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Fundamentals, Bubbles, Trading Strategies: Are they the Causes of Black Monday?

By D. Johannes Jüttner, Sydney and Tuscaloosa/Alabama*

I. Introduction

The share market price rises on all major bourses came to a sputtering halt in mid-October 1987 and they crashed on 19th October. At its peak, the All Ordinaries market index of the Australian stock exchanges stood 50 % above its level at the beginning of 1987, with 44 % the comparable figure for New York, 46 % for London, 42 % for Tokyo.

The uniformity of equity price rises since about 1982, particularly, however, their accelerating pace during the last year created a climate of general anxiety that share market prices were overvalued in terms of economic fundamentals. The overvalued equity prices were generally regarded as unsustainable in terms of expected earnings and dividends, especially when viewed against the background of global trade imbalances and the huge US fiscal deficit. The eventual collapse of the stock markets therefore turned out to be the inexorable finale to a grand delusion.

However, the fact that stock market values parted company with the underlying economic fundamental does not explain the severity of the eventual fall. The former is a frequent occurrence while the latter is almost a unique event, paralleled only by the Great Crash of 1929. Some analysts therefore likened the bull market to an expanding bubble, increased by speculative frenzy that eventually burst.

Other observers, while not ignoring the impact of the fundamentals and the existence of speculative mania, emphasize the destructive role of trading strategies, which linked equity with futures and options markets, for the speed of the decline.

In this paper we examine the likely part played by all three presumed determinants of Black Monday, namely fundamentals, bubbles and trading

* This study has been completed while the author was a visiting professor of economics at the University of Alabama.

strategies. Much of our evidence is judgmental and preliminary. Nevertheless, official investigations have shed some light on the events surrounding the crash and they include the following: The Report of the Presidential Task Force on the Market Mechanism, January 1988 (*Brady Report*); *N. Katzenbach*, An Overview of Program Trading and Its Impact on Current Market Practices (commissioned by NYSE (*Katzenbach Report*); General Accounting Office, Stock Market Crash of October 1987, Preliminary Report to Congress (GAO Report); Securities and Exchange Commission, Securities and Exchange Commission Recommendations Regarding the October 1987 Market Break, February 1988 (SEC Report); Securities and Exchange Commission, The October 1987 Market Break – A Report by the Division of Market Regulation, US Securities and Exchange Commission (SEC Staff Report); Commodity Futures Trading Commission, Final Report on Stock Index Futures and Cash Market Activity During October 1987 to the US Commodity Futures Trading Commission (CFTC Staff Report). The Bank of England (1988) also commented extensively on the crash. To the best of my knowledge, the regulatory authorities of other countries were less forthcoming.

II. The Role of Fundamentals

Shares in a company derive their value from the promise of expected future earnings. The one period expected return, r_K , of a share equals the capital gain during the period $t + 1$ plus the expected dividend yield, i.e.

$$(1) \quad r_K = \frac{P_{t+1} - P_t}{P_t} + \frac{D_{t+1}}{P_t}$$

capital gain (%) dividend (%)

or in more familiar form:

$$(2) \quad r_K = \frac{P_{t+1} + D_{t+1} - P_t}{P_t}$$

where P_t : share price at t

P_{t+1} : expected share price at $t + 1$

D_{t+1} : expected dividend at $t + 1$

Solving equation (2) for the current price we obtain

$$(3) \quad P_t = \frac{P_{t+1} + D_{t+1}}{1 + r_K}$$

In equilibrium, the expected rate of return is equal to the required (by shareholders) rate of return. Thus, the current price equals the sum of the discounted values of the end-of-period price and the expected dividend. The end of period price, of course, depends on the discounted share price and expected dividend of one period further in the future and so on for the whole life of the company. Clearly, only a few would be able to predict dividends and share prices for several years ahead, let alone make forecasts for the distant future. However, what the mass of share investors lacks in far-sightedness is made up by analysts making some courageous, but simplifying, assumptions. Dividends are expected to grow at a constant annual rate, g , and the required rate of return is assumed to be constant (see *Brealey* 1983, p. 69). Given these simplifying conditions, equation (3) may be rewritten as

$$(4) \quad P_t = \frac{D}{r_K - g}$$

where D stands for the expected annual dividend stream. Obviously, this equation holds only when $r_K > g$. Let $r_K = 0.10$, $g = 0.05$ and $D = \$2$, then $P_t = \$2/(0.10 - 0.05) = \40 .

