

Technical Analysis

(Text reference: Chapter 16)

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Background

- “technical analysis” broadly defined refers to the study of past price, volume, or other trading-related data to predict future prices; completely at odds with weak-form market efficiency
- dates back at least to the late 19th/early 20th century, well before fundamental analysis
- technical analysis is (quote from text, p. 605):
 - ... a reflection of the idea that the stock market moves in trends which are determined by the changing attitudes of investors to a variety of economic, monetary, political and psychological forces. The art of technical analysis, for it is an art, is to identify changes in trends at an early stage and to maintain an investment posture until a reversal of that trend is indicated.

- some more recent systems are based on fairly sophisticated computerized trading strategies (e.g. neural nets)
- apparent evidence of success is usually due to one or more of the following flaws:
 - failure to adjust for risk
 - failure to consider transactions costs
 - failure to consider dividends
 - failure to test using out-of-sample data
 - survivorship bias
 - reliance on visual comparisons
 - non-implementable systems
- nonetheless, some strategies appear to work

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Charting

- there are a wide variety of patterns that are supposed to indicate future stock prices (head and shoulders, inverted V, duplex horizontal, etc., see text Figure 16.5)
- the most famous example of charting is the Dow Theory
 - contends that there are three forces affecting stock prices:
 1. primary trend
 2. secondary/intermediate trends
 3. tertiary trends
 - a support level is a value below which a price is seen as unlikely to fall; a resistance level is a value above which a price is unlikely to rise
 - the theory is quite vague, being traced to a series of editorials written by W. Hamilton in the *Wall Street Journal* between 1902-1929
 - uses the DJIA and DJTA to infer the primary trend (e.g. a bull market signal is when both indexes break their resistance levels)

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- Cowles (*Econometrica*, 1934) evaluated Hamilton's forecasts and concluded that they had little value: a market timing strategy based on them did not outperform the market
- Brown, Goetzmann and Kumar (*Journal of Finance*, 1998) re-evaluated Hamilton's record:
 - a market timing strategy earned basically the same return as the S&P, but significantly outperformed it on a risk-adjusted basis
 - Hamilton was right much more often than he was wrong:

	Market Up	Market Down
Call up	74	56
Call down	18	36

- a graph of returns around editorial dates clearly shows that the Dow Theory is a “momentum” theory
- a neural network approach designed to replicate Hamilton's forecasts has similar performance from 1930-1997: returns are quite close to a buy and hold strategy, but at lower risk (ignoring transactions costs)

Momentum and contrarian strategies

- momentum (contrarian) investors buy (sell) recent winners and sell (buy) recent losers

	Annualized Abnormal Returns		
	W	L	W-L
Weekly 1962-86:			
Top 50%/bottom 50% of NYSE/AMEX	-24.9%	89.8%	-114.7%
Monthly 1929-82:			
Top 10%/bottom 10% of NYSE/AMEX	-11.6%	12.1%	-23.7%
Semi-annually 1962-89:			
Top 10%/bottom 10% of NYSE/AMEX	8.7%	-3.5%	12.2%
Annually 1929-82:			
Top 10%/bottom 10% of NYSE/AMEX	5.0%	-6.1%	11.1%
3 years 1926-82:			
Top 35/bottom 35 of NYSE	-1.7%	6.5%	-8.2%
5 years 1926-82:			
Top 50/bottom 50 of NYSE	-2.4%	7.2%	-9.6%

Moving average and trading range breakout strategies

- variable length moving average strategy:
 1. Calculate average closing price of a stock over the last 200 trading days
 2. Divide today's closing price by 200 day average
 3. If ratio $>$ ($<$) 1, buy (sell) stock tomorrow
 4. Repeat the next day
 5. At the end of the test period, compute the average daily return on buy and sell days
- difference between buy and sell returns should be ≈ 0 (if markets are weak-form efficient)
- note that every day is either a buy or a sell \Rightarrow one variation is the fixed length moving average strategy: buy signals are generated when the ratio changes from < 1 to > 1 ; once bought a stock is held for 10 days

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- the trading range breakout strategy is similar, but involves computing high and low closing prices over the past 200 trading days. A buy (sell) signal is generated when the daily close $>$ ($<$) the high (low); once bought a stock is held for 10 days
- using daily DJIA data from 1897-1986 Brock, Lakonishok, and LeBaron (*Journal of Finance*, 1992) find:

	Annualized Average Returns		
	Buy	Sell	Buy - Sell
Variable length MA	10.7%	-6.1%	16.8%
Fixed length MA	13.8%	-4.8%	18.6%
Trading range breakout	11.8%	-5.8%	17.6%

- both the fixed length MA and the variable length MA appear to be profitable, even after transactions costs (because they do not involve very much trading)

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Technical indicators

- in addition to prices, a variety of trading related statistics are sometimes used to try to forecast future market movements
 - trin (average volume in declining stocks divided by average volume in advancing stocks): $\text{trin} > 1$ is considered a bearish signal since falling stocks have higher volume
 - short interest: bearish because short sales are made by sophisticated investors who forecast price decreases, bullish since short positions must eventually be covered
 - odd lots: naive/small investors trade in odd lots, a ratio of odd lot purchases to sales > 1 is bearish
 - breadth: extent to which market index movements are reflected widely in prices of all stocks in the market (usually indicated by the “tick” (i.e. advances less declines)); used to infer broad market trends
 - relative strength: price of a firm relative to price index for an industry; indicates which firms have outperformed in the past

The Value Line system

- uses a combination of fundamental and technical analysis (momentum and relative strength measures for price and earnings)
- has been quite successful at selecting securities (text Figure 16.18)
- however, Value Line has been much less adept at actually implementing its own recommendations (text pp. 626-627):
 - high turnover
 - impact of spreads
 - timing of trades

Pairs trading

- a commonly used strategy on Wall Street and by hedge funds
- basic idea: find two stocks whose prices have tended to move together in the past; when the spread between them widens, short the winner and buy the loser
- similar to contrarian strategies, but relies on correlations between particular pairs of stocks
- originally developed by a team of “quants” at Morgan Stanley in the 1980s
- based on psychological factors: “human beings don’t like to trade against human nature, which wants to buy stocks after they go up, not down”

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- sounds simple, but many issues have to be addressed: how do you identify stocks that “move together”? Do they have to be in the same industry? Should they be only liquid stocks? How far apart do they have to be in order to take a position? When do you close down a position?
- evaluated by Gatev, Goetzmann, and Rouwenhorst (1999):
 - use data from 1962-1997
 - use only liquid stocks
 - open positions when stocks diverge by two standard deviations and close them at the next crossing of prices
 - find that it was profitable for low cost market participants
 - much of the gains were in the utilities sector (other sectors were profitable, but not as profitable as utilities)
 - pairs trading did very well throughout the 1970s (when the market as a whole did quite poorly), but not in the bull market of the 1990s

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