

CONTAINS:

Lesson Plan #1
A Simulated Futures Market

Lesson Plan #2:
Investigating Futures Markets

Lesson Plan #3:
An Innovative Example of Futures Markets

Lesson Plan #4:
Exploring Options Markets

Lesson Plan #5:
Talk with a Futures or Options Broker

TRADING RISK: MARKETS FOR FUTURES AND OPTIONS



Instructor's Note: Futures and options have become an important part of the financial landscape in recent years. Because most people, including many economics teachers, are not quite sure how they work, this section begins with some general background information on futures and options that you can use as needed. The section at the end titled "For More Information" suggests some online resources that provide more details.

Background Information for Teachers:

• Futures Contracts

A futures contract is an agreement between a buyer and a seller to exchange a specified quantity of a commodity or financial asset at some future date for a specified price. Futures contracts began in the commodities markets and were particularly useful for agricultural goods. As described on the video, futures contracts for financial assets came somewhat later, beginning to become popular in the 1970s in foreign exchange markets, then spreading to markets for bonds and stocks.

Futures contracts commit both buyer and seller to the transaction. They can be used either to reduce risk or to increase it. Suppose that you are a farmer who is growing corn. You must incur your cost during the spring and early summer when you buy your seed, fertilizer, etc. At the time you plant, you don't know what price you will get for your corn in the fall. If the price is low, you may make large losses; if the price is high, you can make big profits. Few farmers (or businesspeople, for that matter) like to gamble on their livelihood, so they would welcome the opportunity to eliminate at least some of the uncertainty about corn prices. Futures markets in agricultural commodities allow farmers to do this. The farmer hedges his risk by selling a futures contract in wheat with a delivery date corresponding to the harvest.

Buyers can also hedge risks with futures markets. Suppose that a baker knows that she will need wheat in specific amounts during each month of the year. Her profits may be strongly affected by unforeseen fluctuations in wheat prices. By purchasing futures contracts in wheat for the times of her major wheat needs, she can lock in her price well in advance, reducing her risk.

Thus, hedging in futures markets is a way for traders to anticipate future transactions and reduce their risk by setting the price in advance. However, futures contracts can also be used by speculators to assume additional risk. Suppose that instead of a farmer, you are a financial investor who studies agricultural markets. During the summer, you are convinced that corn is going to be very cheap in the fall, but the futures price of corn for fall delivery is high, so you sell corn futures. If you are correct and the fall price of corn on the spot market turns out to be low, you can buy the corn you need there to fulfill the futures contract delivery at the higher price you agreed on during the summer. However, if your prediction turns out to be wrong and the fall spot corn price is high, you will still have to buy corn to fulfill the futures contract. If the fall spot price is higher than the price specified by your futures contract, you make a loss.

Thus, speculators can essentially bet on their predictions about prices in the future by buying and selling futures contracts. It is usually people with a high tolerance for risk who choose to speculate. Notice that a hedger with corn to sell who wants to reduce risk by buying a futures contract for corn doesn't care who the seller of the contract is. It could be another hedger who needs corn and is reducing risk or it could be a speculator who simply believes that the spot price of corn is going to fall. If two hedgers transact, both reduce their risk. If a hedger transacts with a speculator, then risk is transferred from the hedger to the speculator. Thus futures markets may act both to reduce risk and to shift its incidence from those with low risk tolerance to those who are more willing to bear it.

As described in the interview with Leo Melamed in the video segment, futures contracts for financial assets began in the 1970s. The impetus for this came from a change in how the exchange rates between various currencies were determined. Prior to 1971, the prices of most major currencies in terms of one another were fixed. Governments set these fixed exchange rates and bought and sold their own currency in exchange for others in order to balance the market at the fixed price. This system of fixed exchange rates was the last remnant of the gold standard system that flourished in the 1800s.

In 1971, President Nixon abandoned the convertibility of the dollar into gold and the fixed-exchange-rate system soon fell apart. Instead of being fixed, exchange rates floated against one another, with each day's price being determined by market supply and demand, usually without government intervention.