Equation has been used to demonstrate the potential volatility of share prices. Assume the required rate of return falls to $r_K = 0.06$ while the dividend expectations remain unchanged. The price of the common stock then rises to $P_t = \$2/(0.06 - 0.05) = \200 . Conversely, when the required rate of return rises to $r_K = 0.15$, the share price drops to $\$20$.

Given our stock valuation formula, it appears that the persistent and finally accelerating, recent upward trend of share prices can only have been fed by a first gradual and then increasing fall in r_K . The economic circumstances during the bull market of the 1980s do not lend support to the view that the outlook for dividends and their growth rate (D and g) improved substantially during that period. In fact the opposite is true, as our previous comments regarding the global imbalances have shown. This rules out rising D and g as the causes of the buoyant share market. This leaves a declining r_K as the most likely root of the share price rally.

While the variability of the required rate of return explains even substantial fluctuations of equity prices, the question arises whether such drastic changes in this discount rate are plausible. Let us examine the evidence. As the required rate of return is unobservable, we (see *Jüttner* 1987a) examined a proxy, namely the dividend yield between 1979 and 1984. While for most of the period fluctuations of the dividend yield were quite moderate, at times the differences between peaks and troughs can be substantial. For example, the dividend yield in the first quarter of 1982 stood at 6.13%, while

in the quarter before the crash in 1987 its value had fallen to 2.23. Thus, the evidence lends some credence to the view that fundamental factors, as reflected in the movement of r_K , have driven up share market prices. At some point during the first half of October, investors changed their minds about what the required rate of return should be; r_K increased sharply and stock market prices crashed. It is important to emphasize that our explanation does not rely on dividends and their growth over time as likely factors having caused the equity price gyrations. In fact, we assumed both to remain unchanged. While this oversimplifies the issue, it at the same time highlights the crucial role played by the variability of the required rate of return.

Our reliance on movements in r_K opens up a dilemma. We set out to explain Black Monday in terms of economic fundamentals. Our analysis has forced us to almost entirely rely on movements in the required share market yield. But what factors determine this yield? If movements in this variable reflect cool, judicious and prudent assessments of the entire yield structure of the economy, we are prepared to regard the required rate of return as a fundamental economic variable. That is, if r_K fell, gradually for most of the time and finally sharply because its movement mirrors the development of the entire yield structure of the economy, the role of fundamentals in the crash would be supported. However, an alternative interpretation of the development of r_K is feasible and perhaps even more plausible. Share price rises may generate a climate where more and more investors come to expect further price increases. The expectations of higher equity values in the future induces them to revise downwards the yield they require. When a speculation fever grips more and more investors, r_K falls. For this story to remain convincing we require an exogenous event that explains the sudden turn-around of the required yield. So far nobody has come up with a convincing solution to this problem.

One answer has it that speculators come to realize the unsustainability of inflated share prices and they expect them to fall. The likelihood of a reversal rises with each day the inflated stock prices continue to rise. The abrupt price fall in October was set off by a confluence of unfavourable events: an unexpectedly high trade deficit led to sharply higher interest rates; anti-takeover tax legislation resulted in tumbling of stocks of takeover targets; a controversy arose between the US Treasurer *Baker* and the President of the German Bundesbank about the future course of global economic strategy. These incidents provided the initial signal for the sell-off in world share markets. It appeared that the bubble was bursting.

III. Bursting of a Share Price Bubble

A growing school of thought (another emerging bubble?) alleges that asset markets may embark on a process of price rises where the market price is driven by its own expected rate of change. *Flood and Garber* (1980, p. 746) state:

“In such conditions, the arbitrary, self-fulfilling expectation of price changes may drive actual price changes independently of *market fundamentals*; we refer to such a situation as a *price bubble*” (cursive in original).

