QUANTUM HEDGING

Unleashing the Power of A.I. in Grain Commodity Trading

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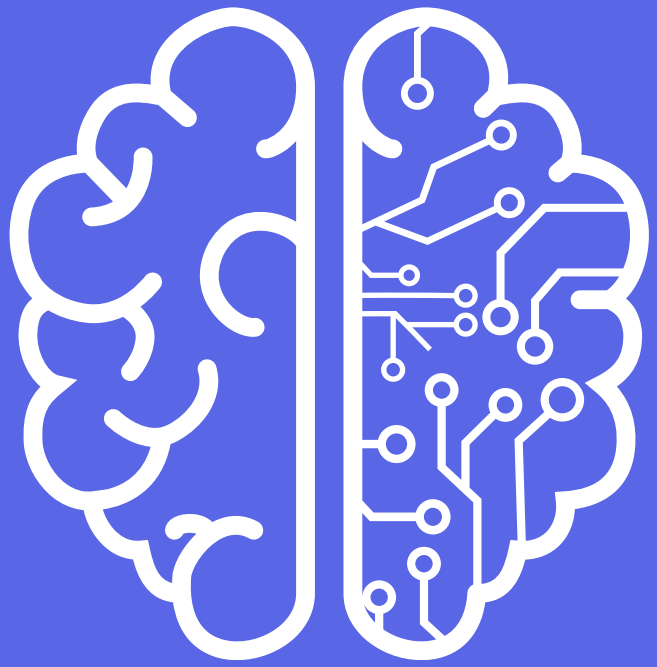

Artificial Intelligence (AI) has emerged as a transformative force in a wide array of industries. The promise of improved decisions, labor savings and better predictions are just some of the tantalizing reasons that business leaders and consumers are diving headfirst into AI-driven applications. In commodity markets, their dynamic and complex nature presents challenges for traditional forecasting methods, and as such AI, with its ability to analyze vast amounts of data, identify patterns, and adapt to rapidly changing market conditions, offers a valuable solution.

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Agricultural Commodity Markets Are Complex

The complexity of agricultural commodity markets arises from the intricate interplay of natural, economic, political, and social factors that influence the production, distribution, and consumption of agricultural products.

Seasonal

Agricultural commodities are often subject to seasonal variations due to planting and harvesting cycles. Likewise, commodity buyers and end-users may have their own seasonal tendencies, creating a potential for mismatched supply/demand signals, which can lead to outsized price responses.

Environmental

Agricultural production is highly dependent on natural factors like weather, soil quality, and pest infestations. Unpredictable events such as extreme weather events or disease outbreaks can significantly impact crop yields.

Global

Agricultural markets are intertwined in a global web of international trade. Changes in supply or demand in one part of the world can affect prices in other parts of the world. International trade, geopolitical events, and exchange rates can influence market dynamics and their degree of interconnectedness.

Governmental

Government interventions, subsidies, tariffs, and regulations can have a significant impact on agricultural markets. Policies related to trade agreements, agricultural subsidies, and biofuel mandates can create uncertainties and affect market dynamics.

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Can the Human Mind Capture the Full Complexity of Grain Commodity Markets?

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The Problem

Today's human advisor focuses primarily on a few key factors they think will influence price.

- Commodity markets are complex and dynamic, so **oversimplification as a price prediction strategy** is likely to have negative results.
- A factor that may exert a positive influence on prices under certain conditions **may not exert as much influence** under different circumstances.
- **Markets do not exist in a vacuum**, but instead are a complex system of signals, interactions, and feedback loops.
- **Predictions alone do not guarantee success** and are often directional (bullish/bearish), and on occasion include price targets. But what is the probability that those predictions will come true? Is it a coin flip (50/50), or more certain (90/10)?

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“All models are wrong but some are useful.”

George E.P. Box, Statistician

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Are Technical Indicators A Good Signal for Price Direction?

Traders often favor technical indicators because they are relatively easy to use and the decision rules for trading can be clearly articulated. However, the criteria for using any indicator should be based on its validity at predicting future price movements. It is here that the trading industry is woefully inadequate when it comes to testing and validating the efficacy of technical indicators.

In what follows, we illustrate the performance of two common technical indicators: **Relative Strength Index (RSI) and Moving Averages**. We test how well these two different indicators perform at predicting future price direction for corn and soybean prices. The performance is tested on nearby futures prices for 8 years of daily trading, 2016 to 2023.

In the following charts, we illustrate the results in several ways, showing the particular trading signals given for the most recent year of trading in 2023.

Green and red arrows signify the point in time when a buy and sell signal is generated from the respective indicators. In addition, we also show key performance metrics of total profits and percent winning trades for each year.

