

Lecture 06 Inefficient Markets Hypothesis

Recap

- Last Week
 - Market predominantly not random
 - But pattern of market movements very hard to work out
 - Fractal markets hypothesis
 - Market dynamics follow highly volatile patterns
 - "Fractal" dimensions to system with underlying "deterministic" pattern plus noise
 - Measured by Box Dimension and Hurst Exponent
 - Latter covered in addendum to lecture 5
- This week
 - If there are patterns to stock prices, what are they?
 - The "Inefficient Markets Hypothesis"

The impossibility of efficiency

- Key assumption of EMH
 - Investors can accurately predict the future
 - "The first assumption is *complete agreement*..."
 - ("investors are assumed to agree on the prospects of various investments"; Sharpe 1964)
 - **And this distribution is the true one**—that is, it is the distribution from which the returns we use to test the model are drawn." (Fama & French 2004)
- Reality—future uncertain
 - How do investors cope with
 - Not knowing the future
 - And yet having to invest?
- Keynes: they form "conventions" about the future...

A Keynesian view

- Key issue is **uncertainty**, not risk
 - Cannot possibly estimate expected returns far into future:
 - "our basis of knowledge for estimating the yield ten years hence of [an investment] amounts to little..."
 - those who seriously attempt to make any such estimate are often so much in the minority that their behaviour does not govern the market."
 - Therefore investors can't know "fundamental value"
 - Versus essential aspect of CAPM: investors can work out "real value" of shares
 - Share values therefore always speculative

A Keynesian view

- Without knowledge of future, investors develop "conventions" to cope with uncertain future. They
 - "assume that the present is a ... serviceable guide to the future..."
 - that the existing state of ... prices ... is based on a correct summing up of future prospects...; [and]
 - we endeavor to fall back on the judgment of the rest of the world which is perhaps better informed."

Keynes's view

- Investors profit by picking shifts in confidence:
 - "the professional investor and speculator are ... concerned, not with making superior long-term forecasts of the probable yield of an investment over its whole life, but with foreseeing changes in the conventional basis of valuation a short time ahead of the general public... this behaviour... is an inevitable result of an investment market... For it is not sensible to pay 25 for an investment of which you believe the prospective yield to justify a value of 30, if you also believe that the market will value it at 20 three months hence." [OREF II]
- Markets thus conducted by speculation on immediate behaviour of other speculators, rather than rational calculation:

Keynes's view

- The Stockmarket as a beauty contest and "the third degree":
 - "... pick out the six prettiest faces ... the prize being awarded to the competitor whose choice most nearly corresponds to the average preferences of the competitors as a whole... We have reached the third degree where we devote our intelligences to anticipating what average opinion expects the average opinion to be."
- The practicality of rational calculation?:
 - "Investment based on genuine long-term expectation is ... scarcely practicable. He who attempts it must surely ... run greater risks than he who tries to guess better than the crowd how the crowd will behave..."

The "Price system" and Asset Markets

- Normal micro theory:
 - Supply a positive function of price
 - Demand a negative function of price
 - Supply and demand independent
- If price rises
 - Supply rises
 - Demand falls
 - Tendency towards equilibrium
- But finance markets
 - Supply (of assets, shares) possibly a positive function of price
 - Demand also a **positive** function of price:

The "Price system" and Asset Markets

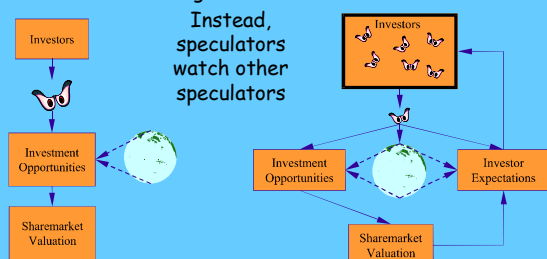
- If price of assets (shares, real estate, etc.) rising, demand also rises
 - Buyers hope to buy and sell on a rising market
- The faster the rate of price increase (generally speaking) the faster the growth of demand
- Tendency to move away from "equilibrium" ("fundamental value", historic price to earnings ratios, etc.)
- Price thus destabilises an asset market
- Far-from-equilibrium process means
 - Overvaluation of popular "growth" stocks
 - Undervaluation of unpopular "value" stocks...

