ending Stocks	141	92	410	410
Avg. Farm Price ($/bu) 2/	14.40	13.00	9.00 - 11.00	9.45 - 10.95

We cannot quantify the future, because it is an unknown, but we have learned how to use numbers to scrutinize what happened in the past. But to what degree should we rely on the patterns of the past to tell us what the future will be like? Which matters more when facing a risk, the facts as we see them or our subjective belief in what lies hidden in the void of time? Is risk management a science or an art? Can we even tell for certain precisely where the dividing line between the two approaches lies? It is one thing to set up a mathematical model that appears to explain everything. But when we face the struggle of daily life, of constant trial and error, the ambiguity of the facts as well as the power of the human heartbeat can obliterate the model in short order. The late Fischer Black, a pioneering theoretician of modern finance who moved from M.I.T. to Wall Street, said, "Markets look a lot less efficient from the banks of the Hudson than from the banks of the Charles."

Peter Bernstein (Against the Gods: The Remarkable Story of Risk, 1998)

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Course outline

General discussion on price forecasting

- why price forecasting is important and how it can be useful in commodity markets

- how we can forecast commodity prices

- limitations of forecasting techniques

Basic concepts and philosophy of fundamental and technical analysis

- theoretical foundation of fundamental analysis: supply-demand framework

- theoretical foundation of technical analysis: price patterns

- overall similarities and differences between the two approaches

- economic theory and fundamental and technical analysis: random walks and efficient markets

> *"The most basic investment question is: Can the markets be beat? The efficient market hypothesis provides an unambiguous answer: No, unless you count those who are lucky." [Schwager, J.D., 2012, Market Sense and Nonsense: How the Markets Really Work (and How They Don't)]*
>
> *If the efficient market hypothesis is correct, should we still study fundamental and technical analysis?*

Fundamental and technical analysis in practice

- Fundamental analysis
  - economic principles, supply and demand
  - the balance sheet approach
  - the tabular and graphic approach
  - the regression approach
  - trends and seasonality
- Further discussion
  - Strengths and weaknesses
  - Are they complements or substitutes in market analysis?

- Technical analysis
  - trends
  - supports and resistances
  - moving averages
  - oscillators and indexes
  - trading volume and open interest

  - Real-world examples and common mistakes
  - Is one method better than the other?

This chart shows futures prices for soybeans. Technical analysis says the price behavior observed in October-November 1997 forms a "head-and-shoulders top", indicating price was going to decrease. That is, just by looking at this price chart and paying no attention to economics; technical analysts anticipated that soybean prices were going to decrease in December 1997. It seems to have worked in this example. However, does it always work?

Evaluation

One of the main components of the course will be a trading simulation. You will have access to the Agricultural Economics Commodity Trading Room (Filley Hall, room 105) and to the software Barchart Trader (licensed by Barchart). Within Barchart Trader, you will have a trading account that allows you to trade futures contracts on commodities. You are expected to trade futures contracts on different commodities based on your price expectations/forecasts, which should reflect the material discussed in class. Details about the trading simulation will be explained in class. Based on the trading simulation, you will work individually on three activities:

- *Trading reports:* you will submit reports regularly discussing your trades (details about the format of the reports will be discussed in class).

- *Term paper:* on April 27th you will submit a full report discussing your trading activity during the semester (details about the format of the report will be discussed in class). This term paper will replace the final exam, thus there is no final exam in this course.

In addition to the above activities related to the trading simulation, you will also work on assignments and exams during the semester. Some information about them is provided below, and more details will be discussed during the semester.

- *In-class assignments*: These assignments will be done in pairs and consist on questions to be completed during our lecture.

- *Exams*: two exams (February 28th and April 20th) will be done individually in our regular classroom.

Please note that:

- If you know that you will miss an exam, report or assignment, contact me as soon as possible. If your absence is related to health, family or work issues, we can discuss a make-up the exam, report or assignment.

The *final grade* will be a weighted arithmetic average of all grades obtained during the semester in all course activities listed below. The weights of each component of the final grade are listed below.

o in-class assignments (simple average of your grades in in-class assignments*)	20%
o trading reports (simple average of your grades in the reports**)	15%
o term paper (due on April 27th)	20%
o exam 1 (February 28th)	20%
o exam 2 (April 20th)	20%
o attendance	5%

(*) We will have several in-class assignments during the semester. All grades, except for the three lowest ones, will be included in the calculation of the average.

