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How to find mass, volume and density for liquid and solid More Info Solar System and Beyond, Dark Energy and Matter, Black Holes More Info Here is the Encyclopedia Britannica's list for-- The Greatest Inventions of All Times More Info How does a battery work... making a battery using lemons More Info View with most latest browsers using HTML5 More Info The six simple machines with an online assessment More Info Read the latest about how they built the Egyptian Pyramids More Info Nanorobotics, nanomedicine, nanocar, atomic force microscope...more More Info Try an interactive activity that uses molecular modeling to explain the reason ice floats. More Info Conduction - Convection - Radiation Molecular Dynamics Simulation of Water More Info Interactive experiment to understand concept ... More Info And, why is it so important --where does a large amount exist? More Info 1 The Efficient Market HypothesisLecture 4 The Efficient Market Hypothesis Describes the financial instruments traded in primary and secondary markets. Discusses Market indexes. Discusses options and futures. McGraw-Hill/Irwin Copyright © by The McGraw-Hill Companies, Inc. All rights reserved. 1 2 Learning outcome What is market efficiency and why it is important?The empirical evidence and its implications Your role in market efficiency 3 Random Walks and the Efficient Market Hypothesis 4 Why it is important to have efficient markets?Market efficiency centers on the idea that stock prices fully reflect information Investors can trust that market prices reflect fair value of assets Do not have to conduct expensive research Corporations' goal is clear: maximize share price = max shareholder wealth A clear benchmark for corporate decision making Capital and resources are allocated in sectors that would generate most welfare 5 Random Walks and the EMHClosely related with the EMH is the concept that stock prices should follow a random walk That is, price changes should be random and unpredictable Why? Under EMH, prices reflect all information. So what causes price to change is the release of new information, i.e., news Flow of new information and thus price change is random 6 Random Walk with Positive TrendSecurity Prices the +trend line is there because firms invest in +NPV projects on average +trend is related to expected return Deviations from the trend should be unpredictable. Deviations from the trend should be unpredictable. the + trend line is there because firms invest in + NPV projects on average Time 7 Forms of the EMH Depending on the information set, you can have weak, semi-strong or strong form EMH Weak-form EMH The relevant information is historical prices and other trading data such as trading volume. If the markets are weak form efficient, use of such information provides no benefit "at the margin." Explain, at the margin, means after cost of obtaining and using the information. Weak- Prices reflect all information that can be derived from trading data such as prices and volume. Semi-Strong: Prices reflect all publicly available information regarding the firm's prospects. Financial Data, information about the industry, the firm management, etc. Strong- Stock prices reflect all information both public and private. (inside information). 8 Forms of the EMH (cont.) Semi-strong form EMHThe relevant information is "all publicly available information, including past price and volume data." If the markets are semi-strong form efficient, then studying past price and volume data & studying earnings and growth forecasts provides no net benefit in predicting price changes at the margin. Weak- Prices reflect all information that can be derived from trading data such as prices and volume. Semi-Strong: Prices reflect all publicly available information regarding the firm's prospects. Financial Data, information about the industry, the firm management, etc. Strong- Stock prices reflect all information both public and private. (inside information). 9 Forms of the EMH (cont.) Strong form EMHThe relevant information is "all information" both public and private or "inside" information. If the markets are strong form efficient, use of any information (public or private) provides no benefit at the margin. SEC Rule 10b-5 limits trading by corporate insiders (officers, directors and major shareholders). Inside trading must be reported. Weak- Prices reflect all information that can be derived from trading data such as prices and volume. Semi-Strong: Prices reflect all publicly available information regarding the firm's prospects. Financial Data, information about the industry, the firm management, etc. Strong- Stock prices reflect all information both public and private. (inside information). 