Flood and Garber assume a deterministic bubble; the price rises go on for ever. Obviously, this is unrealistic. The rational bubbles literature assumes that market participants perceive themselves to be in a bubble situation, that is, they are aware that share prices systematically and persistently deviate from the underlying fundamentals. Rationality in a situation where stock prices are being bid up frenetically, with open eyes and independently from economic fundamentals, requires that the speculator expects the bubble to last for another period with probability π and crash with probability $1 - \pi$. Investors remain in the market because expected capital gains compensate them for the risk of a price slump. As everyone expects the bubble to eventually burst, prices have to rise at an ever increasing rate. Only the prospect of larger capital gains in the face of a rising risk of collapse compels speculators to play the bubbles game. In other words, when the probability of a crash grows (π decreases), speculators demand higher capital gains in order to be compensated for the increased risk. Consequently, share prices will accelerate. The bubble may be pricked by even a minor unfavourable event; π falls to zero (*Blanchard and Watson*, 1982).

There exists, however, one fundamental problem with the rational bubbles approach. How do you get out of it before it pops? Evidently, as long as there are capital gains to be made, bubble blowers do not pull out of share investments. At least this theory does not allow for an escape route. While individual speculators might entertain the view that they are able to sell out before the crash, a moment's reflection suggests that collectively they are doomed. Now, why would anybody, let alone almost the entire global investment community, bid up prices in a frenzy when, at least for its majority, these capital gains can never be realized? One possible answer is that speculation of this kind is intoxicating, blocking out the inevitable crash. Another may be that the concept of rational – as opposed to irrational – bubbles is flawed. The Bank for International Settlements in its Annual Report 1989 confirms our view “that the crash in part reflected the bursting of a speculative bubble” (p. 79).

IV. Trading Strategies

The widespread adoption of trading strategies has been blamed to a large extent for the prolonged and steep upward trend of stock prices and for the sudden collapse of the share market in October 1987. In order to place the importance of trading strategies and other factors, such as economic fundamentals and psychological sentiments, in the right perspective, we commence with the results of two surveys; one carried out by the Presidential Task Force on Market Mechanisms, the so-called Brady Task Force (1988) and the other by the Institutional Investor (1988). They attempt to throw light on the major factors believed to be responsible for Black Monday.

1. Causes of Black Monday: The Views of the Experts

The Brady Task Force sent over 470 questionnaires to market participants and other interested parties, inter alia, to regulators, chief executives of the larger companies and Nobel Laureates in economics to canvas their views about the reasons for the stock market crash. 211 replies were received; the result of the Task Force's analysis is given in Table 1.

Table 1

Causes of Black Monday – The Markets' Views

Perceived importance of factors affecting stock market decline in week prior to October 19, 1987: (Percentage citing as most important)	Perceived importance of factors affecting stock market decline on October 19, 1987: (Percentage citing as most important)
Fundamental ¹ <div></div> 77%	Fundamental ¹ <div></div> 20%
Technical ² <div></div> 6%	Technical ² <div></div> 40%
Psychological ³ <div></div> 17%	Psychological ³ <div></div> 40%

1. Fundamental factors: Rising interest rates, trade of budget deficits, overvalued bull market, declining value of the dollar, overall change in economic outlook.
2. Technical factors: Portfolio trading, specialist system, poor capitalization of specialist.
3. Psychological factors: Panic, erosion of confidence in US policies, investor nervousness, fear of NYSE closing, bearish predictions of stock analysts.

Source: Presidential Task Force on Market Mechanisms and Wall Street Journal, January 11, 1988, p. 16.

A similar survey, though by 'phone, was carried out by the Institutional Investors during the second half of November 1987 "with chief investment officers or other senior officials at more than 100 of America's largest institutions." The results are presented in Table 2.

Table 2
Causes of Black Monday – The Institutions' Views

How important do you think each of the following factors was a cause of the October crash?

