

Should Technical Analysis Be Part of Your Crop Marketing Program?

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Perception that Markets Have Changed Dramatically

...the funds – managed commodity investment groups with significant financial and technological resources – may exert undue collective influence on market direction without regard to real world supply-demand or other economic factors.

---Illinois farmer, September 1999

The introduction of the index funds, along with expanding trading limits for large specs, has resulted in unprecedented price volatility. I suspect the volatility we have seen in grains -- sometimes \$100-per-acre price swings -- and livestock where weekly price swings can be more than the 10-year average profitability, will be the norm. Consistency and flexibility have never been more important than in today's marketplace.

---market analyst, November 2005





Source:National Agricultural Statistical Service, US Department of Agriculture (http://www.agstats.state.il.us/website/reports.htm)





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Is Technical Analysis the Solution?



...most people in the grain industry other than fundamental analysts have concluded that the market prices have little to do with supply and demand, but more on the technical movements of the markets themselves. I have become a much better marketer since I have sworn off fundamental analysis. I think farmers would be better served with a more in-depth discussion of technical analysis and the effect of funds in the market.

---Illinois farmer, summer 2005



Technical Analysis is Very Controversial Among Traders

I haven't met a rich technician. Excluding, of course, technicians who sell their services and make a lot of money.

---Jim Rogers in *Market Wizards*

I always laugh at people who say, 'I've never met a rich technician.' I love that! It is such an arrogant, nonsensical response. I used fundamentals for nine years and got rich as a technician.

---Marty Schwartz in Market Wizards







Academics Tend to be Highly Skeptical of Technical Analysis

Chartist-technicians are in about as low repute as ESP investigators because they usually have holes in their shoes and no record of reproducible worth.

--Samuelson, 1965

Despite decades of dredging the data, and the popularity of media reports that purport to explain where markets are going, trading rules that reliably survive transactions costs and do not implicitly expose the investor to risk have not yet been reliably demonstrated.

---Cochrane, 2001





Outline of Workshop

- Introduction to technical analysis
 - Charting
 - RSI
 - Moving averages
- Market efficiency and random walks
- Evidence on the profitability of technical analysis
- Implications for farm marketing





Fundamental Analysis

- Definition: An assessment of price based on underlying **supply** and **demand** factors and changes in those relationships
- Goal: Estimate fundamental value and compare to market price
 - Value > Price: Bullish
 - Value < Price: Bearish</p>



- Focus on fundamentals of supply and demand, such as crop size, export demand, consumer income
 - Forecast techniques range from subjective judgment to sophisticated statistical models



Technical Analysis

- A forecasting method for price movements using past prices, volume, and open interest
- Most technical indicators focus on patterns in historical prices
- Goal: Determine trend in past prices and project this into the future





Types of Technical Analysis

- Chart analysis
- Pattern recognition
- Overbought/Oversold indicators
- Seasonal tendencies
- Cycle analysis
- Computerized trading systems















FIGURE 4.4 Illustration of Trends and Related Chart Signals in a Selective Hedging Program





FIGURE 4.17 Illustration of a Headand-Shoulders Top on a Bar Chart





FIGURE 4.21 Key-Reversal Top on October 1997 Live Cattle Futures











FIGURE 4.33

Congestion Areas as Possible Consolidation Patterns on a Bar Chart















FIGURE 6.2 Relative Strength Index on the March 1998 Feeder Cattle Futures Chart

Agricultural Futures and Options: Principles and Strategies. Wayne D. Purcell and Stephen R. Koontz (eds.) 2nd edition, Prentice Hall: NJ, 1991.

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TABLE 4.1	To calcula
Procedure for	1. Record
Calculating a 14-Day	2. Sum the
Relative Strength Index	average

te:

- the last 14 day-to-day price changes based on closing prices.
- e negative and positive changes and divide each sum by 14 to create a "down and "up average," respectively.
- 3. Define Relative Strength Index as (U)/(U+D) where U = up average and D = downaverage.
- 4. Employ $RSI = (U)/(U+D) \times 100$ to convert to percentages versus decimals.