The "Inefficient Markets Hypothesis"

- Argument that investors
 - React slowly to news
 - Under-react and Over-react
 - Ignore "reversion to the mean"
- Series of good reports leads to expectation of more good news
- Firm valuation rises, seen as "growth stock"
 - rise becomes self-fulfilling; bandwagon buying
- Firm cannot sustain above sector/economy performance indefinitely
- Initial "bad news" reports ignored as firm "reverts to mean"
- Finally, "bear" valuations set in; bandwagon selling
 - "growth stock" underperforms in medium term

The "Inefficient Markets Hypothesis"

- 90% of price variability due to internal dynamics of speculators watching other speculators:
 - EMH idea of investors focusing solely upon expected risk/return wrong:



The "Inefficient Markets Hypothesis"

- Key outcomes of "Inefficient Markets Hypothesis" (IEH)
 - Shares with low volatility outperform the market
 - Opposite of EMH
 - Markets characterised by
 - Slow reaction by investors to news
 - Under and over reaction at different times
 - Institutional investors behave differently to individuals
 - Forced by short time horizon to match Index
 - Advantage for individuals over institutions
 - *Best stocks to buy are ones doing poorly now*
 - *Likely to have better growth and **lower downside** volatility in future*

The "Inefficient Markets Hypothesis"

- Companies with good results now
 - Tend to become complacent
 - Attract competitors
 - Get high stock market valuations
- Companies with poor results now
 - Face "improve or die" pressure
 - If in "dull" industries, don't face many competitors
 - Get low stock market valuations
- Inversion of future performance results
 - "Good" results now often followed by poor ones
 - "Poor" results now often followed by good ones
 - "Reversion to the mean"

The "Inefficient Markets Hypothesis"

- "Contrarian strategy" of buying poor performers now
 - Won't work in short-medium term
 - Market over-valuation of "good" companies will give them good short-medium term results
 - Will work in medium-long term
 - Persistent failure of "good" companies to maintain results slows share price rise
 - "Unexpected" good performance of "poor" companies
 - Yields good dividends
 - Leads to eventual market revaluation of shares
- So non-institutional investors *can* "outperform the Index" by value & contrarian investment
 - But...

The "Inefficient Markets Hypothesis"

- Individual investors *don't* necessarily do this
 - Self-defeating ("irrational"?) behaviour as well...
 - "follow the advice of financial gurus,
 - Fail to diversify,
 - Actively trade stocks and churn their portfolios,
 - Sell winning stocks and hold on to losing stocks thereby increasing their tax liabilities..." (Shleifer 2000 p. 10)
 - Undermines both EMH and possible gains from market inefficiency
 - Also partly explains market inefficiency
 - As does behaviour of money managers...

The "Inefficient Markets Hypothesis"

- Professional managers:
 - "choose portfolios that are excessively close to the benchmark they are evaluated against ...
 - To minimise the risk of underperforming this benchmark...
 - Herd and select stocks that other managers select,
 - Again to avoid falling behind and looking bad...
 - Add ... stocks that have recently done well, and
 - Sell stocks that have recently done poorly,
 - To look good to investors who are getting end of year reports on portfolio holdings..." (Shleifer 2000 pp. 12-13)

The "Inefficient Markets Hypothesis"

- "Bottom line" of IEM
 - Two major groups of investors
 - Fund Managers
 - Short-term horizon forces index following
 - Individuals
 - Behavioural herding causes following of fads
 - Market inefficiency generates opportunities
 - Fund managers can't pursue because of short-term monitoring
 - Individuals tend to miss by "following the crowd"
 - Opportunities to profit from "contrarian" investing
 - Buy high B/M, out of favour sectors, low volatility
 - Worse performance over short term possible
 - Better performance over medium-long term likely