	Very Important Factor	Somewhat Important Factor	Not Very Important Factor	Not Sure
An extremely overpriced stock market	65 %	28 %	4 %	3 %
The growing trade deficit	40 %	41 %	19 %	–
Widespread use of program trading	33 %	42 %	25 %	–
Lack of action on the budget deficit	30 %	43 %	27 %	–
Growing lack of confidence in the Reagan administration, especially since Paul Volcker's exit from the Federal Reserve	16 %	52 %	32 %	–
The expectation of a recession	7 %	27 %	66 %	–

Are there any other factors that you believe were major causes of the crash?

	Cited by
Portfolio insurance	19 %
Rising interest rates	18 %
Comments by Treasury Secretary <i>James Baker</i>	11 %
Restrictive/tight monetary policy	10 %
Foreign investors selling/lack of confidence in market on the part of foreigners	8 %
Bill in Congress to restrict leveraged buyouts	7 %
Weak dollar	3 %
Inflation	3 %
Consumer and corporate debt	2 %
Lack of liquidity	2 %
Lack of coordination between the Securities and Exchange Commission and the futures exchanges	2 %

Source: Institutional Investor, January 1988, p. 36.

The results of the two surveys are revealing. While according to the *Brady* Report the vast majority of market participants (77 %) attributed the decline in stock market prices in the week prior to October 19 to fundamental economic factors, they were viewed as less significant as a possible cause of the free fall that occurred on October 19.

The most frequently mentioned cause (65%) of the crash in the Institutional Investor's survey, namely the overpricing of stocks, reveals little; it merely prompts us to ask why prices were bid up to this level. Respondents in this questionnaire also give prominence to fundamental factors such as trade and budget deficits, uncertainty about the course of monetary policy and rising interest rates.

The results of the *Brady* survey emphasize the importance of psychological and technical factors for the October 19 crash. Psychological factors such as panic, loss of confidence, nervousness and bearish sentiments are difficult to explain in economic terms, but their build-up undoubtedly contributed to the bursting of the share price bubble. Psychological factors do not feature prominently in the replies given by institutional investors. This is hardly surprising as they presumably were among the heavy seller of stock and it would poorly reflect on their professionalism to have acted in a panic-stricken state of mind and out of nervousness.

Technical factors include program trading as well as the role and poor capitalization of specialists (market makers). The part played by market makers has been discussed in a previous paper (*Jüttner*, 1988). It is worth emphasizing that program trading and portfolio insurance also feature prominently in the Institutional Investor's survey. A detailed analysis of these trading techniques is therefore appropriate, especially since they have not at all, or at least not noticeably, featured in previous share market booms and busts.

2. Trading Strategies

The *Brady* Report contains a pertinent description of the damaging role played by trading strategies.

"The precipitous market decline of mid-October was „triggered“ by specific events: an unexpectedly high merchandise trade deficit which pushed interest rates to new high levels, and proposed tax legislation which led to the collapse of the stocks of a number of takeover candidates. This initial decline ignited mechanical, price-intensive selling by a number of institutions employing portfolio insurance strategies and a small number of mutual fund groups reacting to redemptions. The selling of these investors, and the prospect of further selling by them, encouraged a number of aggres-

sive trading-oriented institutions to sell in anticipation of further market declines. These institutions include, in addition to hedge funds, a small number of pension and endowment funds, money management firms and investment banking houses. This selling, in turn, stimulated further reactive selling by portfolio insurers and mutual funds.

Portfolio insurers and other institutions sold in both the stock market and the stock index futures market. Selling pressure in the futures market was transmitted to the stock market by the mechanism of index arbitrage. Throughout the period of the decline, trading volume and price volatility increased dramatically. This trading activity was concentrated in the hands of a surprisingly few institutions. On October 19, sell programs by three portfolio insurers accounted for just under 2 billion dollars in the stock market; in the futures market three portfolio insurers accounted for the equivalent in value of 2.8 billion dollars for stock. Block sales by a few mutual funds accounted for about 900 million dollars of stock sales." (p. V).

The trading strategies referred to in the Report are portfolio insurance, index arbitrage and trading on market direction. Let us analyse these in turn.

