

Towards the Science of Technical Analysis

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Based on Joint Work with Andrew W. Lo

Bloomberg Thursday Night Technicals

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Status Quo

- **Efficient markets**

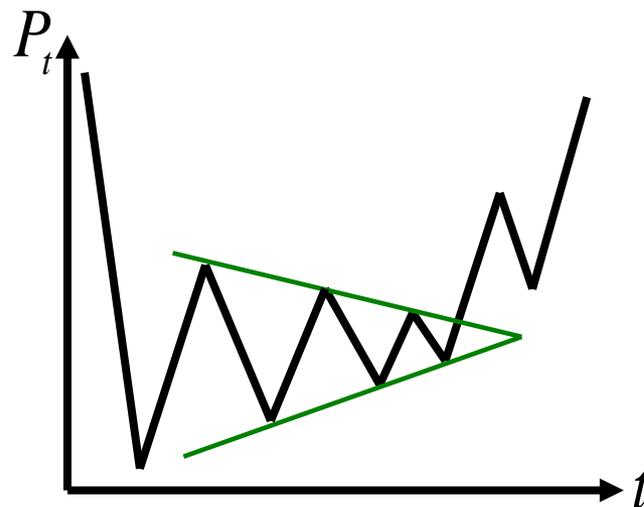
Bachelier (1900)

Fama (1965)

Samuelson (1965)

$$E[\Delta^n Y(T, t)] \equiv 0$$

- **Technical analysis**



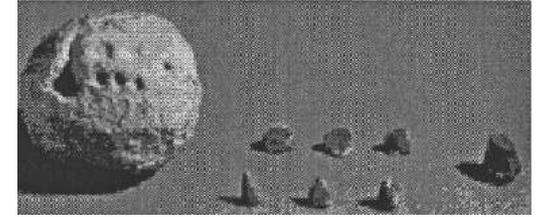
- Large gap between academics and practitioners

Broad Study of Technical Analysis

[H. Lo 2003-present]

- **Past**

Historical study: Place in context



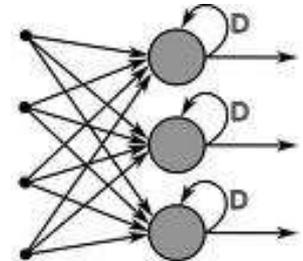
- **Present**

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]

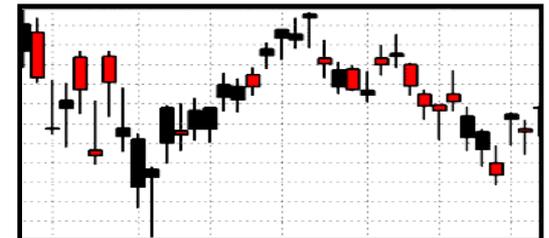
- **17th c. Holland:** *Confusion de Confusiones*
[de la Vega]

“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.

In the Words of Masters

- 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.

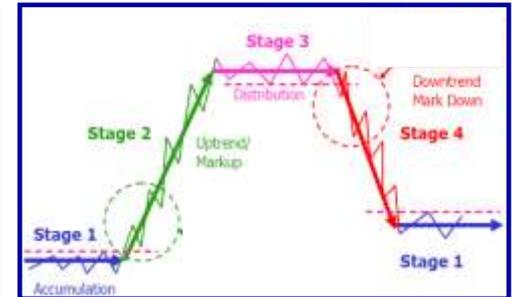
Deemer: I am convinced that the Rydex funds reflect the hedge-fund trading activity which is the driving force in the market.

Interviews

- Topics: Beginnings, style, favorite patterns
- Historical value
- Variety of methods...



Elliott wave



Weinstein's

- ...but ultimately converge to basics: patterns

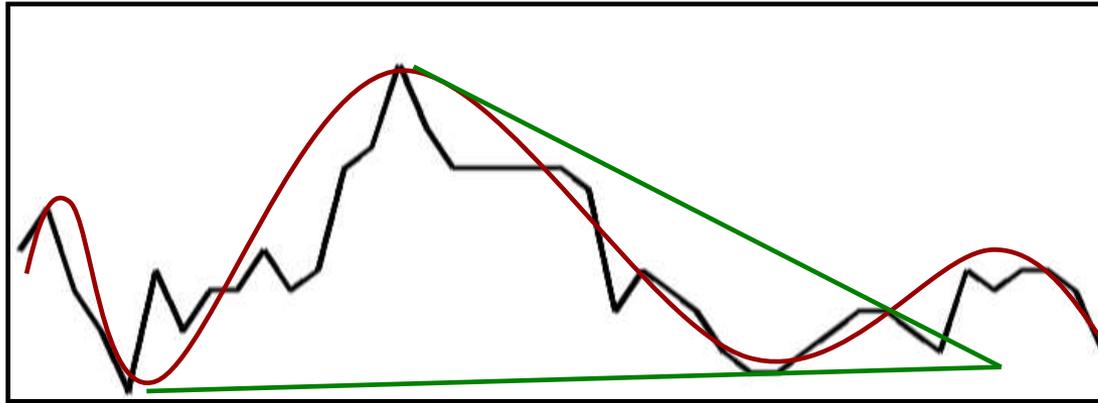
Outline

- Past: History
- Present: Interviews
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Standardization

- Visual pattern recognition is subjective:

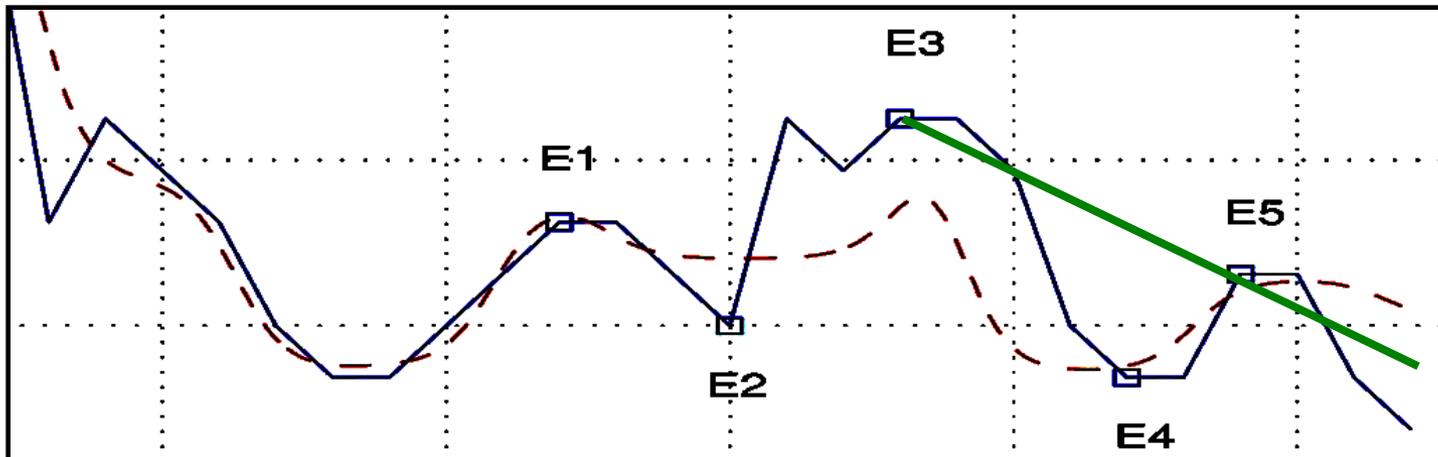


Head & Shoulders (HS) or **Triangle Bottom** (TBOT)?

- 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!