10 Relationships between forms of the EMHNotice that _____ _____ (but _____) Strong form efficiency would imply that _____. semi-strong efficiency implies weak form efficiency holds Weak- Prices reflect all information that can be derived from trading data such as prices and volume. Semi-Strong: Prices reflect all publicly available information regarding the firm's prospects. Financial Data, information about the industry, the firm management, etc. Strong- Stock prices reflect all information both public and private. (inside information). NOT vice versa both semi-strong and weak form efficiency hold 11 Implications of the EMHTechnical analysis Fundamental analysis Active versus passive investment Portfolio management 12 Technical Analysis: The idea is that pattern repeats itself (or trend would continue) If you can identify them, you can predict future price movement One on the left is real, the one on the right is simulated. 13 Relationship to the EMHTechnical Analysis: If the markets are weak form efficient (or semi-strong form efficient or strong form efficient) will technical analysis be able to consistently predict future price changes? Ans: In practice, chartists don't believe in efficient markets Technical Analysis or TA is using past prices and volume information to predict future price changes Chartists, by definition, don't believe in efficient markets. They are using historical price and volume data to attempt to reap excess returns. Fundamental Analysis: Understanding the economic fundamentals of the firm, its industry and the economy. A semi-strong efficient market suggests fundamental analysis would not aid in stock picking. 14 Fundamental Analysis Fundamental analysis (FA) assumes that stock prices should be equal to Techniques of FA generally focus on the discounted value of the expected future cash flows the stock is expected to provide to investors. Forecasting the firm's future dividends or earnings, Discounting those future cash flows by the required rate of return (usually obtained from the CAPM), and Comparing the resulting estimated price with the current stock price. 15 Fundamental Analysis If the estimated price is _____ than the current price an investor should ___ the stock since it is _____ and since its price should _____ to the "true" or "fundamental" value uncovered by the analyst. If the estimated price is ____ than the current price the stock should be ____ because the stock is currently _____ by the market. In either case if the analyst is correct the investor should receive an _____. Abnormal return refers to return in excess of that required for the risk being undertaken buy greater undervalued increase less sold overvalued "abnormal return" 16 Relationship to the EMHFundamental Analysis: If the markets are weak form efficient (or semi-strong form efficient or strong form efficient) will fundamental analysis be able to consistently predict price changes? Ans: using economic and accounting information to predict stock price changes If the markets are only weak form efficient? Fundamental Analysis CAN predict price changes If the markets are semi-strong or strong form efficient? Fundamental Analysis CANNOT predict price changes 17 What research have found about TA and FA?Most technical trading do not generate abnormal profit after adjusting for transaction costs FA To add value, your forecast must be better than the consensus forecast (not enough to find a good company) Strong competition makes it difficult for FA to bring net benefit after costs Both of these are key points the students need to understand 18 Implications of Efficiency for Active or Passive ManagementAssumes inefficiency, use technical and/or fundamental analysis to pick securities Active Management Passive Management Security analysis Timing strategies Investment Newsletters Consistent with semi-strong efficiency Active management assumes markets are inefficient. Use either technical or fundamental analysis to pick stocks. Passive management tends to be the management style that fits the EMH. No reason to spend any money or make any effort to pick "winners." Buy and Hold portfolios Index Funds 19 Market Efficiency and Portfolio ManagementEven if the market is efficient a role exists for portfolio management Identify risk & choose appropriate risk level Tax considerations Other considerations such as liquidity needs or diversify away from the client's industry We talked about investor preferences due to level of risk aversion. Risk tolerance can change as you age! Highly taxed investors may dislike investments with large dividends. People may desire selling losers and winners together to minimize taxes. Other. Talk about a large manager at a Firm like GM. Would not want to hold more auto industry stock, due to his overweighting of wealth tied up in the auto industry. 