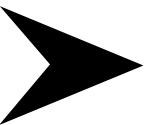


Efficient Capital Markets

- In an efficient capital market, security
 - prices adjust rapidly to the arrival of new information,
 - therefore the current prices of securities reflect all information about the security
- Whether markets are efficient has been extensively researched and remains controversial
 - Investors
 - Portfolio managers



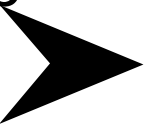
Why Should Capital Markets Be Efficient?

- Security prices adjust rapidly to new information
 - Security prices reflect all available information
 - Informationally efficient market

The premises of an efficient market

- A large number of competing profit-maximizing participants analyze and value securities, each independently of the others
- New information regarding securities comes to the market in a random fashion
- Profit-maximizing investors adjust security prices rapidly to reflect the effect of new information

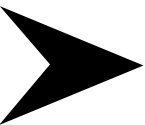
Conclusion: the expected returns implicit in the current price of a security should reflect its risk



Alternative

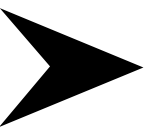
Efficient Market Hypotheses (EMH)

- Random Walk Hypothesis – changes in security prices occur randomly
- Fair Game Model – current market price reflect all available information about a security and the expected return based upon this price is consistent with its risk
 - Eugen Fama
 - Efficient Market Hypothesis (EMH) - divided into three sub-hypotheses depending on the information set involved



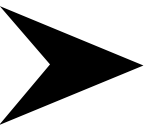
Efficient Market Hypotheses (EMH)

- Weak-Form EMH - prices reflect all **security-market** information
- Semistrong-form EMH - prices reflect all **public** information
- Strong-form EMH - prices reflect all **public and private** information



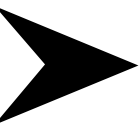
Weak-Form EMH

- Current prices reflect all security-market information, including the historical sequence of prices, rates of return, trading volume data, and other market-generated information
- This implies that past rates of return and other market data should have no relationship with future rates of return



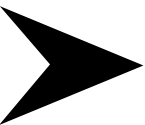
Semistrong-Form EMH

- Current security prices reflect all public information, including market and non-market information
- This implies that decisions made on new information after it is public should not lead to above-average risk-adjusted profits from those transactions



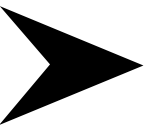
Strong-Form EMH

- Stock prices fully reflect all information from public and private sources
- This implies that no group of investors should be able to consistently derive above-average risk-adjusted rates of return
- This assumes perfect markets in which all information is cost-free and available to everyone at the same time



Tests and Results of Weak-Form EMH

- Security returns over time should be independent of one another because new information comes to the market on a random fashion and prices adjusts rapidly to new information
- Statistical tests of independence between rates of return
 - Autocorrelation tests have mixed results
 - Significant positive or negative correlation in return over time
 - Runs tests indicate randomness in prices
 - + or -

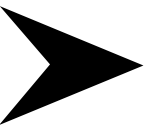


Tests of Trading Rules

- Prior tests of independence were too rigid
 - Argue of technical analysis
- Examine of alternative technical trading rules through simulation
- Not above buy and hold strategy return by using any trading rule that depended solely on past market data

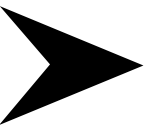
Tests of Trading Rules

- Comparison of trading rules to a buy-and-hold policy is difficult because trading rules can be complex and there are too many to test them all
 - Filter rules yield above-average profits with small filters, but only before taking into account transactions costs
 - Trading rule results have been mixed, and most have not been able to beat a buy-and-hold policy



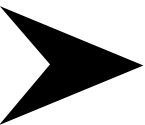
Tests and Results of Weak-Form EMH

- Testing constraints
 - Use only publicly available data
 - Include all transactions costs
 - Adjust the results for risk
- Operational problems
 - Trading rules required too much subjective interpretation
 - Infinite number of trading rules



Tests and Results of Weak-Form EMH

- Results generally support the weak-form EMH, but results are not unanimous



Tests of the Semistrong Form of Market Efficiency

Two sets of studies

- Studies to predict future rates of return using available public information beyond pure market information
 - Time-series analysis
 - Cross sectional distribution
- Event studies that examine how fast stock prices adjust to specific significant economic events