3. *Stock Index Portfolios*

Before we discuss the role of trading strategies we have to understand another unique feature of some portfolio management techniques of the 1980s, namely stock index funds. According to the efficient market hypothesis, asset prices incorporate all relevant past, present and future information. Stock prices perform a random walk. This implied that over the long haul portfolio managers cannot out-perform the market. Thus, holding a collection of assets that mimic the market portfolio's risk and return profile constitutes the optimal investment strategy. This point has been made by *Sloan* and *Stern* (1988).

The emergence of stock index futures and options markets provided a further impetus for investors to replicate the market portfolio. For example, the Standard and Poor's (S & P) 500 stock index measures the market value of a weighted average of 500 stocks relative to that of a historical base date. The weight of each stock in the index equals the ratio of the market value of the outstanding shares of that company to the market values of all outstanding shares which are included in the index. The S & P 500 share index futures contract which is the most successful in the U.S., allows funds managers to hedge their portfolios of shares, provided it is a clone of the S & P 500 share price index. There are other US share price indices (NYSE composite, Value Line and Major Market Index) which attempt to embody the market portfolio and for which corresponding stock index futures contracts exist but they are less frequently used for hedging. As an aside it is men-

tioned that the most well-known stock market index, the Dow Jones Industrial Index, which consists of a weighted average of 30 industrial stocks, is not traded in the futures market. In order to view the importance of index funds in the right perspective, let us quote some data from the (US) Pensions & Investments Age: as of June 1987, US \$ 175 billion was invested in stock index funds.

The Australian share price index futures contract is based on the All Ordinaries Index of the Australian Stock Exchanges. The All Ordinaries is a weighted average of the share market prices, expressed in index form, of over 250 Australian companies relative to a base period listed on the Sydney and Melbourne stock exchanges. The market value of the stocks included in the index amounts to almost 90 % of the value of all companies listed on the exchanges. Options on stock indices are also traded.

4. Portfolio Insurance

The prolonged upward movement in share market prices since about 1982 together with the historical experience of the inevitable trend reversal created growing concern that the stock market gains may turn out to be elusive. While a few market participants were prudent enough to relinquish their stock market involvement early, many succumbed to the temptation of reaping even larger capital gains in the future and a few large institutions found it virtually impossible to move out of share investments. The unwinding of equity portfolios of giant institutional investors (pension and mutual funds, etc.) would have been a slow, cumbersome and costly exercise. Of course, subsequently they would have faced again the painstaking task of assembling a portfolio of equities with the desired risk and return features.

Portfolio insurance appeared to answer the prayers of funds managers. Advocates of this new hedging technique promised to protect unrealized capital gains of a portfolio of shares. However, portfolio insurance turned out to be a disaster; to boot, it exacerbated the crash.

The term portfolio insurance is really a misnomer. It has nothing in common with the connotation of the term insurance. It did not protect, as it was supposed to, portfolio investors from share price falls in October 1987. Nevertheless, we will retain this term in the following.

The first point to observe is that portfolio insurance can only be applied to portfolios that mirror any of the available share price indices for which also futures or options contracts exist. In the following we assume that the portfolio (of a pension fund) to be insured consists of cash market stocks

that is identical in composition (but smaller in size, of course) to the S & P 500 share price index. Its value is \$ 900 million. If the pension fund wants to insure part or all of its portfolio of shares against the possibility of a share price fall, it can sell shares in the spot market when there are signs of a general decline of share prices. Alternatively, the manager can sell share index futures contracts. Selling, say, \$ 150 million of shares, requires time and incurs transactions costs. The same result can be achieved, only faster and with lower transactions costs, when the pension funds sells a certain number of share price index futures contracts. Such a futures contract is a “derivative” instrument; it does not represent a corporate ownership claim. The value of such a derivative instrument is determined mainly by the price of the underlying stock or basket of stocks from which it is derived.

One such instrument is the S & P 500 index futures contract; it is equal to \$ 500 times the S & P 500 stock index. This index stood at mid-October at about 300. To simplify matters we assume the same level for the stock index futures contract. As an aside it is mentioned that the equilibrium difference between the cash price of a stock and its expected future price depends on the cost of holding the stock (see *Santoni*, 1987). This “cost of carry” equals the market interest rate (opportunity costs) adjusted for the systematic risk of the stock in question minus any expected dividend. The cost of holding an index portfolio is simply the sum average of the holding costs of the individual stocks it contains.

