

# FCOJ

## FUTURES & OPTIONS



Jul 05 9800    Sep 05 9950    Nov 05 10100    Jan 06 10250



**The New York Board of Trade (NYBOT) provides the world's premier futures and options markets for several internationally traded agricultural commodities: cocoa, coffee, cotton, frozen concentrated orange juice (FCOJ) and sugar.**

The trading of agricultural commodities represents one of civilization's oldest commercial activities. Crop commodities, such as cotton and sugar, have been in use for around 3,000 years. Basic commodities with universal value in different cultures could be described as the first international currencies of exchange. With such a long history as a basis of commerce, it is easy to understand how the marketplace value of each commodity could play a major role in the rise and fall of empires.

The shape and scope of commodity trading has evolved since the early trading routes were established, but the role of commodity trading still remains a fundamental economic component in world economic development. The price fluctuations of a basic commodity can still shock the economy of a country or an entire region. The price of the latest yield of the citrus grove or the coffee plantation matters a great deal. The central importance of commodity pricing gave rise to the commodity exchanges and their principal pricing tools – futures and options contracts.

For well over a century, cotton, coffee, sugar, cocoa and citrus industry representatives have joined traders and investors in the New York Board of Trade (NYBOT) futures and options markets to engage in price discovery, price risk transfer and price dissemination for these internationally traded commodities. Each day, people from around the world look to the NYBOT markets for a benchmark price.

While the pricing role of the NYBOT markets has remained the same, the exchanges have changed their names, merging, expanding and adding new agricultural products over the years.

## New York Board of Trade Historic Timeline

- 1870** The New York Cotton Exchange (NYCE) trades first cotton futures contracts
- 1882** Coffee Exchange of the City of New York trades first coffee futures contracts
- 1914** Coffee Exchange adds sugar futures
- 1916** Coffee Exchange becomes the New York Coffee and Sugar Exchange
- 1925** New York Cocoa Exchange begins trading cocoa futures
- 1966** **New York Cotton Exchange adds Frozen Concentrated Orange Juice (FCOJ-1) futures**
- 1979** New York Coffee and Sugar merges with New York Cocoa Exchange forming the Coffee, Sugar & Cocoa Exchange, Inc. (CSCE)
- 1982** CSCE introduces options on sugar futures, first U.S. exchange-traded option
- 1984** NYCE introduces cotton options
- 1985** **NYCE adds FCOJ-1 options**
- 1986** CSCE adds cocoa and coffee options
- 1998** CSCE and NYCE form New York Board of Trade
- 2004** **NYCE introduces FCOJ-A (Florida/Brazil) futures and options**
- 2004** CSCE and NYCE become the New York Board of Trade

*Potential users of the NYBOT FCOJ futures and options markets are encouraged to read a companion NYBOT publication entitled "Understanding Futures and Options" for an overview and explanation of the basics of these markets. More information is also available at [www.nybot.com](http://www.nybot.com) and [www.nybotlive.com](http://www.nybotlive.com).*

## FCOJ A MODERN VALUE ADDED-COMMODITY

Frozen Concentrated Orange Juice (FCOJ) is a relatively modern form of a basic agricultural commodity. For centuries, oranges were consumed as a fresh fruit, not storable for long periods of time or easily shipped long distances except in dried form. Fresh orange juice like fresh milk was perishable once produced and had a very limited “shelf life”. Supply of fresh oranges (and juice) could be easily disrupted. Price shocks were therefore immediate and sharply felt. The model for production/consumption of bottled orange juice was also similar to fresh milk: locally produced, locally consumed. Fresh oranges could be shipped longer distances to market. And then the fresh juice was squeezed by hand at home.

The citrus market changed radically when the process for making FCOJ was invented in Florida in 1947, right after World War II. Demonstrating a clear preference for FCOJ convenience and taste, consumers quickly substituted FCOJ for fresh oranges. FCOJ, a value-added form of the basic citrus commodity, became the standard for an industry.

The FCOJ market has experienced tremendous growth internationally due to technological innovations in storage, packaging and bulk transportation systems. The invention of the FCOJ process and the development of more sophisticated storage and delivery methods meant that orange juice had taken on characteristics that made it more suitable for the creation of a futures market. Standards were established, longer storage of the product became possible, and transportation of that product was simplified. Each of these capabilities meant that the terms of standardization and delivery could be codified in the form of a futures contract. When tank trucks and bulk storage replaced shipment and storage in drums, the industry again expanded its capabilities and marketing power. Orange juice has replaced oranges as the preferred method of consumption in the home. With all the industry advances, production and consumption of FCOJ has become global.