An Example of Computing RSI Index

					Positive	Negative	
		Closing		Price	Price	Price	
		Price	Day	Change	Change	Change	
SX04	4/2/2004	784.5					
SX04	4/5/2004	782.5	1	-2		2	
SX04	4/6/2004	779	2	-3.5		3.5	
SX04	4/7/2004	786	3	7	7		
SX04	4/8/2004	778.5	4	-7.5		7.5	
SX04	4/12/2004	752	5	-26.5		26.5	
SX04	4/13/2004	738	6	-14		14	
SX04	4/14/2004	765.5	7	27.5	27.5		
SX04	4/15/2004	717	8	-48.5		48.5	
SX04	4/16/2004	732.5	9	15.5	15.5		
SX04	4/19/2004	735.25	10	2.75	2.75		
SX04	4/20/2004	734.75	11	-0.5		0.5	
SX04	4/21/2004	721	12	-13.75		13.75	
SX04	4/22/2004	734.5	13	13.5	13.5		
SX04	4/23/2004	739.75	14	5.25	5.25		
					5.1	8.3	13.4
					0.38		
				RSI	38		



Trading Systems

- A technical trading system consists of a set of trading rules that generate trading signals (long, short, or out of the market) according to parameter values
- Popular technical trading systems include
 - Moving averages
 - Channels
 - Stochastics
 - Momentum oscillators



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TABLE 5.1 Demonstration of 3- and 10-Day Moving Averages for Lean Heat	Closing Price	3-Day Moving Total	3-Day Moving Average	10-Day Moving Total	10-Day Moving Average Signal	
	\$54.10					
Enturos: Calculations	54.75					
and Pure Soll Signals	54.90	163.75	54.58			
ana buy-seli signais	55.30	164.95	54.98			
	55.65	165.85	55.28			
	56.00	166.95	55.65			
	56.10	167.75	55.92			
	55.80	167.90	55.97			
	56.05	167.95	55.98			
	55.60	167.45	55.81	554.25	55.43	
	55.10	166.75	55.58	555.25	55.53	
	54.70	165.40	55.13	555.20	55.52	Sell
	54.10	163.90	54.63	554.40	55.44	
	54.20	163.00	54.33	553.30	55.33	
	53.60	161.90	53.97	551.25	55.13	
	53.10	160.90	53.63	548.35	54.84	
	52.90	159.60	53.20	545.15	54.52	
	53.20	159.20	53.07	542.55	54.26	
	53.90	160.00	53.33	540.40	54.04	
	54.40	161.50	53.83	539.20	53.92	
	55.00	163.30	54.43	539.10	53.91	Buy
	55.10	164.50	54.83	539.50	53.95	1
	54.90	165.00	55.00	540.30	54.03	
	55.50	165.50	55.17	541.60	54.16	
	55.90	166.30	55.43	543.90	54.39	





FIGURE 5.8 Bar Chart and Performance of 9- and 18-day Moving Averages for December 1996 Corn Futures





Agricultural Futures and Options: Principles and Strategies. Wayne D. Purcell and Stephen R. Koontz (eds.) 2nd edition, Prentice Hall: NJ, 1991. FIGURE 5.7 Use of the 50-Day Moving Average on the December 1996 Corn Futures Chart



Key Question: Does it work?





Demonstration of an Efficient Market

T-57 Figure 10.1 Competition at the Turnstiles



Essentials of Finance: An Integrated Approach George W. Gallinger, Jerry B. Poe © 1995 by Prentice-Hall, Inc. A Simon & Schuster Company Englewood Cliffs, New Jersey 07632



First Source of Price Movement in Efficient Markets: Temporary Price Changes

- Small, short-term price movements due to temporary supply-demand imbalances between buy and sell orders
- Sometimes called the "bid-ask bounce"
- **Random** effect through time
- Occurs over very short time intervals, typically by the second, minute or, at most, the hour





Second Source of Price Movement in Efficient Markets: New Information

- New information on supply and demand factors, such as crop size, exports, etc.
- New information
 - Changes equilibrium price
 - Unpredictable in content and importance
- If data is predictable, then it cannot be new information!



