

## Market Efficiency and Behavioral Finance

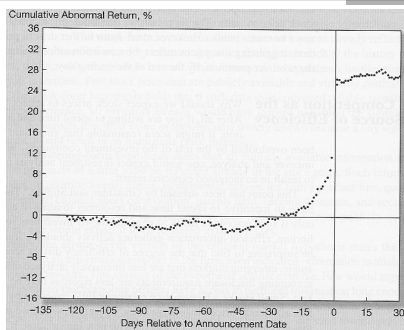
### Chapter 12

## Market Efficiency

- if stock prices reflect firm performance, should we be able to predict them?
- if prices were to be predictable, that would create the possibility of making “sure” profits
- this creates pressure on prices to adjust such that these profit opportunities disappear
- in the end, an *efficient* (i.e., well-functioning) market exhibits no predictable price movement
- prices are said to follow a *random walk*, and this is called the *Efficient Market Hypothesis (EMH)*

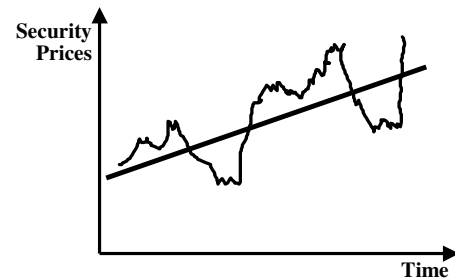
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## Impact of New Information on Stock Prices – Takeover Attempts



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## Random Walk with Positive Trend



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## Efficient Market Hypothesis

- any (publicly available) information on future performance of firms should already be embedded in stock prices
- only *new (unexpected)* information should affect stock prices → price changes are random and unpredictable
- note that randomness of price changes does not mean irrationality of price *levels*, but rather the rationality of their determination

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## Efficient Market Hypothesis (cont.)

- in practice, not all the information might be included in prices because of transaction costs
  - emerging markets are less analyzed than well-developed markets
  - smalls stocks are less analyzed than large stocks
  - small investors cannot afford the cost of information for all/many stocks
- competition among investors looking for “leads” on inefficiently priced stocks should ensure the elimination of inefficiencies

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## Versions of the EMH

- differ with respect to the amount of information reflected in stock prices
- **weak form** = all information that can be derived from past performance: prices, trading volumes, etc. → trend analysis is fruitless
- **semi-strong form** = all publicly available information – same as weak form + fundamental information, quality of management, accounting standards, etc.
- **strong form** = all information about a firm, including information available only to insiders

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## Technical Analysis

- relies on analyzing past price information to find recurrent and predictable patterns, allowing for the prediction of future price evolution
- *chartists* = people performing technical analysis
- (weak form of) EMH → technical analysis is fruitless
- *Dow theory*, the origin of most technical analysis, identifies three forces:
  - primary (long-term) trend
  - intermediate trend – deviations from primary trend
  - minor trend – daily fluctuations of little importance

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## Technical Analysis (cont.)

- newer theories: Elliott wave theory, Kondratieff waves, relative strength approach
- *resistance (support) level* = price levels above (or below) which prices would not rise (or fall) because of market psychology
- *trin* = trading index (reported in financial papers)  
$$Trin = \frac{\text{Volume declining/Number declining}}{\text{Volume advancing/Number advancing}}$$
- if *trin* > 1, bearish market (net selling pressure)

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## Technical Analysis (cont.)

- if investors trade at prices close to support levels, they actually believe they can make “fair” profits, i.e. that prices are as likely to go up as they are to go down
- hence, price patterns have to be *self-destructing* – once widely recognized, they are incorporated into investors’ decisions and into prices
- the market is in continuous dynamics to find new patterns once the old ones self-destruct

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## Fundamental Analysis

- relies on analyzing the “fundamental data” of the firm:
  - earnings and dividend prospects
  - risk evaluation of the firm
  - future interest rates
- (semi-strong version of) EMH → fundamental analysis is fruitless (competition among analysts should eliminate pricing inefficiencies)
- the trick is to find firms that are *better* than anybody else expects them to be

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## Active Portfolio Management

- EMH predicts that only serious and in-depth analyses could pay off
- but these analyses come at a high cost → they are feasible only for managers of large portfolios (small gains in returns can only pay off if large sums invested)
- the best decision for small investors is to invest in mutual funds – even so, there is no guarantee the fund will be able to uncover (sufficiently) mispriced securities

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## Passive Portfolio Management

- *passive management* = invest in a well-diversified portfolio without attempting to outperform the market
- is suggested by EMH
- one common strategy is to create an *index fund*, i.e. invest in a portfolio that mimics an broad-based index (e.g., S&P 500)
- another strategy is to maintain a *passive core* (an indexed position) and augment it with one or more actively managed portfolios

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## Market Efficiency and Portfolio Management

- if market is efficient, why is there still a role for active management?
  - provide investors with well-diversified portfolios with the desired level of systematic risk
  - tax considerations – high- and low-bracket investors might target different securities (dividends vs. capital gains)
  - risk profile of investors (hedging against risk outside of the market)
  - age profile of investors

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## Importance of Market Efficiency

- if stock prices accurately reflect future firm performance, then this creates the premises for efficient resource allocation
- if stock prices are formed inefficiently, that creates the potential for inappropriate investments in the economy (firms that should face high costs of raising capital are actually able to raise it cheaper)
- the result can be severe social costs

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## Testing the EMH – Issues

- *magnitude issue* – the gain from active management can be so small as to be swamped by total market volatility
- *selection bias issue* – we only observe failed attempts of active management
- *lucky event issue* – there will always be some investors that got lucky and won over a longer period of time (luck vs. skill)

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## Weak Form Tests

- based on looking at *serial correlation* (correlation with past values) in stock returns
- empirically, positive serial correlation over short horizons (but small magnitude)
- for intermediate horizons, *momentum effect* = good or bad recent performance of a particular stock continues over time
- over long horizons – strong negative serial correlation
  - overshooting
  - time-varying market risk premium
  - reversals

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## Weak Form Tests (cont.)