(**) We will have several trading reports during the semester. All grades, except for the lowest one, will be included in the calculation of the average.

Letter grades will be assigned to the final grade based on the following ranges:

Final grade		Final grade	
98-100	A+	77-79	C+
93-97	A	73-76	C
90-92	A-	70-72	C-
87-89	B+	67-69	D+
83-86	B	63-66	D
80-82	B-	60-62	D-
		0-59	F

Students choosing to take the course as "Pass/No Pass" will need to earn a final grade of 73 or better to receive a 'Pass' grade.

Finally, there will also be _bonus questions_ assigned during the semester. Note that these bonus questions are not required and students can choose to do all of them, some of them or none of them.
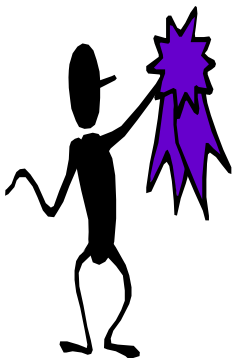
- If you choose not to do bonus questions at all, your final grade will be calculated just as described above. Your final grade will not be affected if you don't do any bonus questions.

- If you choose to do some or all bonus questions, your final grade will be calculated as described above plus a credit based on your performance in the bonus questions. Your final grade will be increased by 0.1 points for each point you earn in the bonus questions. For example, if your final grade is 80 and you accumulate 11 points in the bonus questions during the semester, then your final grade will increase to 81.1 (=80 + 11 x 0.1).

Some random thoughts related to forecasting.

"Difficult to see. Always in motion is the future." (Yoda)

"The future ain't what it used to be." (Yogi Berra)

"If you have to forecast, forecast often." (Edgar R. Fiedler)

"It is far better to foresee even without certainty than not to foresee at all." (Henri Poincare)

"A good forecaster is not smarter than everyone else, he merely has his ignorance better organized." (Anonymous)

Academic integrity.

Plagiarism or any other form of cheating in examinations, term tests or academic work is subject to serious academic penalty. Cheating in examinations or tests may take the form of copying from another student or bringing unauthorized materials into the exam room. Exam cheating can also include exam impersonation. A student found guilty of contributing to cheating in examinations or term assignments is also subject to serious academic penalty.

Students are expected to adhere to guidelines concerning academic dishonesty outlined in Section 4.2 of University's Student Code of Conduct (http://stuafs.unl.edu/ja/code/). Students are encouraged to contact the instructor for clarification of these guidelines if they have questions or concerns.

The Department of Agricultural Economics has a written policy defining academic dishonesty, the potential sanctions for incidents of academic dishonesty, and the appeal process for students facing potential sanctions. The Department also has a policy regarding potential appeals of final course grades. These policies are available for review on the department's website (http://agecon.unl.edu/undergraduate).

Special needs

Students with disabilities are encouraged to contact the instructor for a confidential discussion of their individual needs for academic accommodation. It is the policy of the University of Nebraska-Lincoln to provide flexible and individualized accommodation to students with documented disabilities that may affect their ability to fully participate in course activities or to meet course requirements. To receive accommodation services, students must be registered with the Services for Students with Disabilities (SSD) office, 132 Canfield Administration, 472-3787 voice or TTY.

Information for emergency response

- Fire Alarm (or other evacuation): In the event of a fire alarm: Gather belongings (purse, keys, cellphone, N-Card, etc.) and use the nearest exit to leave the building. Do not use the elevators. After exiting, notify emergency personnel of the location of persons unable to exit the building. Do not return to building unless told to do so by emergency personnel.

- Tornado Warning: When sirens sound, move to the lowest interior area of building or designated shelter. Stay away from windows and stay near an inside wall when possible.

- Active Shooter

  o Evacuate: if there is a safe escape path, leave belongings behind, keep hands visible and follow police officer instructions.

  o Hide out: If evacuation is impossible secure yourself in your space by turning out lights, closing blinds and barricading doors if possible.

  o Take action: As a last resort, and only when your life is in imminent danger, attempt to disrupt and/or incapacitate the active shooter.

- UNL Alert: Notifications about serious incidents on campus are sent via text message, email, unl.edu website, and social media. For more information go to: http://unlalert.unl.edu.

Additional Emergency Procedures can be found here:

http://emergency.unl.edu/doc/Emergency_Procedures_Quicklist.pdf