20 Are Markets Efficient? The Empirical Evidence 21 Empirical Tests of Market EfficiencyTests of EMH is similar to asking… Can anyone consistently earn an abnormal return? Abnormal returns mean positive returns after risk adjustment Do investors systematically misinterpret information? Systematical misinterpretation of information means repeat the same mistakes over and over in an irrational fashion. Event Studies look at how quickly information is integrated into prices around an informational event. EMH suggests quick assimilation of information into prices. Do professional managers, use their resources and tools to outperform the market? EMH suggests professionals will not outperform the market. Are there specific trading rules that could make money? Use filter rules (ex. Buy after 20% price drop, sell after 20% gain) 22 Empirical Tests of Market Efficiency (cont.)Event studies Assessing performance of professional managers Testing a trading rule Examine how quickly information is integrated into prices around an informational event. EMH implies rapid assimilation of information into prices. Can professional managers, using their resources and tools, "beat" the market after considering risk? EMH implies professionals will not outperform the market. Event Studies look at how quickly information is integrated into prices around an informational event. EMH suggests quick assimilation of information into prices. Do professional managers, use their resources and tools to outperform the market? EMH suggests professionals will not outperform the market. Are there specific trading rules that could make money? Use filter rules (ex. Buy after 20% price drop, sell after 20% gain) Testing whether a rule that uses available information can earn abnormal returns after considering the risk and cost of using the rule. EMH implies that such rules will not work. 23 How Tests Are Structured: Event StudiesCalculation of abnormal returns: Market Model approach a. b. rt = a + b(rindex,t) + et Estimate a and b coefficients Abnormal Return or AR = (Actual - Expected) ARt+1 = et+1 = Actual return – [a + b(rindex,t+1)] Question: How do we determine if the returns are abnormal? Returns at any time t should be a function of the market returns the risk free rate and the market returns that occur during the same period. Abnormal returns are excess (unexpected returns) Example: examining prices and returns around positive surprise earnings announcement (next page…) 24 How Tests Are Structured: Event Studies= abnormal return Inefficient market -t +t Announcement Date Efficient market -t +t 25 How Tests Are Structured: Event StudiesMarket Model approach continued: c. Cumulate the abnormal returns over time: Add up the ARs over time +t -t Cumulating the excess returns over time we can see if information is integrated into prices before or after the event. Here it appears to have some information leaking into the price prior to the event date. See p. 285 for cumulative abnormal returns and earnings announcements. (Post-Earning announcement drift) In this case there appears to be information leakage before the announcement date (day 0), but markets adjust quickly to new information. 26 Post-earnings-announcement-drift anomalyCumulative Abnormal Returns in Response to Earnings Announcements Anomalies are patterns of returns that seem to contradict the EMH Rendleman, Jones and Latane' results. These have been updated many times. Note the continual drift up after the earnings announcement date for the firms with the highest earnings surprises and the continual drift down for the firms with poor earnings surprises. This is termed the short term momentum effect and is counter to market efficiency. You apparently CAN earn +ARs from this one, although logically this seems unlikely. 27 Weak-Form Anomalies Returns over short horizons (3-12 months)Jegadeesh and Titman (1993) found momentum effect: poorly and well-performing stocks in one period continue the same performance in the following periods Returns over long horizons (5 years) De Bondt and Thaler (1985) found reversal effect: the tendency of poorly performing and well performing stocks in one period to experience reversal in the subsequent period. 28 Semi-strong Tests: Size and book-to-market anomaliesReturns of size-based portfolios, Returns of based on Book-to-Market ratio, 1926 to 2007 NYSE stocks broken up into size deciles. This is driven by January returns! (The first two weeks). Arbel and Strebel claim this size effect is a neglected firm effect and is hence due to higher risk, not fully captured by the CAPM. Brooks and others have shown that these returns are hard to capture due to high trading costs and lower liquidity of small firms. Also, low P/E stocks & neglected firms yield abnormal returns 29 Mutual Fund and Analyst Performance 30 No Evidence of Mutual Funds Out-PerformanceMutual Funds Alphas Based on a Four Factor Model Persistence of Mutual Fund Performance Belaboring the point? Not much persistence in performance over time. Carhart 1997, JOF NB: 1. alpha = average of abnormal returns 2. important to use correct benchmark 31 Stock market analysts Barber et al. (2001) find evidence of analysts' positive bias in stock recommendation Womack (1996) find positive changes in analysts' recommendations are associated with +5% increase in stock price; 11% fall for negative changes Overall, some value added