In 8 years of corn and soybean trading, our testing of the success of RSI and moving average technical indicators found the **trades generated by these signals were only profitable around 20% to 30% of the time.**

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Evaluating Moving Average Price

50 and 200 Day Moving Average in Soybeans

Data Source: CME Group

This is a candlestick chart for nearby soybean futures in 2023. In addition, there are two smooth lines – MA50 and MA200 – which depict the 50- and 200-day moving average price. Moving averages help smooth out volatile prices and better identify the dominant price trend. For trading, a signal to go long or buy is when the current price is above both the 50- and 200-day moving average. These entry points are denoted by green up arrows on the chart. Conversely, a signal to go short or sell occurs if the current price falls below the 50- and 200-day moving average, and the red arrow signifies those trades.

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Evaluating Relative Strength Index

Data Source: CME Group

The top left is a candlestick chart for nearby corn futures in 2023.

The RSI, bottom left, is a momentum indicator scaled from 0 to 100 which tries to quantify oversold/overbought conditions. When the RSI moves to its upper ranges, then the market is considered overbought and may be due for a corrective move lower. For trading, we used a 25/75 RSI range to make trading decisions. When the RSI falls below 75, then a short position is taken (red arrows), and a long trade when the RSI breaks out above 25. Here we see only 3 trades initiated within a 1-year period, which would limit its usefulness as a crop marketing sales technique. Farmers generally sell their crop 5 to 10 times a year. Therefore, these indicators are not guaranteed to give enough signals to match a farmer's selling needs.

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Performance of RSI and Moving Averages in Corn and Soybeans

	Corn						Soybean					
	RSI			Moving Average			RSI			Moving Average		
Year	Annual Profit/Loss (Cents/Bu)	Winning Trade (%)	# of Trades	Annual Profit/Loss (Cents/Bu)	Winning Trade (%)	# of Trades	Annual Profit/Loss (Cents/Bu)	Winning Trade (%)	# of Trades	Annual Profit/Loss (Cents/Bu)	Winning Trade (%)	# of Trades
2016	-6	40.0	5	-3	0	1	-38	33.3	6	-9	0	2
2017	3	100.0	1	4	33.3	3	70	75.0	4	-46	0	5
2018	-11	20.0	5	-17	0	4	35	33.3	3	-56	16.7	6
2019	-5	28.6	7	-21	0	5	51	75.0	4	-19	33.3	3
2020	-40	11.1	9	53	100	3	-113	16.7	6	202	20	5
2021	-171	0.0	6	66	66.7	3	-16	33.3	6	31	50	4
2022	-69	20.0	5	20	33.3	3	-226	0.0	3	62	60	5
2023	301	66.7	3	-34	33.3	6	-70	40.0	5	-312	0	6
8 Year Totals	**2**	**24.4**	**41**	**68**	**32.1**	**28**	**-307**	**37.9**	**37**	**-147**	**22.2**	**36**

Data Source: CME Group

Evaluating the performance of the RSI and Moving Averages in corn and soybeans over an 8 year period reveals the sporadic nature of trading returns. The moving average indicator tends to perform better in a trending market. The RSI tends to perform better in a choppy market. In other words, a specific technical indicator is best if, and only if, the market conditions are favorable for that specific tool.

Knowing a market is trending or chopping, and whether it will persist in the days, weeks, months ahead, is the crucible of the trader's challenge. Technical indicators, as designed, are backward-looking and are poor predictors of futures market conditions, and hence, price. As an added complexity for farmers, using these tools to time cash sales will be fraught with complications, as there is no guarantee there will be enough (or too few) sales over a year.

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“I should've stuck to my trading plan.”

“I got caught up in the FOMO.”

“Hindsight is 20/20.”

“I let my emotions get the best of me.”

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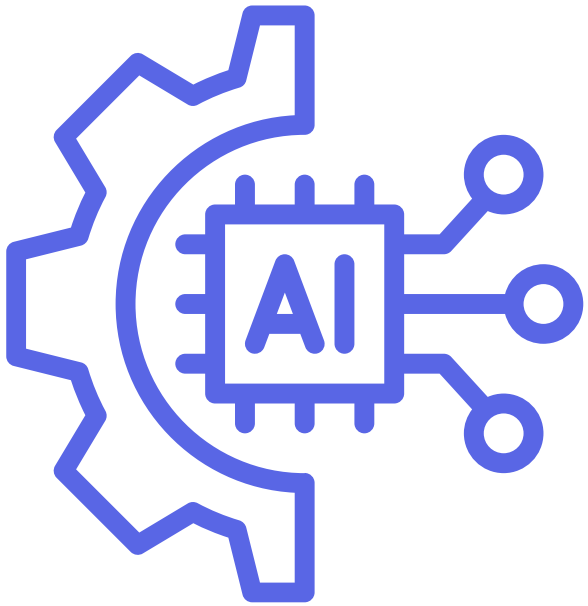
The Quantum Hedging Solution

Expert-guided AI models ingest massive datasets to uncover the most important factors for predicting price behavior.