All the advances and expansion in the industry, however, did not remove the price risk associated with the citrus industry. It only expanded the effects of the risk. In 1966 to meet the challenges of this new industry, the Citrus Associates subsidiary of the New York Cotton Exchange was formed and FCOJ futures began trading. The rapid globalization of the industry (e.g., the development of the Brazilian citrus industry) and the price volatility of orange juice quickly made FCOJ futures the primary hedging tool for the FCOJ industry. In 1985, options on FCOJ futures were introduced. In 2004, OJ futures evolved further with the listing of the FCOJ-A (Florida/Brazil only) contract.

Today, over 70% of the oranges harvested in the U.S. are processed for orange juice. With the technological and global trade developments that have directly affected orange production and processing, the industry continues to grow rapidly.

## PRODUCING FCOJ

It takes three to five years for newly planted trees to bear fruit of commercially harvestable quantities and fifteen to twenty years to reach peak production. Orange production, like cocoa and coffee, requires an extended development time and long-term commitments of land and labor. These factors make adjustments on the supply-side difficult to manage, creating producer vulnerabilities to price shocks. Tree plantings, the number of trees bearing fruit, the ages of the trees, the fruit yield per tree, the size of the fruit, fruit droppage, the juice yield per orange and loss of trees due to weather or disease can all be important factors in determining FCOJ production (and price).

## FLORIDA

Most oranges for U.S.-produced FCOJ are grown in Florida. Most concentrate is blended from two types of Florida oranges: early and mid-season oranges harvested from October through March and later maturing Valencia oranges that are harvested from April through June. The performance of these Florida crops is therefore important to the overall supply of FCOJ. When there is not enough U.S. production to meet domestic demand, imports of FCOJ are needed. Those imports come primarily (but not exclusively) from Brazil.

## BRAZIL

While most of the FCOJ produced in the U.S. is consumed domestically, Brazil exports most of its production. In fact, Brazil dominates world trade in FCOJ, accounting for as much as 80% of the world's exportation of FCOJ. Brazil's FCOJ industry began developing in the 1960s and grew quickly to where by the 1980s, FCOJ became Brazil's third largest agricultural export after soybeans and coffee. It supplies 30-50% of the FCOJ consumed in the U.S. and is a major supplier to Canadian and European markets.

## FLORIDA/BRAZIL JUICE

Although other regions of the U.S. and other Central and South American countries compete in the orange market, Florida and Brazil crops remain dominant forces. Florida/Brazil juice now accounts for about 91% of the world production of FCOJ. Although the market relies heavily on Florida/Brazil, the quality of juice blends is often the same regardless of country of origin.

The U.S. marketing season for FCOJ begins December 1 and continues through November 30, while the Brazilian season spans the period from June 1 to May 31. Freeze season in Florida runs from December through March and drought season in Brazil runs from July to November.

Because of the inverse relationship between the growing seasons for the U.S. and Brazil, their combined production makes the FCOJ market a year-round market, accounting for an enormous portion of the world's oranges utilized for processing. In fact, much of the Brazilian and Florida crops are grown primarily for processing. In other countries, oranges are still grown primarily for the fresh produce market and juice processing is a residual use of oranges.

Reflecting the industry practices, the primary FCOJ futures contract (FCOJ-A) traded in the NYBOT market, beginning with the May 2005 contract, specifies that juice deliverable against the contract must be of Florida and/or Brazil origin.

## SUPPLY AND DEMAND

FCOJ is a true "weather" market. Frost and freezes may affect Florida production, while dry weather and droughts may affect Brazilian production. Freezes can damage or destroy existing fruit on the trees or can destroy the bloom and the new growth, thus cutting the next season's potential output. Fruit damage means that juice content of the surviving fruit may decrease, reducing the yield per box of fruit. If a freeze is severe enough, a large portion of the fruit may not be usable. At the other end of the spectrum, dry weather may retard or damage buds that bear next season's harvest. Freezes or drought scares can produce short-lived increases in FCOJ prices while damaging freezes or extended droughts may support sustained advances. Other weather events such as a hurricane striking the Florida citrus groves can have a significant impact on short or long-term supply. The following tables show the significant impact of freezes on Florida orange production.