by analysts but ambiguity remains in terms of trading costs or changes in investors' demand 32 Bubbles and Market Efficiency 33 Bubbles and Market EfficiencyPeriodically stock prices appear to undergo a 'speculative bubble.' A speculative bubble is said to occur if prices deviate too far away from its intrinsic value Does this imply that markets are not efficient? Difficult to tell if you are in a bubble and difficult to predict when the bubble will burst With hindsight there appear to be times when stock prices decouple from intrinsic value (i.e. bubbles), sometimes for years The near financial melt down in 2008 was an indisputable fact of market failure or in efficiency On bubbles: Stock prices are estimates of future economic performance of the firm and these estimates can change rapidly. Risk premiums can change rapidly and dramatically. 34 Your role in market efficiency 35 Avoid the two extreme views on EMHEMH is true A stock picked by a monkey throwing a dart is as good as a stock selected by a fund manager No need for TA, nor fundamental analysis Two economists walking down the street see a $20 note on the sidewalk One wants to pick it up The other says, "Don't bother; if the note were real someone would have picked it up already." EMH does not hold You can devise your magic trading rule and become a billionaire 36 EMH and Competition Grossman & Stiglitz (AER, 1980):It is not possible to have informationally efficient markets Arbitrage opportunities do exist from time to time; without such opportunities, there will be no incentive to gather information, and the price-discovery aspect of financial markets will collapse. Those who expend resources to obtain information receive compensation 37 37 EMH and Competition (cont.)So market is 'efficient' if Once information becomes available, market participants quickly analyze it & trade on it Competition among investors should imply that stock prices fully reflect publicly available information quickly. Else there are unexploited profit opportunities Which would give rise to arbitrage opportunities for profits! Implications: research & analysis can be rewarded A new discipline: behavioral finance 38 38 Summary EMH says prices reflect all informationFar reaching implications for investors, corporations, regulations and industry policy EMH implies random walks Three forms of EMH: weak, semi-strong and strong Weak form EMH implies technical analysis is useless Semi-strong form EMH implies fundamental analysis is useless 39 Summary (cont.) Need to adjust for risk appropriately to test for market efficiencies Anomalies (e.g. size and market-to-book) could be due to model misspecification Recent financial crisis brings into the question of allocational efficiency Those who expend resources to obtain information receive compensation and competition makes market efficient 40 Reading material Bodie, Kane, Marcus, 2009, Investment 8th Edition. Chapter 11. Grossman and Stiglitz (1980) On the impossibility of informationally efficient markets, American Economic Review 70, 393 – 408. Jegadeesh and Titman (1993) Returns to buying winners and selling losers: Implications for stock market efficiency, Journal of Finance 48, 65 – 91. We're fetching your file...Please wait a moment while we retrieve your file from its home on the internet The Efficient Market Hypothesis 8 Bodie, Kane, and Marcus Essentials of Investments, 9th Edition8.1 Random Walks and Efficient Market Hypothesis • Random Walk • Notion that stock price changes are random • Efficient Market Hypothesis (EMH) • Prices of securities fully reflect available informationFigure 8.1 Cumulative Abnormal Returns before Takeover Attempts: Target CompaniesFigure 8.2 Stock Price Reaction to CNBC Reports8.1 Random Walks and Efficient Market Hypothesis • Competition as Source of Efficiency • Investor competition should imply stock prices reflect available information • Investors exploit available profit opportunities • Competitive advantage can verge on insider trading8.1 Random Walks and Efficient Market Hypothesis • Versions of EMH • Weak-form EMH • Stock prices already reflect all information contained in history of trading • Semistrong-form EMH • Stock prices already reflect all public information • Strong-form EMH • Stock prices already reflect all relevant information, including inside information8.2 Implications of the EMH • Technical Analysis • Research on recurrent/predictable price patterns and on proxies for buy/sell pressure in market • Resistance Level • Unlikely for stock/index to rise above • Support Level • Unlikely for stock/index to fall belowImplications of the EMH • Fundamental Analysis • Research on determinants of stock value, i.e. earnings, dividend prospects, future interest rate expectations and firm risk • Assumes stock price equal to discounted value of expected future cash flowImplications of the EMH • Active versus Passive Portfolio Management • Passive investment strategy • Buying well-diversified portfolio without