Under floating exchange rates, the relative prices of currencies have fluctuated a lot. Now it is difficult for importers and exporters to know how much foreign goods are going to cost when converted to their own currencies. Consider the situation of a Jaguar importer who signs a contract in January to pay a certain number of British pounds for an order of Jaguars in July. The cost of the shipment in dollars depends on what exchange rate between dollars and pounds happens to prevail in July. By buying a pound futures contract in January, the importer knows the dollar cost of the Jaguars immediately and thus reduces risk.

Speculators are also active in foreign-exchange futures. Those who believe that the spot price of a currency is likely to rise may buy a futures contract in the currency hoping to make a profit by re-selling the currency at the higher spot rate they expect. Speculators who believe that a currency's price will fall may sell futures contracts.

Futures markets for other financial assets developed along with those for currencies. It is now possible to trade futures contracts on many U.S. government bonds as well as market baskets of stocks such as those making up the Standard and Poors 500. One can even trade futures contracts on the weather!

Why would anyone want to buy or sell weather futures? Suppose that you operate a shopping mall in Chicago. You are trying to plan your budget for the year and don't know how much to plan for heating costs in the winter. If the weather turns out to be mild, you won't need to spend nearly as much as if the weather is severely cold. You could eliminate this risk by buying heating degree day futures for Chicago for the coldest months of the year. The spot price at which these futures come due is related to how cold the month is: the colder the month, the higher the spot price. Thus, someone who buys these futures at a fixed price during the previous summer gains the difference between the (high) spot price and the futures price when the winter month turns out to be cold. Thus, you as a mall operator make some money on the futures contract to help offset the higher heating bills you pay. If the winter month is warmer than usual, then you as a buyer of futures would have lost money on the contract, but in this case you don't have to pay much for heating so you have money to spend. The futures contract helps reduce the variation in your heating expense by lowering it in cold winters and raising it in warm ones. This makes your expenses more predictable and lowers your risk.

A final comment: formal futures contracts are traded only for commodities for which there are enough traders on both sides who are willing to trade. Many banks arrange forward contracts for their customers, which are like customized futures contracts in commodities (or delivery dates) for which formal forward contracts are not traded. Forward contracts are very common in currencies other than the most widely-traded ones. For example, an importer wanting to arrange for future delivery of Swedish kroner would not be able to find a formal futures contract, but could arrange a forward contract through a large bank.

Similarly, customized business insurance policies can sometimes be arranged to reduce the risk associated with specific economic events. Insurance and futures contracts can be viewed as complementary and often similar approaches to reducing risk. In both cases, one can arrange to receive money when adverse events occur.

• Options Contracts

A futures contract obligates both parties to make a transaction at a specified price at a specified future date. An options contract is similar in that it specifies a future date (the expiration date) on (or before) which a transaction may occur and a price (the strike price) at which the transaction is to proceed. However, under an options contract, one party (either the buyer or the seller) gets to decide whether or not the transaction proceeds.

Options are classified according to whether it is the buyer or the seller that has the option to choose whether or not to transact. A call option is an option to buy an asset; a put option gives a seller an option to sell. Suppose that A buys a call option from B for 100 ounces of gold with a strike price of \$300 per ounce and an expiration date of January 1, 2002. Then at any time between now and January 1, 2002, A can choose to buy 100 ounces of gold from B for \$300 per ounce. In general, A will exercise the option if the price of gold is higher than \$300 per ounce, since that allows A to get gold more cheaply than it is available on the spot market.

A might buy a call option for two reasons. Either she needs to obtain gold on (or before) January 2002 or she may be speculating in expectation that the price of gold is going to rise. If A wants to buy gold to use, then buying the option assures that she will pay no more than \$300 per ounce, though she may pay less—she will choose to ignore the option and buy on the spot market if the spot price is below \$300. If she is speculating, then she can make an immediate profit if the price of gold is above \$300 by exercising the option to buy at \$300, then

reselling on the spot market at a higher price. If the spot gold price goes above \$300, she makes a profit, but if the price stays below \$300, she allows the option to expire and stays out of the gold market.

Obviously, A having the option to buy lowers A's risk and raises B's. The gold transaction on January 1, 2002 will proceed when it is to A's advantage (and B's disadvantage), thus A must pay B for the privilege of having this option. The option premium is the price that A pays B for the call option.