**(TABLE 1) CRITICAL TEMPERATURES FOR FLORIDA ORANGES**

	<b>WINTER Dec.-Mid Feb.</b>	<b>SPRING Mid Feb.-March</b>
BLOOM	NOT APPLICABLE	29-30'
FRUIT	26'	29' (small green)
LEAVES	24'	27'
TWIGS	22'	24'
BRANCHES	20'	22'

**SEVERITY OF FREEZE (DAMAGE VS. TIME)**

TEMPERATURE	DURATION	CONSEQUENCE
28'	6 hrs. or more	Extensive fruit damage
26'	4 hrs. or more	Extensive fruit damage
24'	2 hrs. or more	Extensive fruit damage
20'	4 hrs. or more	Extensive fruit damage

**FREEZE RECOVERY PERIODS**

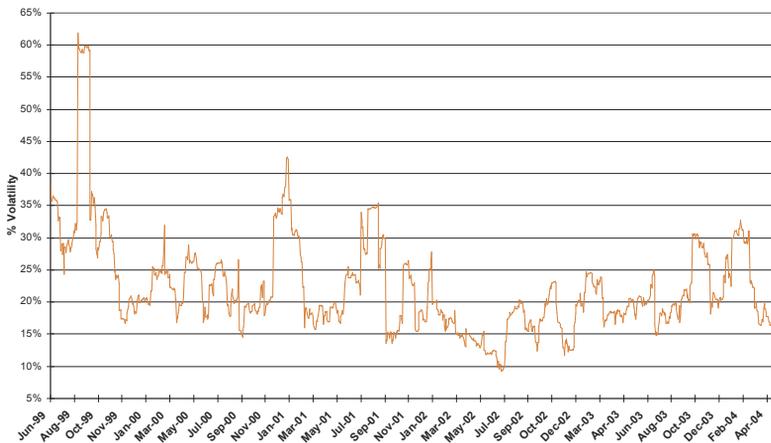
FREEZE TYPE	MINIMUM TEMPERATURE	NO. OF YRS. TO RECOVERY
LIGHT	32' - 29'	0
MODERATE	28' - 25'	0
HARD	24' - 21'	1-3
SEVERE	Less than 20'	3-7

*Along with the weather concerns, a number of other factors including processing capacity, disease (such as canker) and the strength of the U.S. dollar can affect the supply and pricing of FCOJ. If a freeze forces large amounts of fruit to market all at once, for example, processing capacity may not be able to accommodate the surge. Since FCOJ is priced for international trade in U.S. dollars, a strong dollar can drive up juice prices in Europe or other key markets.*

**On the demand side**, changes in consumer preference affect pricing substantially. Since its creation, FCOJ has been a major feature in the American diet. Orange juice has dominated the juice world. In recent years, however, FCOJ has faced increased competition from other types of orange juice products such as chilled and fresh-squeezed OJ. Other types of juices and soft drinks (carbonated and non-carbonated) have also taken market share. In addition, various dietary trends have had an impact on consumption. Consumers are also price sensitive and do alter buying patterns based on the relative prices juice products. But the major factor in FCOJ pricing has been and continues to be the weather.

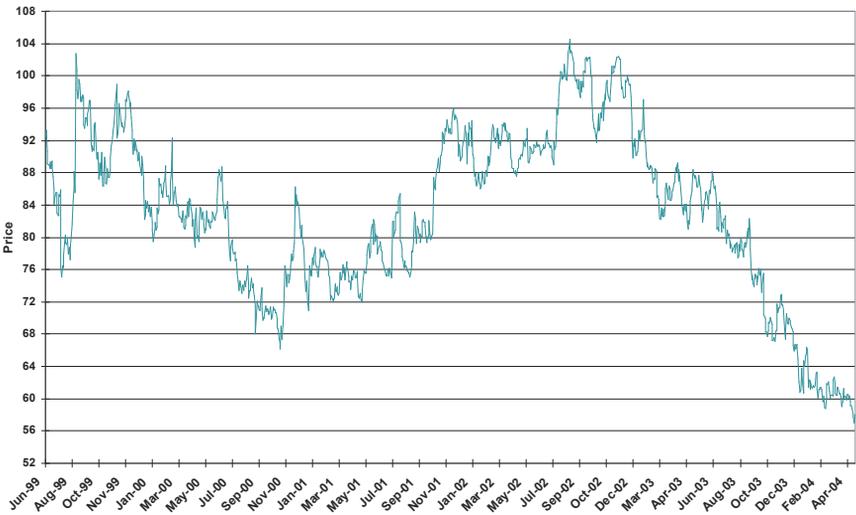
*This sensitivity to weather factors combined with a competitive global juice and beverage market makes the price of FCOJ extremely volatile.*