Now, a stock index futures contract is a deal between a seller (short position) and a buyer (long position) to settle in cash any difference between the contract stock index value and its value at the future settlement date. With a futures index of 300, each contract price amounts to \$ 150 000 ($\$ 500 \times 300$).

Let us work through an example as it is sketched in Fig. 1.

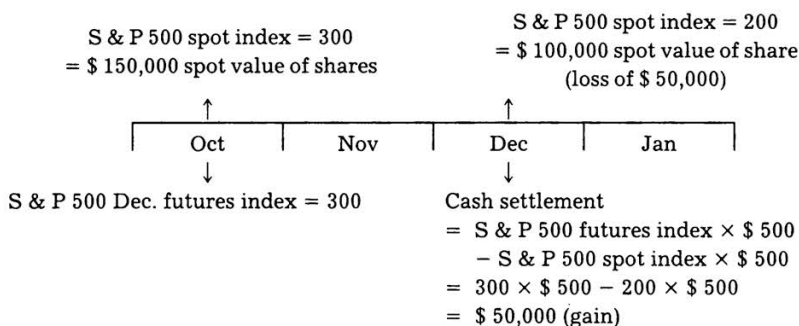


Fig. 1: Insurance in Futures Market

The pension fund manager sells in October 1000 futures contracts each valued at \$ 150 000 amounting to a total sum of \$ 150 million; cash settlement takes place in December. The S&P spot share price index has then dropped to 200. The pension fund thus gains \$ 50 000 on each of the 1000 contracts, amounting to a total profit of \$ 50 million. If the portfolio of shares is still held, its value will have dropped from the equivalent of the index value of 300 ($= \$ 150 \text{ million} = 300 \times \$ 500$) to a value of \$ 100 million which corresponds to the index of 200, ($= 200 \times \$ 500$). The gain in the futures market thus offsets precisely the loss of the physical holdings of shares and the funds manager has successfully protected part of his/her portfolio from price falls; of course, the remaining portfolio of \$ 750 million would have been negatively affected by the share market decline.

The question thus arises why it had been left unhedged. There are two possible answers. First, a portfolio that is covered by short positions in the futures market against downside risk is also bereft of any upside potential. Total hedging eliminates all opportunities for future capital gains. For example, when the share price index stands above the 300 mark in December, the physical portfolio gains in value, but an offsetting sum would be lost in the futures market. Undoubtedly, many believed at the beginning of October the share market would fall, but not yet. For this reason, many investors only hedged part of their portfolios. Second, leaving a portion or even all of the portfolio exposed to the risk and the opportunities of changing prices, fits into the design of portfolio insurance. An insurance strategy of our pension fund's portfolio would require the following course of action. Cover an additional \$ 150 million through short sales in the futures market when the spot share price index falls further by, say, 3% and so on until the entire portfolio is covered by corresponding short positions in the futures market. When the entire portfolio of shares is eventually hedged through short positions in the futures market, the portfolio has been locked in at prices close to the top of the market. Of course, some losses have been suffered as hedging occurred on the downtrend of prices. It is readily accepted that an investor whose portfolio of shares is covered by short futures positions, is holding a riskless asset. However, we are now dealing with a synthetic asset (portfolio of physical stocks and short futures contracts) which, theoretically at least, offers complete protection from share price falls.

Institutional investors with portfolio insurance had this course of action mapped; however, the implementation of portfolio insurance was held up by some insurmountable obstacles along the way.