A put option gives the seller the right to decide whether to consummate the transaction. If C buys a put option for gold from D with the same price and date as the one described above, then C can decide to sell 100 ounces of gold to D at a price of \$300 per ounce at any time before January 1, 2002.

Again, there are two main reasons why C might buy a put option: he may have gold he needs to sell on January 1, 2002 or he may be speculating that spot gold prices will fall below \$300. In either case, he exercises the option if the spot gold price is below \$300 and allows the option to expire if it is above.

If he has gold to sell, he simply chooses to sell at the higher of the two prices: the \$300 option strike price or the spot market price. In this case, by buying the put option C has assured that he will be able to sell his gold for a price of \$300 or above. If he is speculating, then if the spot price is below \$300 he makes an immediate profit by buying on the spot market and reselling at \$300 by exercising the option. If the spot price is above \$300, this transaction would make a loss so he simply allows the option to expire. Again, C reduces his risk and D's risk increases, so C must pay D an option premium in order to purchase the option contract.

• Valuing Call Options

What determines the premium that A pays B for a call option or that C pays D for a put option? As discussed in the video segment, two economists named Fischer Black and Myron Scholes developed a formula for the pricing of options. The mathematics of the Black-Scholes formula is quite complex. However, the intuition of the factors involved in options pricing are pretty straightforward.

Basically, an option is more valuable to the buyer the more likely it is to be exercised and the greater the potential gain if it is exercised. The option buyer gains nothing if the option is not exercised (and forfeits the premium she pays to obtain the option), so options that are unlikely to be exercised are worth little. If the current gold price is \$250 per ounce, then an option to buy for \$400 per ounce next week would be worthless because it is nearly impossible that the spot price would go high enough to make you want to exercise the option. However, if the current spot price of gold was \$390, then an option to buy next week at \$400 might be valuable: the higher the current spot price, the more valuable is a given call option. This happens because the higher the spot price is now, the more likely it is to be above the strike price on the expiration date, so the more likely it is that the option will be exercised.

Similarly, an option to buy at \$260 is worth a lot more than an option to buy at \$400, regardless of the current market price. A lower strike price both increases the probability that the option will be exercised and also increases the amount that the option buyer gains from having it. The lower the strike price, the more valuable is a call option.

Finally, options are more valuable if the spot price of the asset is more volatile. If everyone knew that the price of gold was going to remain unchanged at \$260 per ounce for the next year, then there would be no need to buy an option contract. A contract with a strike price above \$260 would never be exercised, so it would have no value. A contract with a strike price of, say, \$250 would surely be exercised, so the seller of such a contract would insist on receiving \$10 per ounce for agreeing to the contract. If the buyer pays \$10 for the option and \$250 for gold under the contract, she gains nothing relative to simply buying gold on the spot market at \$260, thus again the option has no value.

The greater the expected fluctuations in the spot price of gold, the more likely it is that the price will move into the range where it will be exercised and the greater the probable gain from exercising it. Therefore, an increase in the volatility of the spot price of the asset increases the value of a call option.

• Valuing Put Options

A similar analysis can be applied to put options. A put option is exercised if the spot price is below the strike price.

Thus a lower current spot price or a higher strike price makes a put option more valuable. An increase in volatility makes exercising a put option more likely, so put options also become more valuable when markets are more volatile.

For More Information:

An excellent source of information on options is <http://biz.yahoo.com/opt/>. This site contains basic information on options, plus a glossary of terms and an options calculator that will compute the value of an option given certain characteristics of the underlying asset.

To see what kinds of futures contracts can be traded (including some unusual ones), visit the sites of the major futures exchanges.

The following are some of the big ones:

- <http://www.cme.com/>
- <http://www.liffe.com/>
- <http://www.nybot.com/>
- <http://www.cbot.com/>

Lesson Plan #1: A Simulated Futures Market

Grade Level: 6–12

Time Required: 40–60 minutes, plus discussion time

Overview:

This lesson simulates a futures market for a hypothetical commodity called gummy fruit. In the basic simulation, half of the students are gummy fruit growers who produce and sell fruit and half are processors who buy and use it. Both growers and processors have the option of transacting in a futures market in the spring at the beginning of the growing season and/or in the spot market at the time of the fall harvest. The futures market is simulated with a double oral auction on a classroom trading floor. The spot market price may (in the simple version) be determined by a random dice roll or (in a more advanced version) by a separate auction. Students can then calculate how much profit they made and how much they might have made from a different trading strategy. The simulation is repeated for several trading periods to allow for a range of different market outcomes (poor harvest vs. good harvest, strong demand for processed fruit vs. weak demand).