attempting to find mispriced securities • Index fund • Mutual fund which holds shares in proportion to market index representation8.2 Implications of the EMH • Role of Portfolio Management in Efficient Market • Active management assumes market inefficiency • Passive management consistent with semistrong efficiency • Inefficient market pricing leads to inefficient resource allocation8.3 Are Markets Efficient? • Issues • Magnitude issue • Efficiency is relative, not binary • Selection bias issue • Investors who find successful investment schemes are less inclined to share findings • Observable outcomes preselected in favor of failed attempts • Lucky event issue • Lucky investments receive disproportionate attention8.3 Are Markets Efficient? • Weak-Form Tests: Patterns in Stock Returns • Returns over short horizons • Momentum effect: Tendency of poorly- or well-performing stocks to continue abnormal performance in following periods • Returns over long horizons • Reversal effect: Tendency of poorly- or well-performing stocks to experience reversals in following periods8.3 Are Markets Efficient? • Predictors of Broad Market Performance • 1988—Fama and French: Return on aggregate stock market tends to be higher when dividend yield is low • 1988—Campbell and Shiller: Earnings yield can predict market returns • 1986—Keim and Stambaugh: Bond market data (spread between yields) can predict market returns8.3 Are Markets Efficient? • Semistrong Tests: Market Anomalies • Anomalies • Patterns of returns contradicting EMH • P/E effect • Portfolios of low P/E stocks exhibit higher average risk-adjusted returns than high P/E stocks8.3 Are Markets Efficient? • Semistrong Tests: Market Anomalies • Small-firm effect • Stocks of small firms can earn abnormal returns, primarily in January • Neglected-firm effect • Stock of little-known firms can generate abnormal returns • Book-to-market effect • Shares of high book-to-market firms can generate abnormal returns8.3 Are Markets Efficient? • Semistrong Tests: Market Anomalies • Post-earnings announcement price drift • Sluggish response of stock price to firm's earnings announcement • Abnormal return on announcement day, momentum continues past market price • Bubbles and market efficiency • Speculative bubbles can raise prices above intrinsic value • Even if prices are inaccurate, it can be difficult to take advantage of themFigure 8.3 Average Annual Return: Ten Size-Based Portfolios, 1926-2010Figure 8.4 Average Annual Return as Function of Book-to-Market Ratio, 1926-2010 Figure 8.5 Cumulative Abnormal Returns after Earnings Announcements8.3 Are Markets Efficient? • Interpreting Anomalies • Anomalies or data mining? • Some anomalies have not shown staying power after being reported • Small-firm effect • Book-to-market effectFigure 8.6 Return to Style Portfolio as Predictor of GDP Growth 8.4 Mutual Fund and Analyst Performance • Stock Market Analysis • Analysts are overly positive about firm prospects • Womack: Positive changes associated with 5% increase, negative with 11% decrease • Jegadeesh, Kim, Kristie, and Lee: Level of consensus is inconsistent predictor of future performance • Barber, Lehavy, McNichols, and Trueman: Firms with most-favorable recommendations outperform firms with least-favorable recommendations8.4 Mutual Fund and Analyst Performance • Mutual Fund Managers • Today's conventional model: Fama-French factors plus momentum factor • Wermers: Funds show positive gross alphas; negative net alphas after controlling for fees, risk • Carhart: Minor persistence in relative performance across managers, largely due to expense/transaction costs8.4 Mutual Fund and Analyst Performance • Mutual Fund Managers • Berk and Green: Skilled managers with abnormal performance will attract new funds until additional cost, complexity drives alphas to zero • Chen, Ferson, and Peters: On average, bond mutual funds outperform passive bond indexes in gross returns, underperform once fees subtracted8.4 Mutual Fund and Analyst Performance • Mutual Fund Managers • Kosowski, Timmerman, Wermers, and White: Stock-picking ability of minority of managers sufficient to cover costs; performance persists over time • Samuelson: Records of most managers show no easy strategies for successFigure 8.7 Mutual Fund Alphas Computed Using Four-Factor Model, 1993-2007Figure 8.8 Persistence of Mutual Fund PerformanceFigure 8.9 Risk-Adjusted Performance in Ranking Quarter, Following Quarter8.4 Mutual Fund and Analyst Performance • So, Are Markets Efficient? • Enough that only differentially superior information will earn money • Professional manger's margin of superiority likely too slight for statistical significance 1 EFFICIENT MARKET HYPOTHESISChapter 10 EFFICIENT MARKET HYPOTHESIS The Collective Wisdom 2 OUTLINE Random Walk What is an Efficient Market Empirical Evidence on Weak-form Efficient Market Hypothesis Empirical Evidence on Semi-strong Form Efficient Market Hypothesis Empirical Evidence on Strong-form Efficient Market What is the Verdict Implications for Investment Analysis 3 RANDOM WALK Maurice Kendall found that stock prices followed a random walk, implying that successive price changes are independent of one another. A number of researchers have employed ingenious methods to test the randomness of stock price behaviour. Academic researchers concluded that the randomness of stock prices was the result of an efficient market. 