### **FCOJ FUTURES 30-DAY HISTORICAL VOLATILITY**



Price volatility in FCOJ, like the other commodities represented in the NYBOT markets, makes the futures market necessary and possible. Without the volatility, there would be no risk of sudden price changes and no opportunities for speculators as a result of those changes. A look at the price history of FCOJ reveals how the suddenness and magnitude of price changes when a market event threatens to change the supply and demand equation. FCOJ futures and options provide important management capabilities for an industry that is vulnerable to extreme price risk.

### FCOJ-1 NEARBY PRICE



## TRADING FCOJ FUTURES AND OPTIONS

FCOJ futures have been the primary hedging vehicles for the citrus industry since 1966. The new primary FCOJ futures contract (FCOJ-A), beginning with the May 2005 contract, calls for delivery of 15,000 pounds of orange solids (3% more or less) from Florida and/or Brazil only. This contract allows hedgers to buy or sell a contract to take or make delivery of 15,000 pounds of orange solids (3% more or less) limited to juice of Florida/Brazil origin through exchange-licensed warehouses in Florida, New Jersey, Delaware and California. The delivery method can be drums or tanks **at the seller's option**. Prior to the listing of the FCOJ-A, the FCOJ-1 futures contract (listed only through March 2005) **was not limited to any specific country of origin**. The NYBOT citrus market also provides traders a new version of the old FCOJ contract (FCOJ-B) with no specified country of origin. This FCOJ-B contract, however, will trade for most of its life (all but a day and a half) as a Differential Contract (FCOJ-Diff) versus the FCOJ-A contract. Since the two contracts will have a different last trading day, they will be “unbundled” or converted into the implied FCOJ-A and FCOJ-B futures position, thereby allowing the FCOJ-B to trade outright for the day and a half window.

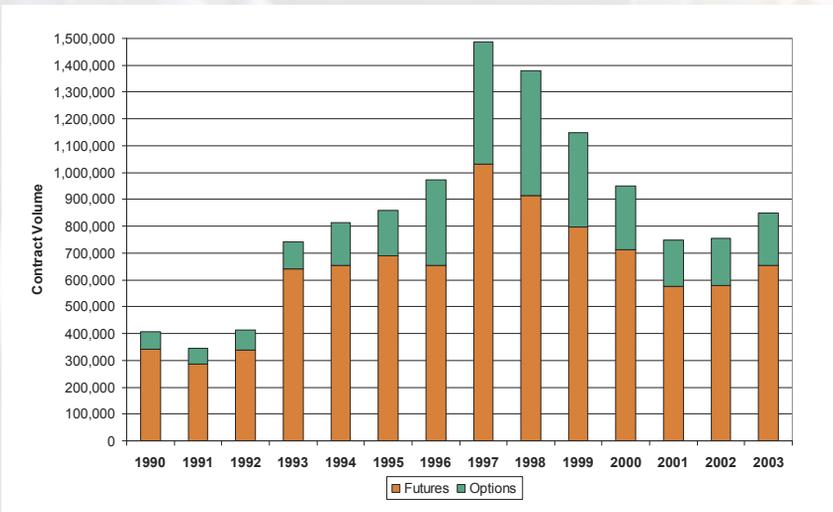
The FCOJ Differential can be bought and sold just like the FCOJ-A and FCOJ-B outright futures contracts. The Differential will trade until two business days before the first notice day of FCOJ-A and FCOJ-B. The Differential contract prices the difference between the FCOJ-B and FCOJ-A contract prices in the same contract month. The Differential price will be expressed as an index of a negative number since FCOJ-A will be expected to trade at a higher price than the FCOJ-B and this premium will vary over time. This index will be determined as FCOJ-B minus FCOJ-A plus 100. As an example, if FCOJ-A was 73 cents/lb. and FCOJ-B was valued at 70 cents/lb. the FCOJ-Diff price would be expressed as 97 (70-73 plus 100).