- Our Market Intelligence Lab's data scientists **guide AI models** to evaluate the historical importance of various market factors
- Machine learning **processes vast amounts of data** to identify market factors most important in predicting price
- These models not only predict price, but also show **the probability trades will beat the benchmark**, using the data
- Commodity trading advice is rooted in rigorous quantitative analysis, based on a **rich, holistic picture of the market**

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Bringing More Accountability to the Agricultural Commodity Markets

Complex Analysis

Agricultural Commodity markets are complex, driven by multiple factors; however, analysts tend to focus on only a few of them. Quantum Hedging's AI machine learning-based approach has the ability to capture the full complexity of the market, therefore providing more precise predictions.

Validation

Has your advisor ever told you to sell your corn or soybeans based on archaic technical indicators like chart patterns or moving averages? These sales are generally made on the untested possibility of change, rather than a proven probability of price behavior. Quantum Hedging's AI-driven forecasts and trading strategies are tested against historical data and generate proven probabilities of success, leveraging quantitative data and analysis to make disciplined decisions.

Transparency

Most advisors do not report their performance. Clients deserve better, and Quantum Hedging intends to lead the way on reporting performance.

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Trade Agricultural Commodities with a Probabilistic Edge, Powered by AI.

More than a typical advisory service, we're a grain market advisory and brokerage firm with an in-house market intelligence lab. Together, we use AI to capture the full complexity of grain markets and conduct quantitative testing and data-driven analysis to help our clients beat the benchmark with confidence.

Market Intelligence Lab

Our in-house market intelligence lab researches the markets and conducts quantitative testing and analysis to build our Quantum AI models.

Dedicated to Ag Commodity Markets

We are focused on agriculture, each bringing 20+ years of experience in agricultural commodities trading.

Expert-Guided AI Models

Our price models put machine learning to work to capture the full complexity of the agricultural commodities market, guided by experts to predict corn and soybean prices.

Probabilities, Not Possibilities

AI-driven price models and trading strategies are tested against historical data to generate precise probabilities of beating the benchmark.

Transparent Performance

We evaluate our performance against key corn and soybean trading benchmarks and share annual performance reports with our clients.

AI Trading Products For Farmers

AI Cash Grain

Subscribe to AI-powered corn and soybean cash grain strategies that give farmers a greater probability of outperforming key benchmarks.

Learn More

AI Cash Grain+

All the benefits of an AI Cash Grain subscription, plus options overlay strategies that increase the probability of outperforming cash sales alone.

Learn More

AI Managed Acre

Holistic acre management, powered by AI, to maximize profit potential on the farm.

Learn More

Brokerage

Dedicated agricultural commodity brokerage for self-directed or advisor-guided trades.

Learn More

AI Trading Products For Investors

AI Investor CTA

Managed trading funds, powered by AI, for investors looking to expand their investment portfolio into agricultural commodities.

Learn More

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Trade Agricultural Commodities with a Probabilistic Edge, Powered by AI.

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About Quantum Hedging

Quantum Hedging was started by three Ag commodity market veterans, each with over 20+ years of experience in agricultural commodities trading, combining expertise in market analysis, advanced statistical modeling, trading strategy and brokerage.

Kevin McNew, PhD

Founder, Director of the Market Intelligence Lab

As lead of our market intelligence lab, Kevin drives the quantitative analysis, guiding AI to determine the market factors most influential on agricultural commodity prices. He leverages machine learning to generate precise probabilities of our price forecasting models and trading strategies.

Cy Monley, Series 3 Licensed

Founder, Director of Trading

As the director of trading, Cy oversees the AI Managed Acre program and brokerage service, assisting farmers with their trades and overall portfolio management.

Satish Nandapurkar, Series 3 Licensed

Founder, Director of Data-Driven Strategy

As the resident strategist and options specialist, Satish leverages our AI-driven price models to evaluate the tradeoffs of commodity trading strategies to design disciplined recommendations for our clients.

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Learn more at

quantum-hedging.com

Quantum Hedging Brokerage services are offered by Boundary Waters Capital, dba Quantum Hedging BR - NFA ID: 0560271. Disclaimer: Commodity trading, including futures, hedging and speculating, involves substantial risk of loss and may not be suitable for all investors. Past performance is not necessarily indicative of future results. Any historical returns, expected returns, or probability projections are forward-looking statements and may not reflect actual future performance.