Haugen's Research

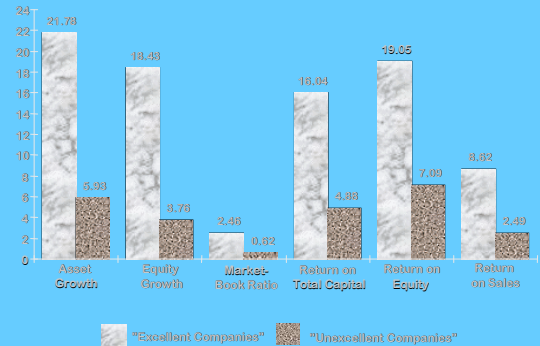
- Main proponent of IEM is Robert (Bob) Haugen
 - Academic till mid-90s
 - Resigned to apply ideas for profit
 - Published several books between academic & commercial career
 - The Inefficient Stock Market
 - The Beast on Wall Street
 - The New Finance
- All detail
 - Empirical failings of CAPM
 - Ways to profit from market systematic mispricing
 - All are "contrarian" strategies:
 - Buy "out of favour" stocks & profit

Haugen's Research

- Famous book *"In Search of Excellence"* studied companies regarded as excellent in terms of 6 characteristics as of 1980: Asset Growth; Equity Growth; Market to Book Ratio (favouring high over low); Return on Capital, Equity, & Sales
 - Ranked companies from "Excellent" to "Unexcellent" on weighted scale of these factors
- Clayman (1987) checked subsequent performance of two groups
- Both excellent and unexcellent reverted to mean...
 - Better results from investing in "unexcellent" companies than "excellent" ones:

"Excellent" versus "Unexcellent" Companies (76-80)

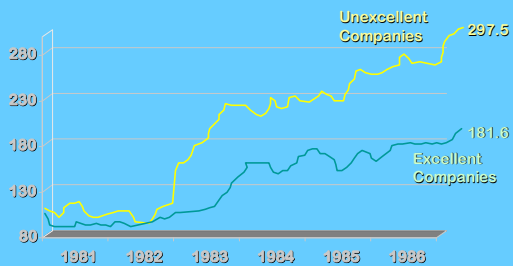
- Excellent companies looked much better than unexcellent ones:



"Excellent" versus "Unexcellent" Companies (81-86)

- Results **opposite** of what fans of excellent companies expected:

Cumulative Value of \$100 Invested in 1981



Source: M. Clayman, 1987, *Financial Analysts Journal*, "In Search of Excellence: The Investor's Viewpoint"

"Excellent" versus "Unexcellent" Companies (81-86)

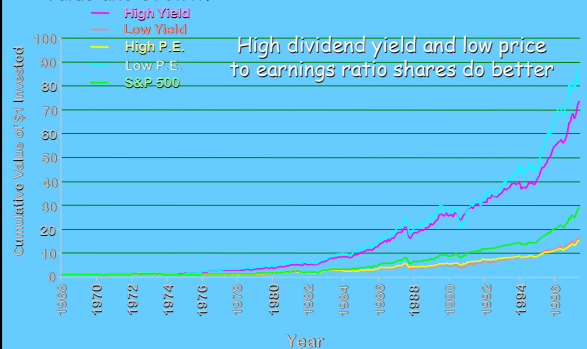
- Clayman's conclusion:
 - "Over time, company results have a tendency to regress to the mean"
 - As underlying economic forces attract new entrants
 - And encourage participants to leave low-return businesses.
 - Because of this tendency
 - Companies that have been "good" performers in the past may prove inferior investments
 - While "poor" companies frequently provide superior investment returns in the future." (1987, p. 63)
- Many other similar patterns uncovered by Haugen...

Haugen's Research

- Future Returns to Stocks
 - Cheap Stocks vs Expensive
 - Relative to Current Earnings and Dividends
 - Stocks ranked and re-ranked
 - by earnings
 - and dividend yield as of April of each year.
 - Subsequent performance of cheapest and most expensive quartiles then monitored.