Objectives:

This simulation gives students an opportunity to learn firsthand about how futures markets can be used to reduce risk by hedging or to increase risk by speculating.

Related National Standards:

NCEE Standard 7: Markets exist when buyers and sellers interact. This interaction determines market prices and thereby allocates scarce goods and services.

NCEE Standard 8: Prices send signals and provide incentives to buyers and sellers. When demand or supply changes, market prices adjust, affecting incentives.

Materials:

- Printed participant worksheets and information sheets. Each student will need one worksheet and one set of worksheet instructions (same for every grower and every processor), plus one information sheet (unique to the individual student). A zipped file available on this Web site contains pdf files that can be printed, and used, plus Microsoft Word files that can be used by instructors who wish to vary the simulation by changing the forms.
- Paper record sheets or a blackboard or overhead transparency on which to record the transactions that students undertake in the futures market.
- Two dice to determine random outcomes.
- Students will need pencils to record results and calculators to compute profits earned in each trading period.

Activity:

• Summary of Activity

Students are initially assigned to one of two roles: grower or processor. Each is given an information sheet and a worksheet. Each grower's information sheet tells how much he or she will produce under different coded harvest outcomes, one of which will be selected by a random dice throw after the futures market is closed. Each processor's information sheet tells how much processed fruit he or she can produce and at what price it will sell under different demand outcomes, one of which will also be selected randomly. The worksheet gives each student a place to record his or her activities and calculate each period's profit earned.

The instructor begins by reading a set of instructions about the simulation and answering any questions about the procedure. The simulation then proceeds for several periods.

In each period, the instructor begins by opening the futures market for trades between growers and proces-

sors. Normally, growers will sell in the futures market to hedge their anticipated harvest season sales and processors will buy. Each transaction is recorded by the instructor and by both participants on their worksheets.

Once trading in the futures market has concluded, time advances to the harvest season and the instructor throws the dice twice to determine the harvest outcome (how much each grower is actually able to sell) and the demand outcome (at what price producers can sell processed fruit). The instructor, using a worksheet provided below, uses the harvest and demand outcomes to determine the harvest-season spot price for fresh fruit.

Since most growers will not have sold the exact amount of fruit that they ended up producing in the futures market, they will have to either sell additional fresh fruit in the spot market at the randomly-determined price or perhaps buy additional fruit to fulfill their futures contracts (if they produce less than they sold as futures). Similarly, sellers who did not buy the amount of fresh fruit that they need on the futures market must now obtain that fruit on the spot market. Once students have entered the appropriate numbers on their worksheets, they can calculate their profits for the period and the period ends.

A sequence of periods is played until the instructor decides that the simulation should end.

• **Preparation of Information Sheets and Worksheets**

Before the experiment begins, the instructor must prepare information sheets, worksheets, and worksheet instructions for participants. The information on each student's information sheet will be different. This Web site includes a pdf file of information sheets for a class of 30 (or fewer) students, plus the data and form files used to generate them using the mail merge feature of Microsoft Word. Instructors who wish to change the numbers or who want to adjust the simulation for more or fewer students can easily do so by altering the data file and performing the merge.

The worksheets and worksheet instructions are the same for all growers and for all processors. Sample worksheets and instructions are in a pdf file (and a Word file) for downloading and duplication.

It is easiest to perform this simulation with the students seated in a semi-circle or circle around an open trading floor in the center of the room. Depending on the classroom configuration, this may be accomplished by moving desks and chairs to the outside of the room with the chairs facing in. Choose six students from one side of the room to be the processors; all other students are growers. Hand out the information sheets and worksheets to all participants.

