Towards the Science of Technical Analysis

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Based on Joint Work with Andrew W. Lo

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Status Quo

- Efficient markets
  Bachelier (1900)
  Fama (1965)
  Samuelson (1965)

- Technical analysis

- Large gap between academics and practitioners

\[ E[\Delta^n Y(T,t)] \equiv 0 \]
Broad Study of Technical Analysis
[H. Lo 2003-present]

- **Past**
  Historical study: Place in context

- **Present**
  Interviews with practitioners: Understand what it is

- **Future**
  Science: Standardization and extensions
Outline

- Past: History
- Present: Interviews
- Future: Science
Technical Analysis through History

- 7th c. BC Babylon: Evidence from price diaries
  Intraday prices recorded when volatility is high [Slotsky ’97]

- 17th c. Holland: *Confusion de Confusiones*
  [de la Vega]
  “For on this point we are all alike; when the prices rise, we think they will run away from us.”

- 18th c. Japan: *The Fountain of Gold*
  [Homma]
  “When all are bearish, there is a cause for prices to rise.”
Technical Analysis through History

- **19th c. China:** *Essential Business*
  [Wang Bingyuan]
  “When goods become extremely expensive, then they must become inexpensive again.”

- **20th c. USA:** *The Wall Street Journal*
  [Dow]
  “It is a bull period as long as the average of one high point exceeds that of previous high points.”
Outline

- Past: History
- Present: Interviews
- Future: Science
In the Words of Masters

- On market inefficiency

**Raschke:** Let's take the Renaissance Medallion Fund. What more proof do you need?

**Weinstein:** I don’t know of any successful traders who don’t acknowledge that charts and trends are helpful.
On cultural biases

Acampora: That's the problem—it's not with what we do, it's how we say it.

Murphy: Academics are now basically copying what we do, renaming it, and trying to take credit for it.
In the Words of Masters

- On changing markets

Dudack: There is a greater amount of noise in daily market action today, primarily generated by hedge-fund managers. We need to measure the market differently.

Deemer: I am convinced that the Rydex funds reflect the hedge-fund trading activity which is the driving force in the market.
Interviews

- Topics: Beginnings, style, favorite patterns
- Historical value
- Variety of methods...
- ...but ultimately converge to basics: patterns
Outline

- Past: History
- Present: Interviews
- Future: Science
Visual pattern recognition is subjective:

Head & Shoulders (HS) or Triangle Bottom (TBOT)?

Quantitative theory [Lo Mamaysky Wang ’00; H. ’07]
A Quantitative Approach

- Smooth the data by statistical techniques
- Define patterns as sequences of local extrema
- Statistical evaluation $\Rightarrow$ patterns are informative
Extensions

- Technical indicators should evolve with markets

- Recall: “The Rydex funds reflect hedge-fund activity which is the driving force in the market.” (Deemer)

- New (first) indicators for:
  - Hedge funds [H. Lo ’07]
  - 130/30 [H. Lo Patel ’09]
Conclusion

Broad study of technical analysis [H. Lo 2003-present]

- Past: A force through history
- Present: Wisdom from the masters
- Future: Standardization
Thank you!