4 WHAT IS AN EFFICIENT MARKETAN EFFICIENT MARKET IS ONE IN WHICH THE MARKET PRICE OF A SECURITY IS AN UNBIASED ESTIMATE OF ITS INTRINSIC VALUE MARKET EFFICIENCY IS DEFINED IN RELATION TO INFORMATION THAT IS REFLECTED IN SECURITY PRICES. FAMA DISTINGUISHES THREE LEVELS OF MARKET EFFICIENCY. Weak-form efficiency Semi-strong form efficiency Strong-form efficiency 5 STOCK MARKET EFFICIENCYSTRONG SEMI-STRONG WEAK MISCONCEPTIONS 1. EMH.. IMPLIES… MARKET HAS PERFECT FORECASTING. 2. AS PRICES TEND TO FLUCTUATE THEY CANNOT REFLECT FAIR VALUE. 3. INABILITY OF INSTITUTIONAL PORTFOLIO MANAGERS TO ACHIEVE SUPERIOR INVESTMENT PERFORMANCE IMPLIES THAT THEY LACK COMPETENCE. 4. THE RANDOM MOVEMENT OF STOCK PRICES SUGGESTS THAT THE STOCK MARKET IS IRRATIONAL. 6 EMPIRICAL EVIDENCE ON WEAK-FORM EFFICIENT MARKET HYPOTHESISSERIAL CORRELATION TEST RUNS TEST FILTER RULES TEST 7 EMPIRICAL EVIDENCE ON SEMI-STRONG FORM HYPOTHESIS• POSSIBLE TO EARN SUPERIOR RISK-ADJUSTED RETURN BY TRADING ON INFORMATION EVENTS? (EVENT STUDY) RETURN … BY TRADING ON AN OBSERVABLE CHARACTERISTIC OF A FIRM? (PORTFOLIO STUDY) 8 EVENT STUDY 1. IDENTIFY THE ANNOUNCEMENT DATE OF THE EVENTEVENT STUDY 1. IDENTIFY THE ANNOUNCEMENT DATE OF THE EVENT ANNOUNCEMENT DATE 2. COLLECT RETURNS DATA AROUND THE ANNOUNCEMENT DATE Rj -n Rj,O Rj, +n -n TO +n 3. CALCULATE THE EXCESS RETURN ERj t = Rj t - BETAj x Rmt 4. COMPUTE THE AVERAGE AND THE STANDARD ERROR OF EXCESS RETURNS ACROSS ALL FIRMS 5. ASSESS WHETHER THE EXCESS RETURNS AROUND THE ANNOUNCEMENT DATE ARE DIFFERENT FROM ZERO AVERAGE EXCESS RETURN T STATISTIC FOR EXCESS RETURN ON DAY t = STANDARD ERROR 9 GRADUAL ADJUSTMENTS TO EARNINGS ANNOUNCEMENTS 10 PORTFOLIO STUDY DEFINE THE VARIABLE (CHARACTERISTIC) ON WHICH FIRMS WILL BE CLASSIFIED CLASSIFY FIRMS INTO PORTFOLIOS BASED UPON THE MAGNITUDE OF THE VARIABLE COMPUTE THE RETURNS FOR EACH PORTFOLIO CALCULATE THE EXCESS RETURNS FOR EACH PORTFOLIO E Rji = Rji - BETAj x RMt 5. ASSESS WHETHER THE AVERAGE EXCESS RETURNS ARE DIFFERENT ACROSS THE PORTFOLIOS 11 RETURNS BY P - E MULTIPLE CLASS18.00% 16.00% 14.00% 12.00% 10.00% 8.00% 6.00% 4.00% 2.00% 0.00% LOWEST HIGHEST 12 EMPIRICAL EVIDENCE ON STRONG-FORM EFFICIENT MARKET HYPOTHESISEMPIRICAL EVIDENCE BROADLY SUGGESTS THE FOLLOWING: CORPORATE INSIDERS EARN SUPERIOR RETURNS, AFTER ADJUSTMENT FOR RISK. MUTUAL FUND MANAGERS, ON AVERAGE, DO NOT EARN SUPERIOR RETURNS AFTER ADJUSTMENT FOR RISK. 13 OTHER EVIDENCE PRICE OVERREACTIONS CALENDAR ANOMALIES EXCESS VOLATILITY NORMAL RANGE OF INTEREST 14 THE CRASH OF 1987 OCTOBER 19, 1987 DJIA 23%P ≃ IV APPEARS LESS APPEALING DIFFICULTY . . VALUING EQUITIES … = = DIFFICULTY IN VALUING EQUITY STOCKS … TWO IMPLICATIONS : 1. INVESTORS TYPICALLY PRICE AN EQUITY STOCK IN RELATIVE TERMS 2. ALMOST IMPOSSIBLE . . TEST THE HYPOTHESIS … P ≃ IV ABSOLUTE EFFICIENCY VS RELATIVE EFFICIENCY 15 VERDICT TRUE, THE EFFICIENT MARKET HYPOTHESIS, LIKEALL THEORIES, IS AN IMPERFECT AND LIMITED DESCRIPTION OF THE STOCK MARKET. HOWEVER, THERE DOES NOT, AT LEAST FOR THE PRESENT, SEEM TO BE A BETTER ALTERNATIVE. MERTON MILLER : "IT IS CLOSER TO BEING A 'PARADIGM' THAN A MERE HYPOTHESIS, BRINGING A COMMON AND COHERENT EXPLANATORY FRAMEWORK TO A WIDE VARIETY OF SEEMINGLY UNRELATED PHENOMENA. LIKE ALL SCIENTIFIC PARADIGMS, IT WILL SURVIVE UNTIL DISPLACED BY A BETTER ONE. AT THE MOMENT, AT LEAST NO BETTER PARADIGM IS IN SIGHT" 16 IMPLICATIONS FOR INVESTMENTSSubstantial evidence in favour of randomness suggests that technical analysis is of dubious value. Routine and conventional fundamental analysis is not of much help in identifying profitable courses of action The key levers for earning superior rates of returns are: Early action on any new development. Sensitivity to market imperfections and anomalies. Use of original, unconventional, and innovative modes of analysis. Access to inside information and its sensible interpretation An independent judgment that is not affected by market psychology. 17 SUMMING UP Stock prices appear to follow a random walk. Therandomness of stock prices is the result of an efficient market It is useful to distinguish three levels of market efficiency : weak form efficiency, semi-strong form efficiency, and strong form efficiency. The weak form efficient market hypothesis says that the current price of a stock reflects all information found in the record of past prices and volumes. The semi-strong form efficient market hypothesis holds that stock prices adjust rapidly to all available public information. The strong form efficient market hypothesis holds that all available information, public and private is reflected in stock prices. 