Tests and Results of Semistrong-Form EMH

- Test results should adjusted a security's rate of return for the rates of return of the overall market during the period considered

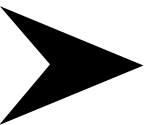
$$Ar_{it} = R_{it} - R_{mt}$$

where:

Ar_{it} = abnormal rate of return on security i during period t

R_{it} = rate of return on security i during period t

R_{mt} = rate of return on a market index during period t

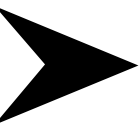


- Time-series analysis
 - Quarterly Earnings Reports
 - The January Anomaly
 - Other Calendar Effects
- Cross-Sectional Return analysis
 - P/E ratio
 - PEG ratio
 - The Size Effect
 - Neglected Firms and Trading Activity
 - BV to Market value ratio
- Event Studies analysis
 - Stock Split Studies
 - IPOs
 - Exchange Listing
 - Unexpected World Events and Economic News

Tests and Results of Semistrong-Form EMH

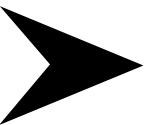
Time series tests for abnormal rates of return

- short-horizon returns have limited results
- long-horizon returns analysis has been quite successful based on
 - dividend yield (D/P)
 - default spread
 - term structure spread
- Quarterly earnings reports may yield abnormal returns due to
 - unanticipated earnings change



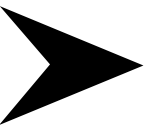
Tests and Results of Semistrong-Form EMH

- Quarterly Earnings Reports
 - Large Standardized Unexpected Earnings (SUEs) result in abnormal stock price changes, with over 50% of the change happening after the announcement
 - Unexpected earnings can explain up to 80% of stock drift over a time period
- These results suggest that the earnings surprise is *not* instantaneously reflected in security prices



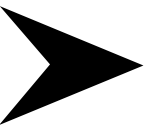
Tests and Results of Semistrong-Form EMH

- The January Anomaly
 - Stocks with negative returns during the prior year had higher returns right after the first of the year
 - Tax selling toward the end of the year has been mentioned as the reason for this phenomenon
 - Such a seasonal pattern is inconsistent with the EMH



Tests and Results of Semistrong-Form EMH

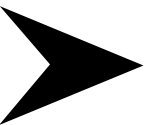
- Other calendar effects
 - All the market's cumulative advance occurs during the first half of trading months
 - Monday/weekend returns were significantly negative
 - For *large* firms, the negative Monday effect occurred before the market opened (it was a weekend effect), whereas for *smaller* firms, most of the negative Monday effect occurred during the day on Monday (it was a Monday trading effect)



Tests and Results of Semistrong-Form EMH

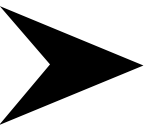
Predicting cross-sectional returns

- All securities should have equal risk-adjusted returns
- Studies examine alternative measures of size or quality as a tool to rank stocks in terms of risk-adjusted returns
 - These tests involve a joint hypothesis and are dependent both on market efficiency and the asset pricing model used



Tests and Results of Semistrong-Form EMH

- Price-earnings ratios and returns
 - Low P/E stocks experienced superior risk-adjusted results relative to the market, whereas high P/E stocks had significantly inferior risk-adjusted results
 - Publicly available P/E ratios possess valuable information regarding future returns
 - This is inconsistent with semistrong efficiency

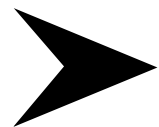


Tests and Results of Semistrong-Form EMH

- Price-Earnings/Growth Rate (PEG) ratios
 - Studies have hypothesized an inverse relationship between the PEG ratio and subsequent rates of return. This is inconsistent with the EMH
 - However, the results related to using the PEG ratio to select stocks are mixed

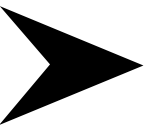
Tests and Results of Semistrong-Form EMH

- The size effect (total market value)
 - Several studies have examined the impact of size on the risk-adjusted rates of return
 - The studies indicate that risk-adjusted returns for extended periods indicate that the small firms consistently experienced significantly larger risk-adjusted returns than large firms
 - Firm size is a major efficient market anomaly
 - Could this have caused the P/E results previously studied?