• **Instructions**

The zipped file contains a general instruction sheet that should be read to the students before the simulation begins. If you feel that it is desirable, a copy of the instructions can be given to the students a day ahead so that they can read them before the simulation. It may also be useful for them to follow along on a paper copy or on a copy projected from a transparency or computer projector as the instructions are read.

It is very important that students understand the instructions for the experiment, so a little extra time devoted to making sure that they are clear may save considerable time and confusion later in the simulation.

• **Running the Simulation**

Once you have read the instructions to the students and answered their questions, you can open the floor for futures trading in the first period. Questions may arise during the first couple of periods. It is best to answer them as you go along so that students understand what they are doing.

Eventually, trade will taper off to a halt, at which point you can close the first period's futures market. At the end of the futures market, students can begin filling in the data for the period on their worksheets. Growers should fill in the amounts sold in each of their transactions and calculate how much they have earned from the futures market. Processors should fill in the amounts bought in their transactions and total up the amount spent. Some students may need assistance in calculating these quantities, so it is wise to pause here during the first period to check to see that they have done it correctly and to assist as needed.

Next, you throw the dice for the harvest outcome, announcing the result to the class. A table on the instructor information sheet gives the outcome codes corresponding to each dice roll result. Then throw the dice again for the demand outcome and find and announce the result. You may then calculate the spot price based on

harvest and demand (using the instructor information sheet) and announce this to the class.

Students now finish calculating their individual outcomes for the first period. Some will struggle with this and need assistance as they proceed. You may wish to step through the process as a group for the first period or two. Here is a brief summary of what each group of students needs to do:

Growers:

1. Given the harvest outcome announced by the instructor, look up the amount your farm produced in the table on your information sheet. (This may be different for each grower.) Fill in that number under “Amount Produced” on the worksheet for the appropriate period.
2. Calculate the net amount that they have left to sell in the spot market. This could be positive (if their production exceeded their sales in the futures market), zero (if they are equal), or negative (if they ended up producing less than they contracted to sell in the futures market).
3. Fill in the announced spot market price and multiply by the net amount they are selling in the spot market to determine spot market revenue. This number will be negative for growers who oversold in the futures market; they must go out on the spot market and buy gummy fruit in order to fulfill the future sales to which they have committed themselves.
4. Finally, adding their total earnings from futures market sales (calculated earlier) to their net earnings from the spot market (positive or negative), they determine their total profit for the year.

Processors:

1. Depending on the announced demand outcome, each processor may or may not be able to sell all he or she can produce. The first step is for each student to consult his or her information sheet to determine the amount of gummy fruit needed and total revenue earned, using the demand outcome announced by the instructor. These numbers can then be filled in on the worksheet.
2. Most processors will probably have purchased some raw gummy fruit on the futures market. The next step is to calculate their net purchases on the spot market as the total amount of fruit needed minus the amount of fruit purchased on the futures market. This number will usually be positive or zero, but could be negative if the processor bought futures contracts for more fruit than he or she was ultimately able to use.
3. Fill in the announced spot price for gummy fruit and multiply by the net amount purchased in the spot market to get the total amount of money spent in the spot market. This number will be negative if the processor overbought in the futures market; they will take some of the fruit bought as futures and resell it in the spot market rather than processing it.
4. Finally, processors can subtract the total spent on the futures market and the total spent on the spot market (positive or negative) and subtract it from total sales revenue to get their profit for the year.

At the end of the first couple of periods, it is a good idea to suggest that the students look at their worksheets and try to decide if they would be better off making more transactions in the futures market or fewer. This might help them improve their strategy as the simulation progresses.

Once they have had time to calculate their outcomes and think about their strategy, you may open futures trading for the next period. Continue with a succession of periods until your available time is exhausted or until the students seem to tire of the game.

• ***What to Expect***

Depending on the class, students may be somewhat reluctant to venture onto the trading floor and start bargaining or they may jump in with both feet. If they need encouragement, you may want to remind them that the futures market is their opportunity to lock in a price for gummy fruit. If they do not use the futures market, then they will have to pay or receive whatever price ends up prevailing on the spot market, which could be quite high or quite low. If there is still a lack of transactions, then go ahead and close trading and let them find out how they do on the spot market. It might take some students a couple of years of using the spot market before they understand the market well enough to use futures wisely.