Crop Production

Released November 10, 2005, by the National Agricultural Statistics Service (NASS), Agricultural Statistics Board, U.S. Department of Agriculture. For information on Crop Production call (202) 720-2127, office hours 7:30 a.m. to 4:00 p.m. ET.

> Corn Production Up 2 Percent from October Soybean Production Up 3 Percent from October Cotton Production Up 2 Percent from October



United States Department of Agriculture

Office of the Chief Economist Agricultural Marketing Service Economic Research Service Farm Service Agency Foreign Agricultural Service

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Main Implications of Market Efficiency

- Competition forces prices to react instantaneously and correctly at all times to new information
- If prices do not change instantly in response to new information, then riskless profit opportunities exist
 - Such opportunities quickly disappear in a competitive market with many well-financed and intelligent participants
 - Sometimes termed the selfdestructive nature of profitable opportunities in efficient markets



Main Implications of Market Efficiency

- Market efficiency does <u>not</u> imply that prices wander aimlessly and are disconnected from supply and demand information
- Just the opposite is true: prices perfectly track new information on supply and demand
- Equilibrium price is a **moving target** because market information changes



- Prices respond **positively** to **bullish** new information
- Prices respond **negatively** to **bearish** new information



Bottom Line

- Arrival of new information must be random, if not, information is not new
- Since new information about supply and demand changes randomly, so must prices
- Key implication: price changes randomly in an efficient market





Coin Flipping Experiment

- Start graph at \$5.00/bu.
- Flip coin one time
 - heads: daily high up 10 cents from previous close
 - tails: daily low down 10 cents from previous close
- Setting the close
 - heads: market closes at high of daily range
 - tails: market closes at low of daily range
- Generate 30 "days" (two flips/day)





Random Walks and Price Movements

- Price changes in an efficient market from day-to-day are independent and behave as if generated by <u>flips of a</u> <u>fair coin</u>
- Called a **random walk** by statisticians
 - Analogy to the path of a drunk walking home from a bar (We are not making that up!)





Implications for Technical Analysis

- After the fact, so-called trends and chart patterns may appear but have **no predictive** power whatsoever
- Any patterns or trends in past prices are an illusion and are useless for predicting the future
 - Like trying to predict the sequence of lottery numbers from past lottery numbers
 - Like trying to predict the sequence of numbers from a roulette wheel from recent winning numbers



 Impossible to consistently use technical analysis in an efficient market to make profitable forecasts of price level or direction



Counter Points by Technical Analysts

- Real-world markets are not perfectly rational
- Technical analysis works in real markets because it takes advantage of natural **psychological biases** in people
 - Waves of irrational optimism and pessimism
 - Greed, hope and fear cycles
- Technical analysis may also work because so many people use it
 - If everyone is doing it, then prices must follow technical indicators!





Recent Work by Economists

- Developed new models showing that price can plausibly adjust slowly to new information due to:
 - Market frictions and transaction costs
 - Market power
 - Trader sentiments
 - Herding behavior of traders
- Slow adjustment to information in the models allows technical analysis to be profitable





Research on the Profitability of Technical Analysis

- Park, Cheol Ho and Scott H. Irwin. "The Profitability of Technical Analysis: A Review." AgMAS Project Research Report 2004-04, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, October 2004.
- Park, Cheol-Ho and Scott H. Irwin. "The Profitability of Technical Trading Rules in US Futures Markets: A Data Mining Free Test," AgMAS Project Research Report 2005-04, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, May 2005.
- Both studies available at the AgMAS website: <u>http://www.farmdoc.uiuc.edu/agmas</u>





2005 Park and Irwin Study

- Replicates a well-known 1988 study on a new set of data to avoid data mining problems
- 12 futures markets
 - Commodities: corn, soybeans, cattle, pork bellies, sugar, cocoa and lumber
 - Metals: copper and silver
 - Financials: British pound, Deutsche mark and US treasury bills
- Trading model
 - Simulates daily entry and exit of futures trades based on 12 different technical systems
 - Computes profits after transactions costs