Since the date, size and standards of the FCOJ-A contracts are all the same, **the only variable is the price (and the date of delivery/contract month)**. That's what futures markets are all about – price. And the price is established moment to moment by buyers and sellers competing in a traditional open outcry auction. The price of FCOJ futures, disseminated by the exchange throughout the world, then becomes the most reliable benchmark for the global cash market product. It is

the basis upon which the cash market price is determined. The actual cash market price may vary (premium or discount) depending on local factors. Hedgers use the FCOJ pricing marketplace to transfer some of their price risk to other hedgers with opposite risk profiles or to speculators who seek profits from short-term price changes on both the buy and the sell side of the market. The FCOJ-A futures contract, like all traditional commodities contracts, has a delivery component to support the legitimacy of the price. While few futures contracts result in physical delivery (a transaction best suited to the cash market), the exchange provides careful guidelines and safeguards for the process, should it occur. The fact that all futures market deliveries carry a seller's option provision creates unknowns and potential logistical inconveniences for buyers who have no control over the location or circumstances of the delivery.

In 1985, the FCOJ market added a new set of risk management tools to control the effects of citrus price fluctuations: **options on FCOJ futures**. Options are available only on the FCOJ-A futures contract. Buyers of options on FCOJ-A futures can establish **price protection** (a price floor or ceiling) against unfavorable price movement and **still benefit from favorable moves**. While futures can lock in a price, options retain flexibility and help to balance downside risk with upside potential.

### ANNUAL FCOJ VOLUME



Options also allow hedgers to develop and implement a wide variety of strategies for reducing risk and /or enhancing return. Unlike futures, which feature unlimited risk and unlimited profit potential, options can limit risk for buyers while providing profit opportunities. In 2004, the volume and open interest in OJ options often surpassed OJ futures, demonstrating the growing importance of options to hedgers and investors.

**Options feature several important advantages:**

- Buyers can never lose more than the premium paid.
- Users and producers can establish a ceiling or floor for prices at various levels thereby using options as a kind of price insurance.
- Option buyers are not subject to margin calls and therefore may not have to establish and maintain a margin account.
- Options provide versatility and flexibility in designing a hedging strategy.

**Option disadvantages include:**

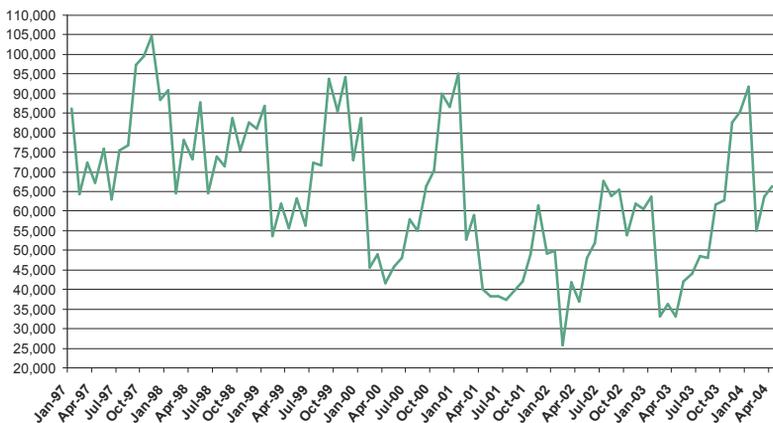
- Option values diminish over time, meaning option buyers can experience a steady erosion of an options time value.
- Option premiums must be paid in full at time of purchase
- Options premiums rise during periods of greater volatility.
- Sellers (writers) of options must meet margin requirements at all times.
- Sellers of options face potentially unlimited risk with only limited profit potential (the premium).

Together, the NYBOT FCOJ futures and options markets fulfill a variety of strategic needs for hedgers and investors. The effective use of either instrument for risk management or speculative investment is determined primarily by several factors including overall business goals, seasonal concerns, risk tolerance, credit availability and cash flow.

## TRADING EXAMPLES

A futures hedge allows an industry participant to lock in a price. This kind of precision can be an advantage when it comes to longer term business planning. No matter how adverse the cash market move, the hedger has protected a specific price. The hedger, therefore, chooses greater certainty in pricing and surrenders some flexibility.