Students are typically energetic participants in double oral auction markets such as this one. However, some students may have some difficulty in doing the calculations that are required to determine their profits. Providing assistance to struggling students may require some time between periods. If you think this is likely to be a severe problem, you may want to team some students up to work together as a single grower or processor. It may also be very useful to have an assistant who can circulate through the room and help students as needed.

• ***Debriefing and Discussion Ideas***

At the end of the simulation, or during the next class period if there is no time, let the students tell you about futures markets. At that point, they should have a pretty good understanding of why participants would use futures markets to reduce risk by hedging.

• ***Files in Zipped Download File***

PDF Files:

- Futures Instructions.pdf (general instructions)
- Instructor Information.pdf (information sheet for instructor's use)
- Grower Information Sheets.pdf (24 information sheets for growers)
- Processor Information Sheets.pdf (6 information sheets for processors)
- Grower's Worksheet.pdf (worksheet for growers, need to copy)
- Grower's Worksheet Instructions.pdf (instructions for growers, need to copy)
- Processor's Worksheet.pdf (worksheet for processors, need to copy)
- Processor's Worksheet Instructions.pdf (instructions for processors, need to copy)

Microsoft Word Files:

- Futures Instructions.doc (general instructions)
- Instructor Information.doc (information sheet for instructor's use)
- Grower Information Sheets.doc (24 information sheets for growers)
- Processor Information Sheets.doc (6 information sheets for processors)
- Grower's Worksheet.doc (worksheet for growers, need to copy)
- Grower's Worksheet Instructions.doc (instructions for growers, need to copy)
- Processor's Worksheet.doc (worksheet for processors, need to copy)
- Processor's Worksheet Instructions.doc (instructions for processors, need to copy)
- Grower Information Form.doc (form letter file for creating grower information sheets using mail merge)
- Grower Data.doc (data file for creating grower information sheets using mail merge; this contains a table of all grower harvest values)
- Processor Information Form.doc (form letter file for creating processor information sheets using mail merge)
- Processor data.doc (data file for creating processor information sheets using mail merge; this contains a table of all processor demand values)

Assessment Recommendations:

One effective method of assessment for exercises such as these is to ask each student to write a brief report on the simulation. Among the questions that might be addressed in the report, and followed up in the ensuing class discussion, are:

- Did the futures price tend to be in the same range as the spot price on average? (This should happen most of the time. If the futures price is always higher, then processors will abandon the futures market; if it is lower, then growers will leave.)
- Who benefited from the futures market when the spot price turned out to be high? Low?
- How can futures markets be used to reduce market risk?

- Could you use futures markets to increase your risk? (Yes, selling gummy fruit futures that you don't expect to produce gives you the opportunity to make or lose lots of money depending on whether the spot price is below or above your negotiated futures price. This is called selling short. You can bet on the other side of the market by buying futures for more fruit than you expect to need, then selling the excess fruit on the spot market. This is called going long.)

Lesson Plan #2: Investigating Futures Markets

Grade Level: 9–12

Time Required: 30 minutes minimum, or more depending on specific activities chosen, plus 15 minutes to watch video

Overview:

This lesson offers several suggestions of how students may explore futures markets. Among the activities suggested are comparisons between the current spot price of a commodity and current and past futures prices, consideration of what commodities are traded on futures markets and why, and how futures contracts can be used either to increase or reduce risk.

Objectives:

This lesson should make students familiar with futures contracts and how they are used.

Related National Standards:

NCEE Standard 8: Prices send signals and provide incentives to buyers and sellers. When supply or demand changes, market prices adjust, affecting incentives.

NCEE Standard 10: Institutions evolve in market economies to help individuals and groups accomplish their goals.