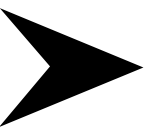
Tests and Results of Semistrong-Form EMH

- The P/E studies and size studies are dual tests of the EMH and the CAPM
- Abnormal returns could occur because either
 - markets are inefficient or
 - market model is not properly specified and provides incorrect estimates of risk and expected returns



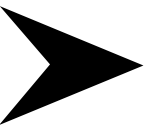
Tests and Results of Semistrong-Form EMH

- Adjustments for riskiness of small firms did not explain the large differences in rate of return
- The impact of transactions costs of investing in small firms depends on frequency of trading
 - Daily trading reverses small firm gains
- The small-firm effect is not stable from year to year



Tests and Results of Semistrong-Form EMH

- Neglected Firms
 - Firms divided by number of analysts following a stock
 - Small-firm effect was confirmed
 - Neglected firm effect caused by lack of information and limited institutional interest
 - Neglected firm concept applied across size classes
 - Another study contradicted the above results



Tests and Results of Semistrong-form EMH

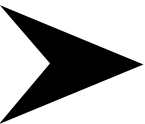
- Trading volume
 - Studied relationship between returns, market value, and trading activity.
 - Size effect was confirmed. But no significant difference was found between the mean returns of the highest and lowest trading activity portfolios

Tests and Results of Semistrong-Form EMH

- Ratio of Book Value of a firm's Equity to Market Value of its equity
 - Significant positive relationship found between current values for this ratio and future stock returns
 - Results inconsistent with the EMH
- Size and BV/MV dominate other ratios such as E/P ratio or leverage
- This combination only works during expansive monetary policy

Tests and Results of Semistrong-Form EMH

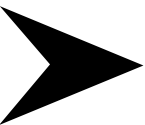
- Firm size has emerged as a major predictor of future returns
- This is an anomaly in the efficient markets literature
- Attempts to explain the size anomaly in terms of superior risk measurements, transactions costs, analysts attention, trading activity, and differential information have not succeeded



Tests and Results of Semistrong-Form EMH

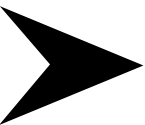
Event studies

- Stock split studies show that splits do not result in abnormal gains after the split announcement, but before
- Initial public offerings seems to be underpriced by almost 18%, but that varies over time, and the price is adjusted within one day after the offering
- Listing of a stock on an national exchange such as the NYSE may offer some short term profit opportunities for investors



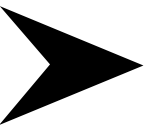
Tests and Results of Semistrong-Form EMH

- Stock prices quickly adjust to unexpected world events and economic news and hence do not provide opportunities for abnormal profits
- Announcements of accounting changes are quickly adjusted for and do not seem to provide opportunities
- Stock prices rapidly adjust to corporate events such as mergers and offerings
- The above studies provide support for the semistrong-form EMH



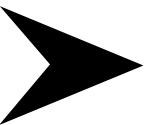
Summary on the Semistrong-Form EMH

- Evidence is mixed
- Strong support from numerous event studies with the exception of exchange listing studies



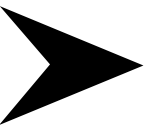
Summary on the Semistrong-Form EMH

- Studies on predicting rates of return for a cross-section of stocks indicates markets are not semistrong efficient
 - Dividend yields, risk premiums, calendar patterns, and earnings surprises
- This also included cross-sectional predictors such as size, the BV/MV ratio (when there is expansive monetary policy), E/P ratios, and neglected firms.



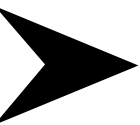
Tests and Results of Strong-Form EMH

- Strong-form EMH contends that stock prices fully reflect all information, both public and private
- This implies that no group of investors has access to private information that will allow them to consistently earn above-average profits



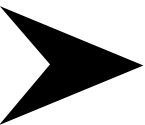
Testing Groups of Investors

- Corporate insiders
- Stock exchange specialists
- Security analysts
- Professional money managers



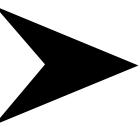
Security Analysts

- Tests have considered whether it is possible to identify a set of analysts who have the ability to select undervalued stocks
- This looks at whether, after a stock selection by an analyst is made known, a significant abnormal return is available to those who follow their recommendations