Haugen's Research

- Cumulative Value of \$1 Invested in Various Forms of Value and Growth

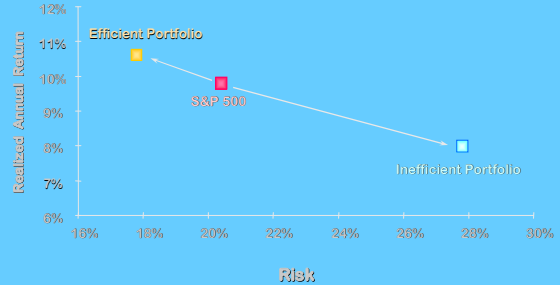


Haugen's Research

- Relative Performance of Portfolios Equally-weighted in the Cheap and Expensive Quartiles
- Difference in cumulative return is measured over rolling 5-year periods.
 - Relative performance appears to cycle over time.
 - But cheap stocks out-perform more often than not
- In following graphs, "efficient" means "what works"
 - CAPM idea of "efficient portfolio"
 - Efficient means risk-return tradeoff
 - Higher return necessitates higher v
 - Actual investing experience
 - *Efficient means lower volatility and higher return*

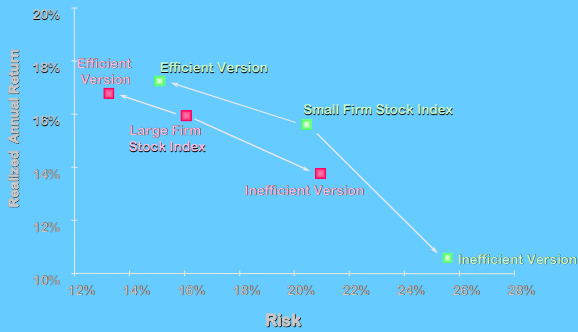
Haugen's Research

- The Effect of Moving to Lower and Higher Risk Portfolios of NYSE Stocks - 1928-1992



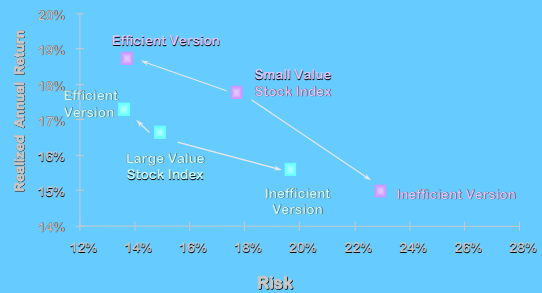
Haugen's Research

- The Effect of Moving to Lower and Higher Risk Portfolios (1979-1992)



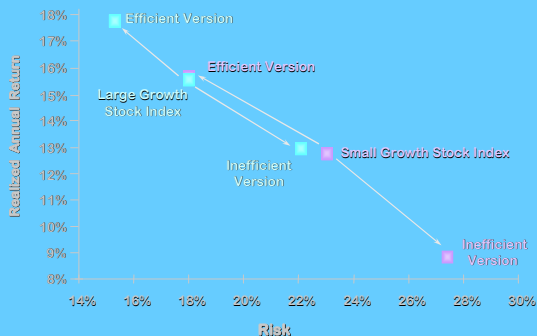
Haugen's Research

- The Effect of Moving to Lower and Higher Risk Portfolios of Large and Small Value Stocks (1979-1992)



Haugen's Research

- Effect of Moving to Lower and Higher Risk Portfolios of Large and Small Growth Stocks (1979-1992)

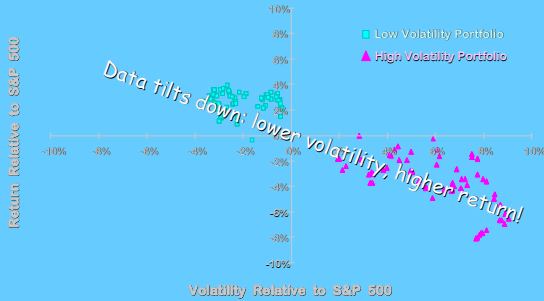


Haugen's Research

- The Relative Performance of Low- and High-volatility Stock Portfolios
 - What has been the performance
 - Over overlapping 5-year periods
 - Of low- and high-volatility portfolios relative to the S&P 500 (positioned at the origin of the graph)?
 - Risk-return tradeoff idea of CAPM implies
 - Higher volatility portfolio would have higher return
 - Lower volatility, lower return
 - Data should "tilt up" in scatter plot
 - But instead...