- or, based on analyzing if there are any easily observable variables that can predict market returns
  - *dividend yield* = dividend/price ratio
  - bond market data
- can also be interpreted as evidence of variation in the market risk premium

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## Semi-Strong Form Tests

- *market anomalies* = easily-accessible statistics (beyond past trading history) can predict abnormal risk-adjusted returns
- the difficulty is in the risk-adjustment: if the procedure is not accurate, the results are hard to interpret
- in the end, the tests are *joined*: the EMH holds *and* the risk-adjustment procedure is valid

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## Market Anomalies

- Small-Firm-in-January Effect
  - average annual returns are consistently higher for (portfolios of) small firms, even after adjusting for risk using the CAPM (by 4.3%)
  - most of it occurs in the first 2 weeks of January
- Neglected-Firm and Liquidity Effects
  - offered as explanation for the small-firm effect
  - non-researched ("neglected") firms have the highest January effect
  - similarly, less liquid stocks (usually, small and less-analyzed) would require a premium

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## Market Anomalies (cont.)

- Book-to-Market Ratios
  - the ratio of the book value of firm equity to its market value is a strong predictor of returns, independent of beta
  - in fact, after controlling for size- and book-to-market effects, beta had no power in explaining returns
- Post-Earnings-Announcement Price Drift
  - new information should be embodied immediately in prices, but prices continue to adjust even *after* the announcement date

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## Explaining Market Anomalies

- Risk Premiums
  - small and low book-to-market firms tend to be firms with poor (recent) performance
  - the size- and book-to-market factors might capture risk premiums on some sources of risk other than the ones in the market portfolio
  - hence, a three-factor model (Fama and French, 1993)
  - this model can explain fairly well security returns

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## Explaining Market Anomalies (cont.)

- Inefficiencies
  - market anomalies are evidence of systematic errors in forecasts (underprice firms with recent poor performance and overprice firms with recent good performance)
  - further studies seem to indicate that analysts are overly optimistic or pessimistic
  - also, it seems that the *characteristic* of being a small or low-book-to-market firm matter, not the "risk premium"

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## Explaining Market Anomalies (cont.)

- Data Mining
  - it is also possible that these effects are just coincidences, correlations that happen by chance for the periods of time analyzed and that seem to determine stock prices
  - some of these effects disappeared after being reported in academic journals
  - still, they were found on many markets across the world

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## Behavioral Finance

- provides an alternative explanation
- *behavioral finance* = take into account how real (different) people make decisions
- irrationalities may arise because
  - investors don't always process information correctly, and hence derive incorrect future distributions of returns → arbitrage opportunities
  - even knowing the true distribution of returns, investors can make suboptimal decisions → arbitrage is limited
- hence, the absence of arbitrage opportunities does not necessarily imply market efficiency

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## Information Processing

- Forecasting Errors
  - people tend to give too much weight to recent experience compared to prior beliefs (*memory bias*)
- Overconfidence
  - people tend to overestimate the precision of their predictions and their abilities → active management is more prevalent than passive (less than 10% of funds in passive mutual funds)

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## Information Processing

- Conservatism
  - investors are too slow to update their beliefs in response to recent evidence (gradual adjustment)
- Sample Size Neglect and Representativeness
  - investors tend to ignore the fact that some decisions are based on small samples and regard them as representative
  - as they realize their errors, corrections occur → reversals

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## Behavioral Biases

- Framing
  - decisions seem to be affected by the way they are framed (win vs. lose) – individuals tend to be risk-averse in gains but risk-lovers in losses
- Mental Accounting
  - investors tend to separate their decisions for different “accounts” rather than regard their holdings as one portfolio
- Regret Avoidance
  - if decisions turn out bad, individuals regret more the “unconventional” decisions (e.g., blue chips)

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## Limits to Arbitrage

- Fundamental Risk
  - pricing inefficiencies do not present risk-free profit opportunities → investors might not take advantage of them if “too much risk”
- Implementation Costs
  - trading costs (e.g., short sales) can reduce net profits from mispricings
- Model Risk
  - investors worry that the model that predicts the profit opportunity might not be accurate

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## Interpretation of Behavioral Finance

- EMH: prices include all the information, hence there are no “easy” profit opportunities
- behavioral finance: prices can be “wrong”, but there are still no “easy” profit opportunities
- hence, not observing easy profits *does not* imply that prices are “right” (i.e., EMH holds)
- however:
  - inconsistencies in behavioral finance explanations (evidence of both under- and over-reaction)
  - too unstructured

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## Mutual Fund Performance

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- remember that most funds do not outperform the market, but there seemed to be some persistence in performance
- to evaluate funds better, we can look at the alpha coefficients (from CAPM) – seem to have an almost zero mean (slightly negative)
- problem: S&P 500 might not be the most appropriate “market index” (mostly big firms)
- if using a multi-factor index, still evidence of underperformance (on the average) relative to market

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## Mutual Fund Performance (cont.)

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- as for consistency, it seems like most of it is in *negative* results
- very few managers compiled career “winning” records
- evidence from bond funds is even more supportive of the EMH
- **in conclusion:** the market is competitive and “efficient” enough so that the margin of skill a professional can add is so small it cannot be detected by statistics

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