### MONTHLY FCOJ OPEN INTEREST



Note: Open Interest is Futures and Options Combined

### EXAMPLE 1

**SCENARIO:** In March, a processor has inventory (representing approximately 15,000 lbs.) that is exposed to price risk. The inventory will be delivered in six months. The current cash/futures basis is 3 cents on (cash FCOJ trading at a 3 cent premium over FCOJ futures).

**STRATEGY:** In March, Processor Sells 1 September FCOJ-A Futures Contract at 88.00. Assuming an unchanged basis, the Processor then locks in a net price of 91.00 cents lb. ( $88.00 + 3.00$ ).

**March – sell 1 Sep Future at 88.00 cents/lb.**

**RESULT:** By September, the futures price has fallen to 75.00 cents/lb. The processor closes out the futures position. September – buy 1 Sep Future at 75.00 cents/lb.

The processor's futures hedge strategy has generated a futures gain of 13.00 cents/lb. or \$1,950:

$$\begin{aligned} & \mathbf{1 \text{ contract} \times [(\text{selling price less buy price}/13.00 \text{ cents/lb.}), \text{ or}]} \\ & \mathbf{1 \times [(\$0.88 - \$0.75 \times 15,000) = \$1,950} \end{aligned}$$

The processor uses the futures gain to offset the lower selling price in the cash market. With a contract basis of 3 cents/lb., the cash price would be 78.00 cents/lb. By adding the futures gain of 13.00 cents/lb., the processor has achieved the price goal of 91.00 cents/lb.

$$\begin{aligned} & \mathbf{78.00 \text{ cents/lb.} (75.00 + 3.00) + 13.00 \text{ cents/lb.}} \\ & \mathbf{(88.00 - 75.00) = 91.00 \text{ cents/lb.}} \end{aligned}$$

While the basis is unlikely to remain constant throughout the hedging period, the futures gain will reduce the losses from the cash market decline. Obviously if the basis diminishes (for example by 2 cents/lb.) the final net price will also be reduced by 2 cents/lb. Conversely if the basis increases, the net price will also increase. Hedging with futures reduces only overall price risk; it does not affect basis risk. Since basis risk is usually considerably smaller than general price risk, the futures hedge will help support the achievement of price goals and sound business planning.

**ALTERNATIVE RESULT (PRICE RISE):** Should the futures market rise in September to 100.00 cents/lb., the price goal will still be achieved. The futures loss of 12.00 cents/lb. would be offset by the cash market gain of 12.00 cents/lb. to produce a net price of 91.00 cents/lb.

$$\begin{aligned} & \mathbf{103.00 \text{ cents per lb.} (88.00 + 3.00 + 12.00)} \\ & \mathbf{\text{minus } 12.00 \text{ cents/lb.} (100.00 - 88.00)} \\ & \mathbf{= 91.00 \text{ CENTS/LB.}} \end{aligned}$$

## EXAMPLE 2

Options provide a higher level of flexibility that can serve a variety of hedging strategies. A primary consideration in the use of options is the level of protection desired versus the premium. For example, with January Futures at 95.45 cents/lb. the following premiums might be in effect:

90 Call @ 6.70	90 Put @ 1.35
95 Call @ 3.80	95 Put @ 3.25
100 Call @ 2.15	100 Put @ 6.50

**Scenario:** Using the same basic hedging scenario, the processor considers options to establish a price floor to protect inventory value. Assume that the basis is zero and remains unchanged. On March 1, with July futures at 88.00, the Sep 85.00 Put is priced at 3.55.

**Strategy:** The processor buys one Sep 85 Put for 3.55 cents/lb. thereby establishing a price floor of 81.45 cents/lb.

$$85.00 \text{ cents/lb} - 3.55 \text{ cents/lb.} = 81.45 \text{ cents/lb.}$$

**Result (falling market):** By option expiry, Sep futures have fallen to 65.00. The Sep 85 Put has a value of 20.00 cents/lb., producing a net sale price for the FCOJ inventory of 81.25 cents/lb.

$$65.00 \text{ cents/lb.} - 3.55 + 20.00 = 81.45 \text{ cents/lb.}$$

**Result (rising market):** By option expiry, Sep Future has risen to 105.00 making the Sep 85 Put worthless and producing a net sale price of 101.45 cents/lb.

$$105.00 \text{ cents/lb.} - 3.55 = 101.45 \text{ cents/lb.}$$

**Summary:** The price floor established by the Sep 85.00 Put in a falling market provided price protection against a 23.00-cents/lb. price decline at a premium of 3.55 cents/lb. In a rising price market, the option hedge allowed the processor to capture 13.45 cents/lb. from a 17.00 cents/lb. price increase.

