Should Technical Analysis Be Part of Your Crop Marketing Program?

Scott H. Irwin and Darrel L. Good
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
Monthly Farm Price of Soybeans in Illinois, January 1960-September 2005

Monthly Farm Price of Corn in Illinois, January 1960-September 2005

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

• 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 4.1
A Typical Bar Chart Format for a Commodity Futures Contract

FIGURE 4.2
Illustration of an Uptrend Line Drawn across Two Daily Price Lows

FIGURE 4.17
Illustration of a Head-and-Shoulders Top on a Bar Chart

The distance “A” is the same as the distance from the top of the head to the neckline and is the price projection after the close below the neckline.

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

FIGURE 4.23
An Island-Reversal Top on a Bar Chart

FIGURE 4.29
Triangle Formations as Consolidation Patterns on a Bar Chart

FIGURE 4.33
Congestion Areas as Possible Consolidation Patterns on a Bar Chart

FIGURE 4.37
Corrections on the
December 1997 Wheat
Futures Contract

Agricultural Futures and Options: Principles and
Strategies. Wayne D. Purcell and Stephen R. Koontz

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

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*14-Day Relative Strength Index*

*March 1998 Feeder Cattle Futures*
| TABLE 4.1 |
| Procedure for Calculating a 14-Day Relative Strength Index |

To calculate:

1. Record the last 14 day-to-day price changes based on closing prices.
2. Sum the negative and positive changes and divide each sum by 14 to create a “down average” and “up average,” respectively.
3. Define Relative Strength Index as \( \frac{U}{U + D} \) where \( U = \) up average and \( D = \) down average.
4. Employ \( \text{RSI} = \frac{U}{U + D} \times 100 \) to convert to percentages versus decimals.

## An Example of Computing RSI Index

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<th>Closing Price</th>
<th>Day</th>
<th>Positive Price Change</th>
<th>Negative Price Change</th>
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<td>4/2/2004</td>
<td>784.5</td>
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<td>-2</td>
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<td>-3.5</td>
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<td>3</td>
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<td>38</td>
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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
### TABLE 5.1
Demonstration of 3- and 10-Day Moving Averages for Lean Hog Futures: Calculations and Buy-Sell Signals

<table>
<thead>
<tr>
<th>Closing Price</th>
<th>3-Day Moving Total</th>
<th>3-Day Moving Average</th>
<th>10-Day Moving Total</th>
<th>10-Day Moving Average Signal</th>
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<td>54.98</td>
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<td>165.85</td>
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<td>56.00</td>
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<td>56.10</td>
<td>167.75</td>
<td>55.92</td>
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<td>54.70</td>
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<td>55.00</td>
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<td><strong>54.43</strong></td>
<td>539.10</td>
<td><strong>53.91</strong> Buy</td>
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<td>55.10</td>
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<td>539.50</td>
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<td>55.90</td>
<td>166.30</td>
<td>55.43</td>
<td>543.90</td>
<td>54.39</td>
</tr>
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</table>

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

If the “market” for taking tickets is efficient, then all fans will spend about the same amount of time in line, regardless of which line they choose.
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!
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 **self-destructive** nature of profitable opportunities in efficient markets

I know what I’m doing…I know what I’m doing…
Main Implications of Market Efficiency

• Market efficiency does not 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 flips of a fair coin

• 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


• Both studies available at the AgMAS website: http://www.farmdoc.uiuc.edu/agmas
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
<table>
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<th>System Type</th>
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<td>Dual Moving Average Crossover (DMC)</td>
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<td>Channel</td>
<td>Outside Price Channel (CHL)</td>
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<td></td>
<td>L-S-O Price Channel (LSO)</td>
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<td>M-II Price Channel (MII)</td>
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<td>Momentum Oscillator</td>
<td>Directional Indicator (DRI)</td>
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<td>Parabolic Time/Price (PAR)</td>
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<td>Combination</td>
<td>Directional Parabolic (DRP)</td>
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<table>
<thead>
<tr>
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<th>Number of Profitable Systems</th>
<th>Average Net Profit for 12 Systems</th>
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<tbody>
<tr>
<td>Corn</td>
<td>0/12</td>
<td>-7.9 %/yr.</td>
</tr>
<tr>
<td>Soybeans</td>
<td>0/12</td>
<td>-7.2 %/yr.</td>
</tr>
<tr>
<td>Pork Bellies</td>
<td>1/12</td>
<td>-8.4 %/yr.</td>
</tr>
<tr>
<td>Live Cattle</td>
<td>2/12</td>
<td>-3.3 %/yr.</td>
</tr>
<tr>
<td>All 12 Markets</td>
<td>34/144</td>
<td>-5.8 %/yr.</td>
</tr>
</tbody>
</table>

\[ y = -0.70 x + 4.85 \]

\[ y = -0.58 x + 3.12 \]

\[ y = -0.52x + 3.87 \]
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

**Corn**

Net Advisory Price - Benchmark Price (cents/bu.)

Average = +1

**Soybeans**

Net Advisory Price - Benchmark Price (cents/bu.)

Average = +16
**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