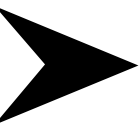
The Value Line Enigma

- Value Line (VL) publishes financial information on about 1,700 stocks
- The report includes a timing rank from 1 down to 5
- Firms ranked 1 substantially outperform the market
- Firms ranked 5 substantially underperform the market



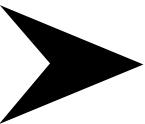
The Value Line Enigma

- Changes in rankings result in a fast price adjustment
- Some contend that the Value Line effect is merely the unexpected earnings anomaly due to changes in rankings from unexpected earnings



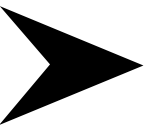
Security Analysts

- There is evidence in favor of existence of superior analysts who apparently possess private information



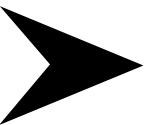
Professional Money Managers

- Trained professionals, working full time at investment management
- If any investor can achieve above-average returns, it should be this group
- If any non-insider can obtain inside information, it would be this group due to the extensive management interviews that they conduct



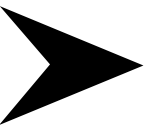
Performance of Professional Money Managers

- Most tests examine mutual funds
- New tests also examine trust departments, insurance companies, and investment advisors
- Risk-adjusted, after expenses, returns of mutual funds generally show that most funds did not match aggregate market performance



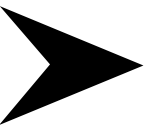
Conclusions Regarding the Strong-Form EMH

- Mixed results, but much support
- Tests for corporate insiders and stock exchange specialists do not support the hypothesis (Both groups seem to have monopolistic access to important information and use it to derive above-average returns)



Conclusions Regarding the Strong-Form EMH

- Tests results for analysts are concentrated on Value Line rankings
 - Results have changed over time
 - Currently tend to support EMH
- Individual analyst recommendations seem to contain significant information
- Performance of professional money managers seem to provide support for strong-form EMH

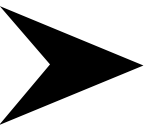


Behavioral Finance

It is concerned with the analysis of various psychological traits of individuals and how these traits affect the manner in which they act as investors, analysts, and portfolio managers

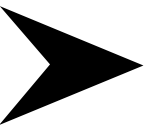
Efficient Markets and Technical Analysis

- Assumptions of technical analysis directly oppose the notion of efficient markets
- Technicians believe that new information is not immediately available to everyone, but disseminated from the informed professional first to the aggressive investing public and then to the masses



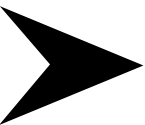
Efficient Markets and Technical Analysis

- Technicians also believe that investors do not analyze information and act immediately - it takes time
- Therefore, stock prices move to a new equilibrium after the release of new information in a gradual manner, causing trends in stock price movements that persist for periods



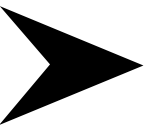
Efficient Markets and Technical Analysis

- Technical analysts develop systems to detect movement to a new equilibrium (breakout) and trade based on that
- Contradicts rapid price adjustments indicated by the EMH
- If the capital market is weak-form efficient, a trading system that depends on past trading data can have no value



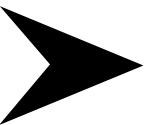
Efficient Markets and Fundamental Analysis

- Fundamental analysts believe that there is a basic intrinsic value for the aggregate stock market, various industries, or individual securities and these values depend on underlying economic factors
- Investors should determine the intrinsic value of an investment at a point in time and compare it to the market price



Efficient Markets and Fundamental Analysis

- If you can do a superior job of estimating intrinsic value you can make superior market timing decisions and generate above-average returns
- This involves aggregate market analysis, industry analysis, company analysis, and portfolio management
- Intrinsic value analysis should start with aggregate market analysis



Aggregate Market Analysis with Efficient Capital Markets

- EMH implies that examining only past economic events is not likely to lead to outperforming a buy-and-hold policy because the market adjusts rapidly to known economic events
- Merely using historical data to estimate future values is not sufficient
- You must estimate the relevant variables that cause long-run movements