Materials:

VCR to view the video segment before the activity

Access to listings of futures prices in financial press or on Internet

Activity:

Students may undertake one or all of the following activities to familiarize themselves with futures markets:

1. Make a list of all of the commodities, assets, events, etc. that you can find for which futures are traded. You should look in the business press (*Wall Street Journal* and/or the business section of major newspapers) and at the Web sites of major futures exchanges. For each kind of futures contract you find, describe which individuals might reduce their risk by buying and selling the contract.
2. Go to a back issue (three to six months old) of a newspaper and find futures price quotes for a contract that matured recently. Then get an issue from the time that the contract matured and compare the futures price quoted with the spot price at the time of maturity. Was the futures price a good predictor of the future spot price? (Because any single contract may have unusual outcomes, you may want to repeat this exercise for several different kinds of contracts to try to get an average result.)
3. Choose a commodity for which you can get current information about the price of a futures contract maturing in a few months. Put yourself in the situation of someone wanting to sell 100 units of that commodity at that maturity date. You may sell a futures contract for all or part of your 100 units today or on any day between now and the maturity date. Follow the market daily and keep track of when you sell futures and what price you get. (This is a good activity for the entire class. If you have Internet access, you can use one of the Web sites listed in the introduction to these lessons to track the contract price each day at the beginning of class. Collect the students' selling decisions each day and have them keep track of their earnings. Which student ends up making the most money?)

4. Any of the activities above can be the basis for a class discussion. If students explore to try to find futures contracts, collect all the results to make a comprehensive list, then discuss how some of the unusual ones (such as the heating and cooling degree day futures) might be used to hedge risk.

Assessment Recommendations:

Some of the above activities involve individual or group assignments for students on which they can be assessed. Participation in class discussion can be the basis for assessment. A useful essay question on an exam (or for a take-home assignment) would be to explain who might use a particular futures contract to reduce risk and how. You might also ask how one could use the contract as a tool for speculating.

Lesson Plan #3: An Innovative Example of Futures Markets

Grade Level: 9–12

Time Required: 30 minutes, or more if desired

Overview:

Developed as a tool for evaluating trading on futures markets, the Iowa Electronic Market (IEM) is an interesting and ever-changing example of how futures markets can be applied to non-traditional commodities and events. On this exchange, one can buy a futures contract on events such as the outcome of elections and policy decisions by the Federal Reserve Board. In this lesson, students explore the IEM. Teachers who are interested may subscribe to their classroom program and actually invest in the futures contracts that are available there.

Objectives:

To familiarize students with an unusual extension of futures trading.

Related National Standards:

NCEE Standard 8: Prices send signals and provide incentives to buyers and sellers. When supply or demand changes, market prices adjust, affecting incentives.

NCEE Standard 10: Institutions evolve in market economies to help individuals and groups accomplish their goals.

Materials:

VCR to view the video segment

Internet-capable computer to explore the IEM site

Background Information for Teachers:

The following quote from their Web site describes the Iowa Electronic Market:

The faculty at the University of Iowa developed the IEM to be an Internet-based teaching and research tool. It allows students to invest real money (\$5.00-\$500.00) and to trade in a variety of contracts. You may be familiar with the best-known part of the IEM, the political markets. Here students can trade shares of political candidates or parties (the payoff depends on the election results). Students also have the opportunity to trade in contracts whose eventual payoff depends on a future event such as an economic indicator, a company's quarterly earnings, a corporation's stock price returns or a movie's box office receipts. (Taken from www.biz.uiowa.edu/iem/media/summary.html)

The IEM Web site also quotes an article from the Wall Street Journal of August 28, 1995 that describes trading in the market for presidential-candidate futures well in advance of the 1996 election. See www.biz.uiowa.edu/iem/wsj/wsj.html.

The IEM Web site also includes an extensive set of instructor resources at www.biz.uiowa.edu/iem/classroom/. Many of these modules are intended for college-level business and economics classes, but some are appropriate for high school students as well.

Activity:

Teachers may choose either simply to have students explore the site (as a group or individually) to show students this unique activity, or to actually join the IEM classroom program and participate in one or more of the current markets.

If you choose simply to explore the site, it may be interesting to do so daily or weekly over an extended

period of time to track changes in the prices of the contracts. This is particularly fun during pre-election periods when the political markets are very active and sensitive to current events.

If you choose to participate directly in the markets, materials available through the classroom program at www.biz.uiowa.edu/iem/classroom/ can help you integrate this with topics you are studying in economics, finance, business, or accounting.

Assessment Recommendations:

Your experience with the IEM will vary depending on the markets that are active at the time you use them and how extensively you participate. Thus, assessment will need to be tailored to the activities that you choose.