Technical Trading Systems Tested

System Type	System Name		
Moving Average	Simple Moving Average with Percentage Price Band (MAB)		
	Dual Moving Average Crossover (DMC)		
Channel	Outside Price Channel (CHL)		
	L-S-O Price Channel (LSO)		
	M-II Price Channel (MII)		
Momentum Oscillator	Directional Indicator (DRI)		
	Range Quotient (RNQ)		
	Reference Deviation (REF)		
	Directional Movement (DRM)		
Filter	Alexander's Filter Rule (ALX)		
	Parabolic Time/Price (PAR)		
Combination	Directional Parabolic (DRP)		



The Performance of 12 Technical Trading Systems, 1985-2003

	Number of Profitable Systems	Average Net Profit for 12 Systems
Corn	0/12	-7.9 %/yr.
Soybeans	0/12	-7.2 %/yr.
Pork Bellies	1/12	-8.4 %/yr.
Live Cattle	2/12	-3.3 %/yr.
All 12 Markets	34/144	-5.8 %/yr.



Annual Mean Net Returns for Corn Using 12 Trading Systems, 1978-2003





Annual Mean Net Returns of the Dual Moving Average System across 12 Futures Markets, 1978-2003





Annual Mean Net Returns for 12 Futures Markets and 12 Trading Systems, 1978-2003





Explanations for the Disappearance of Technical Trading Profits

- Data snooping bias in past studies
- Structural change in price behavior on futures markets
- Self-destructive nature of technical trading strategies





Annual Net Returns of Commodity Trading Advisors (CTAS), 1981-2004



Source: Center for International Securities and Derivatives Markets (CISDM), The University of Massachusetts, Amherst



Annual Net Returns of Commodity Trading Advisors (CTAS) and Total Assets, 1981-2004



Sources: Center for International Securities and Derivatives Markets (CISDM), The University of Massachusetts, Amherst; The Barclay Group



Implications for Farm Marketing

 Evidence clearly points to diminished effectiveness of technical trading systems



- Hedging programs based explicitly on signals from technical trading systems are unlikely to be successful
- As an example, one prominent advisory service started a "Systematic Hedging" program where signals are generated by 9- and 18-day moving averages

• Cautions:

- This evidence does not directly apply to other technical indicators, such as chart patterns, gaps, retracements, and reversals
- Most market advisory service programs and farmers do not tie pricing decisions directly to the signals from technical trading systems





Typical Argument about the Role of Technical Analysis in Farm Marketing



Technical analysis is the key to correct timing of buy and sell decisions in commodity futures markets. The technical dimensions of the market do not dominate the fundamental supply-demand dimensions, and no sustained technical pattern will develop that is contrary to the emerging and underlying supply-demand balance. But the discovered price can and will move and trace out technical patterns, as the market seeks to discover the price that balances the forces of supply and demand. Within the limits to those price moves, technical analysis can be an important guide the timing of pricing actions.

---Purcell and Koontz, Agricultural Futures and Options, Principles and Strategies



Difference between Advisory Service Performance and 24-Month Market Benchmark, 1995-2003 Crop Years





Final Points

- Set realistic expectations
- Available evidence suggests:
 - No opportunity to profit from technical trading systems
 - Little if any enhancement of corn and soybean marketing performance by incorporation of technical indicators
- Technical analysis is not a "silver bullet" for marketing success







Recommended Reading

- Belsky, Gary and Thomas Gilovich. Why Smart People Make Big Money Mistakes-and How to Correct Them: Lessons from the New Science of Behavioral Economics. Simon & Schuster: New York, 1999.
- Malkiel, Burton G. A Random Walk Down Wall Street: Completely Updated and Revised Eighth Edition. W.W. Norton & Company: New York, 2004.
- Paulos, John Allen. *A Mathematician Plays the Stock Market.* Basic Books: New York, 2003.
- Purcell, Wayne D., and Stephen R. Koontz. Agricultural Futures and Options: Principles and Strategies, 2nd Edition, Prentice Hall, Upper Saddle River, New Jersey, 1991.
- Schwager, Jack D. *Market Wizards: Interviews with Top Traders.* Harper and Row, Publishers: New York, 1990.
- Taleb, Nassim Nicholas. *Fooled by Randomness: The Hidden Role of Chance in the Markets and in Life.* Texere: New York, 2001