Haugen's Research

- Test of 5 Year Horizon Performance of Low and High Volatility Portfolios using S&P 500 Stocks (1972-1992)

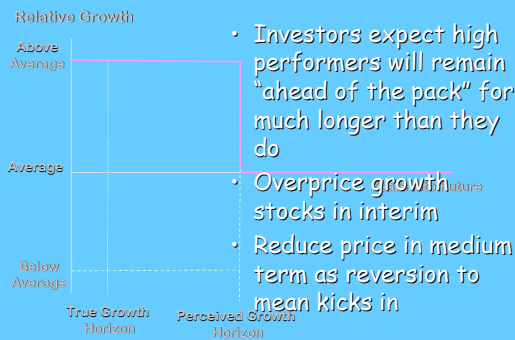


Haugen's Research

- Over-estimation of Short-run
 - Relationship Between Perceived and True Growth Horizon and Average Growth Rates
 - Growth horizon: length of time a typical stock takes to mean-revert to the average rate of earnings growth.
 - Perceived horizon is **longer** than the true horizon
 - Reversion to the mean cuts in ahead of expectations
 - "Growth" stocks
 - Perform well in short term
 - Disappoint in medium term

Haugen's Research

- Over-estimation of Short-run

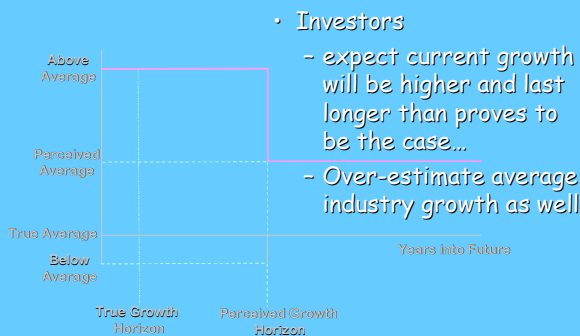


Haugen's Research

- Relationship Between Perceived and True Growth Horizon and Average Growth Rates
 - Investors over-estimate
 - average rate of growth
 - And length of the growth horizon

Haugen's Research

- Overestimation of Short Run and Average Growth



Haugen's Research

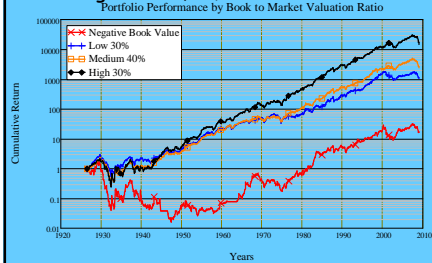
- Tendencies identified in IMH
 - Explain "fractal" nature of stock market data
 - Initial under-reaction to good news
 - Then over-reaction to good news
 - Followed by disappointment by mean reversion
 - Volatile "up-down" feedback
 - Give non-institutional investor opportunity to profit
 - Analyse stocks to identify
 - Low volatility
 - High Book to Market
 - Out of favour sectors etc.
 - Develop portfolio of such stocks
 - Adjust on quarterly basis (minimise transaction costs)

Haugen's Research

- An instance: exploit under-pricing of high Book to Market stocks
 - Data from French (of Fama & French—once proponent of EMH):
 - http://mba.tuck.dartmouth.edu/pages/faculty/ken_french/data_library.html
 - Rank companies by Book to Market Value
 - Negative (negative book value—like Internet startups 1996-2000)
 - Low 30% ("Growth stocks"—expensive but expected to grow above trend by market)
 - Medium 40%
 - High 30% ("Value stocks"—Buffett-style buy)

Haugen's Research

- \$1 invested in 1926 in portfolio is worth in 2009:
 - Negative B/M: \$16
 - Low 30%: \$1,074
 - Medium 40%: \$2,415
 - High 30%: \$14,507



Haugen's Research

- Haugen no longer academic
- Sells portfolio management system based on IMH...
- Many other companies exploiting similar inefficiencies
- Eg, fractal trading systems...



Other approaches

- Not a product endorsement, but...
 - Shows theory of previous lecture used in (successful?) trading strategies