Lesson Plan #4: Exploring Options Markets

Grade Level: 9–12

Time Required: Depends on activities chosen. Minimum 15 minutes to view video, plus time for research and discussion.

Overview:

This lesson gives several suggestions for activities that will help students learn about options. They include simulated investing in options contracts and exploring Web sites to play with options calculators that show how the value of an option contract depends on the properties of the contract and of the asset.

Objectives:

To make students more familiar with what options contracts are and how they are used.

Related National Standards:

NCEE Standard 8: Prices send signals and provide incentives to buyers and sellers. When supply or demand changes, market prices adjust, affecting incentives.

NCEE Standard 10: Institutions evolve in market economies to help individuals and groups accomplish their goals.

Materials:

VCR to view the video segment before the discussion

Internet access for some activities

Activity:

Students may undertake one or all of the following activities to familiarize themselves with options markets:

1. Go to a back issue (three to six months old) of a newspaper and find price quotes for a call and put options contract with an expiration date that recently passed. Then get an issue from the time that the options expired, find the current spot price of the asset, and determine whether the holder of the option would have chosen to exercise it or to let it expire. If she exercised the option, how much would she earn? Would that be enough to cover what she paid for the option? (Because any single contract may have unusual outcomes, you may want to repeat this exercise for several different kinds of contracts to try to get an average result.)
2. Choose a commodity for which you can get current information about the price of call and put option contracts expiring in a few months. Put each student in the situation of someone wanting to buy (or sell) that commodity at that expiration date. (You may want to make some students buyers and others sellers.) Students who are buyers may choose to buy a call option at the going price. Students who are sellers may buy a put option. Have each student choose whether or not to buy an option contract and which one. (There will usually be different contracts with different strike prices.) Collect the students' decisions. On the expiration date, find out what the current price of the asset is and have each student determine whether or not he or she would exercise the option. Have each student calculate his or her net earnings (any profit from exercising the option minus the cost of the option).
3. Have students search for and visit Web sites giving investor information about options. Because options are relatively unfamiliar to many investors, there are quite a few sites available. One that is particularly nice is <http://biz.yahoo.com/opt/>. Most of these sites have options calculators that allow you to calculate the theoretical market value of an option given the current price of the asset, its volatility, the time until expiration, and the strike price. Students can experiment with the calculator to find out how the value of an option is affected by changes in

any of these parameters.

4. Any of the activities above can be the basis for a class discussion.

Assessment Recommendations:

Assessment will depend on which of the activities you choose to have your students perform. Activity #1 and #2 could be done as problem sets by students. They could analyze the results of their experiments with the options calculator in a report.

Lesson Plan #5: Talk with a Futures or Options Broker

Grade Level: 9–12

Time Required: One class period for viewing video and preparation, plus one period for the visiting professional

Overview:

This lesson involves inviting a broker or investment advisor who works with futures and/or options to visit the class to talk about how people use these markets to reduce or take on risk.

Objectives:

To give students more familiarity with futures and options contracts, and with possible careers in finance.

Related National Standards:

NCEE Standard 8: Prices send signals and provide incentives to buyers and sellers. When supply or demand changes, market prices adjust, affecting incentives.

NCEE Standard 10: Institutions evolve in market economies to help individuals and groups accomplish their goals.

Materials:

VCR to view the video segment before the investment professional visits.

Activity:

Most cities have professional investment advisors and brokers who help individuals and firms manage their money. Some large companies, especially banks and companies involved in agricultural goods, also have internal staff who specialize in trading futures and options. If you cannot get any leads from students or parents, you may be able to find someone in the Yellow Pages. Promising categories are Commodity Brokers, Investment Advisory Service, and Stock and Bond Brokers. Alternatively, the home office of a large bank can probably suggest some contacts.

Among the topics that might be explored with this person are:

- The basics of how futures and/or options contracts work.
- Who buys and sells options and futures contracts.
- What differing motivations various individuals have for buying these assets.
- What steps are involved in buying or selling a contract.
- What costs are involved.

Assessment Recommendations:

Participation in the discussion with the visitor can be a basis for assessment. Alternatively, students could be asked to write a paragraph or short essay explaining what they learned from the visit.