The flexibility offered by options extends into the choices of resolving the market position, which translates into three possibilities for buyers:

- In the case of a favorable price move, the buyer can exercise the option before its expiration into a futures contract.
- To reduce transaction costs, the buyer can sell the option back to the market based on its intrinsic and time value.
- In the case of an unfavorable price move, the buyer can allow the option to expire worthless.

*The NYBOT FCOJ contract markets offer important capabilities and advantages.*

**Enhanced Open Outcry:** the proven, traditional pricing strengths of open outcry trading are supported by all the convenience and technical sophistication of NYBOT's new state-of-the-art trading facility at the World Financial Center in Lower Manhattan.

**Market Integrity:** Every transaction in the NYBOT markets is subject to the traditional regulatory scrutiny that characterizes the U.S. futures and options exchanges, ensuring a fair and transparent marketplace. The historical integrity of the NYBOT markets strengthens the quality and reliability of the price discovery process.

**Clearinghouse Security:** Each of the contracts traded at NYBOT is guaranteed by the New York Clearing Corporation (NYCC), the designated clearinghouse for all NYBOT market, which represents over a century of continuous financial integrity. Every market participant trades in the secure knowledge that they face no counterparty credit risk and no transaction uncertainty.

**Personalized Broker Service:** experienced floor brokers offer personal service and competitive pricing for specialized options trading. Brokers in NYBOT's FCOJ options markets can design and execute simple and complex options strategies and write options to implement those strategies at very competitive prices.

**Order Processing:** Electronic Order Routing (EOR) – market users who have internet access to EOR can send orders electronically to the trading floor, where they are filled in open outcry, and then matched, cleared and confirmed electronically in real time. All EOR users can enter, change or cancel all types of orders (including complex combination strategies). Users have real time trade reconciliation in the pit and/or in the booth.

**Market Information Access:** The New York Board of Trade now offers real time streaming data directly from the NYBOT trading floor and delivered over the Internet through NYBOTLive.com. Market users should visit [www.nybotlive.com](http://www.nybotlive.com) and sample the many features of NYBOT's direct data service. Market users also have access to a wide range of educational materials, market analysis and commentary through the NYBOT web site at [www.nybot.com](http://www.nybot.com).

*This brochure serves as an overview of the FCOJ futures and options exchange markets of the New York Board of Trade (NYBOT). Examples and descriptions are designed to foster a better understanding of the FCOJ futures and options market. The examples and descriptions are not intended to serve as investment advice and cannot be the basis for any claim. While every effort has been made to ensure accuracy of the content, the New York Board of Trade does not guarantee its accuracy, or completeness or that any particular trading result can be achieved. The New York Board of Trade cannot be held liable for errors or omissions in the content of this brochure. Futures and options trading involves risk and is not suitable for everyone. Trading on the NYBOT is governed by specific rules and regulations set forth by the Exchange. These rules are subject to change. Contact a licensed broker for additional information. For more detailed information and specifications on any of the products traded on the Exchange, contact NYBOT or your broker.*

*The New York Board of Trade (NYBOT), New York's original futures exchange, provides a global marketplace for a wide variety of traditional and innovative agricultural and financial products including futures and options for cocoa, coffee, cotton, ethanol, orange juice, sugar and currencies as well as equity, currency and commodity indexes.*

*Beginning in 1870 with the founding of the New York Cotton Exchange and the Coffee Exchange of New York City in 1882, the NYBOT exchanges have built and sustained crucial futures and options markets through dangerous and difficult times. The New York Board of Trade and its predecessor exchanges [Coffee, Sugar & Cocoa Exchange, Inc. (CSCE) and the New York Cotton Exchange (NYCE)] have a long history of providing effective risk management tools for major international industries and opportunities for well-informed investors. Risk management is the foundation of our business.*

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