18 Empirical evidence seems to provide strong support forweak-form efficiency, mixed support for semi-strong form efficiency, and weak support for strong-form efficiency. The efficient market hypothesis is an imperfect and limited description of the stock market. however, at least for the present, there does not seem to be a better alternative. The key implications of the efficient market hypothesis are that technical analysis is of dubious value and routine fundamental analysis is not of much help. Efficient Market HypothesisThe conceptsTopics • What if you figure a stock price moving pattern? • Some formal definitions • Implications of Efficient Market Hypothesis • Price modeling • Empirical studies What if? Definitions Implications Price EmpiricsWhat if • What if you have figured out the following: • Buy if out of the 20 trading days for the past month, stock XYZ has been rising for more than 10%. • Sell if out of the 20 trading days for the past month, stock XYZ has been falling for more than 10%. • Follow this rule strictly, return is "abnormally high". What if? Definitions Implications Price EmpiricsStock price reflects information • If you have spotted such price pattern that seems to guarantee you a sure profit, what should you do? • You should definitely exploit it. (How? Borrow as much as you can to invest according to your strategy.) • The process of exploiting the pattern actually ironically destroy the pattern because: • You would bid up XYZ share price when you think it is hot. ↑ Price => ↓ Expected[Return] • You would bid down XYZ share price when you think it is cold. ↓ Price => ↑ Expected[Return] • The fact that you have figured out a stock price movement is very likely to be reflected by the stock price. • The more greedy (which is rational. More precisely, is the higher the ability for you to raise fund) you are, the faster your pattern will be eliminated by your own hands. • Bottom line: info, private or public, is reflected in stock prices. What if? Definitions Implications Price EmpiricsSell Sell Buy Buy Price movement pattern Investors' behaviors tend to eliminate any profit opportunity associated with stock price patterns. Stock Price If it were possible to make big money simply by finding "the pattern" in the stock price movements, everyone would have done it and the profits would be competed away. Time What if? Definitions Implications Price EmpiricsThe army • If you are one of the stock hunters, actively looking for price patterns, who are you competing with? What if? Definitions Implications Price EmpiricsThe army • If you are one of the stock hunters, actively looking for price patterns, who are you competing with? What if? Definitions Implications Price EmpiricsThe army • If you are one of the stock hunters, actively looking for price patterns, who are you competing with? What if? Definitions Implications Price EmpiricsThe army • Imagine not only you, there is essentially an "army" of intelligent, well-informed security analysts, traders, who literally spend their lives hunting for mis-priced securities or securities that follow a pattern based on currently available information. • They have high-tech computers, subscription to professional database, up-to-date information on thousands of firms, state-of-the-art analytical technique, etc. • These people can assess, assimilate and act on information, very quickly. • In their intense search for mis-priced securities, professional investors may "police" the market so efficiently that they drive the prices of all assets to fully reflect all available information. What if? Definitions Implications Price EmpiricsImplications • Competition for finding mis-priced securities is fierce. • Such competition always kills the "sure-profit" pattern. Were there one, it would have been exploited by someone who first spotted it. Thus, roughly speaking, "no arbitrage" should hold. • The first one does make abnormal profit, but Economic profit ≠ gross profit • The "very first" one is not likely to be you. • Even if you are the "very first" one, you are likely to pay higher brokerage and commission fees than institutional investors. • The implications: • stock prices should have reflected all available information. • stock prices should be unpredictable. What if? Definitions Implications Price EmpiricsUnpredictability • Prices are unpredictable in the sense that stock prices should have reflected "all available information". • Thus if stock prices change, it should be reacting only to "new information". • The fact that information is new means stock prices are unpredictable. What if? Definitions Implications Price EmpiricsMarket efficiency • If all past information is incorporated in the price then it should be impossible to consistently beat the market using technical analysis and the like. • Definition 1: • Eugene Fama defined Market Efficiency as the state where "security prices reflect all available information." • Definition 2: • Financial markets are efficient if current asset prices fully reflect all currently available relevant information. What if? Definitions Implications Price EmpiricsThe right question to ask • If new information becomes known about a particular company, how quickly do market participants find out about the information and buy or sell the securities of the company based on the information? • How quickly do the prices of the securities adjust to reflect the new information? • The issue is not merely black or white. We know that the market should neither be strictly efficient nor strictly inefficient. The question is one of degree. • We should ask " how efficient the market really is?" What if? Definitions Implications Price EmpiricsSubsets of available informationFor a given stock All Available Information including inside or private information All Public Information Information in past stock prices What if? Definitions Implications Price Empirics3 forms of market efficiency hypothesis Since we are more interested in how efficient is the capital market, we define the following 3 forms of market efficiency hypothesis: "A market is efficient if it reflects ALL available information" [1] Strong-form - ALL available info [2] Semi-strong form - ALL available info [3] Weak-form - ALL available info All Available Information including inside or private information All Public Information Information in past stock prices What if? Definitions Implications Price Empirics3 forms of market efficiency hypothesis • Weak-form "Stock prices are assumed to reflect any information that may be contained in the past stock prices." • For example, suppose there exists a seasonal pattern in stock prices such that stock prices fall on the last trading day of the year and then rise on the first trading day of the following year. Under the weak-form of the hypothesis, the market will come to recognize this and price the phenomenon away. • Anticipating the rise in price on the first day of the year, traders will attempt to get in at the very start of trading on the first day. Their attempts to get in will cause the increase in price to occur in the first few minutes of the first day. Intelligent traders will then recognize that to beat the rest of the market, they will have to get in late on the last day. The consequences, therefore, is the elimination of the pattern as price in the last trading day should be bid up. What if? Definitions Implications Price Empirics3 forms of market efficiency hypothesis • Semi-strong-form "Stock prices are assumed to reflect any information that is publicly available." • These include information on the stock price series, as well as information in the firm's accounting reports, the past prices and reports of competing firms, announced information relating to the state of the economy, and any other publicly available information relevant to the valuation of the firm. What if? Definitions Implications Price Empirics3 forms of market efficiency hypothesis • Strong-form "Stock prices are assumed to reflect ALL information, regardless of them being public or private." • Under this form, those who acquire insider information act on it, buying or selling the stock. Their actions affect the price of the stock, and the price quickly adjusts to reflect the insider information. What if? Definitions Implications Price Empirics3 forms of market efficiency hypothesis • If Weak-form of the hypothesis is valid: • Technical analysis or charting becomes ineffective. You won't be able to gain abnormal returns based on it. • If Semi-strong form of the hypothesis is valid: • No analysis will help you attain abnormal returns as long as the analysis is based on publicly available information. • If Strong-form of the hypothesis is valid: • Any effort to seek out insider information to beat the market are ineffective because the price has already reflected the insider information. Under this form of the hypothesis, the professional investor truly has a zero market value because no form of search or processing of information will consistently produce abnormal returns.(Even if Steve Jobs is your uncle, you can't profit from listening to his phone calls and trading APPLE stocks.) What if? Definitions Implications Price EmpiricsWhy do we care about capital market efficiency? • As an analyst • As an investment manager • As a corporate financial manager • As a marketing manager • As an accounting manager What if? Definitions Implications Price EmpiricsWhy do we care about capital market efficiency? • As an analyst • If market is efficient, what is your marginal contribution for your securities firm? It should be zero, because you will not be able to spot mis-priced securities to produce additional returns on the portfolios that you are managing. Heat Debate. • Analysts' total contribution to the society should be big. Because in scouting the capital market, they essentially make sure asset prices are effective as signals to others. • If the market is truly efficient => 0