As the share market declined in October, portfolio insurers attempted to shift more and more of their portfolios out of stocks through the futures

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market into the risk-free synthetic asset. Since huge institutional investors applied basically the same mechanical trading strategy, wave after wave of selling sent the prices of futures tumbling, way down below the prices of the underlying stocks. However, as the price crash on Black Monday far exceeded the price declines programmed for portfolio insurance, many selling orders could not be executed quickly enough or not at all. Portfolio insurance became an illusion. Institutions that believed they had insurance in place remained in the market longer than they would have without it and found themselves suddenly exposed and started selling stocks in both the spot and the futures markets on a mammoth scale. The *Brady* Report details the selling of one institution as follows: "These sales of stock baskets by this institution would ultimately continue in 13 waves of almost \$ 100 million each ... and total just under \$ 1.1 billion" (p. 34). The selling pressure created a huge supply overhang. Prices in the spot market did not fall fast enough, because trading in many stocks was halted, while future prices did fall in response to panic selling. Both markets became unhinged and at one stage futures prices were 40% below the corresponding spot prices for shares. This discrepancy should have encouraged index arbitrage to eliminate the gap. However, index arbitrage failed in its attempt to realign the prices levels in the two markets.

5. Index Arbitrage

Index arbitrage implies the simultaneous purchase of index futures contracts and the sale of appropriate baskets of shares or vice versa. Such arbitrage transactions attempt to profit from any gap between the price of the futures contract and the basket price of the stocks. While the mechanics of index arbitrage are not difficult to grasp, a fair amount of explanation is required to understand its mechanics. The interested reader is referred to *Merrick* (1987). However, an intuitive understanding of index arbitrage may be gained when we realize that it is based on the principle of buying in the market where the asset is traded at a discount and selling where it is at a premium.

A typical index arbitrage deal involves buying (selling) an index basket of shares in the spot market and selling (buying) futures index contracts when the spot price is below (above) the futures price. In theory, such arbitrage trades cannot be destabilizing because they ensure that any differences in prices in both the spot and the futures markets are eliminated.

However, the interaction of portfolio insurance and stock index arbitrage produced a torrent of downward pressure on share prices in both markets.

This cascade effect (Bank of England, 1988) has been aptly described by *Abken* (1987)

“A large market decline triggers futures selling by portfolio insurers, which drives the futures price down relative to the index price. This in turn sets off arbitrage trading because the futures become underpriced relative to the index. Stock-index arbitrageurs buy the futures and sell short a basket of stocks that replicates the current composition of the index. Stock sales by arbitrageurs drive the index price down. Thus, stock-index arbitrage transmits the selling pressure from futures to the stock market. Arbitrage-induced price declines in the stock market then induce further portfolio-insurance futures selling, setting off a downward price spiral between the stock and futures markets.”

However, not even the slide into the abyss proceeded as smoothly as that. First, a number of futures exchanges closed temporarily. This disconnected portfolio insurers and index arbitrageurs from the market. Second, rumours about the financial viability of the Chicago Mercantile Exchange’s clearing house (though these rumours were unfounded, the clearing house in fact delayed variation margin payments of \$ 1.5 billion to two investment banks) deterred some potential buyers of contracts because they regarded the credit risk of futures as too high. Third, the closure of futures markets and the temporary suspension of trading in the stock markets made it virtually impossible for arbitrageurs to lock in a favourable price spread. Doubts existed whether and at what prices buy and sell orders could be executed. In addition, some players saw it all coming and traded ahead of the portfolio insurance mob.

6. *Trading on Market Direction*

Not all share market participants accepted the promises of portfolio insurance at face value. A few “aggressive trading-oriented institutions” anticipated correctly, according to the *Brady* Report, the collective attempts of insured funds to sell at the same time in the stock index futures market. Predictable selling pressure also emanated from mutual funds which anticipated, and received, a flood of redemption requests from their investing clients. The Report (p. 29) points out:

“The activities of a small number of aggressive trading-oriented institutions both contributed to the decline during this week and posed the prospect of further selling pressure on Monday. These traders could well understand the strategies of the portfolio insurers and mutual funds. They could anticipate the selling those institutions would have to do in reaction to the market’s decline. They could also see those institutions falling behind in their selling programs. The situation presented an opportunity for these traders to sell in anticipation of the forced selling by portfolio insurers and mutual funds, with the prospect of repurchasing at lower prices.”

Some portfolio insurers deferred selling in order to thwart, in a vain attempt, the actions of these traders. According to commission member *Robert Kirby*: "Suddenly with Monday, they not only had to do an enormous amount of selling, they had an enormous holdover, and the front-runners just ate them alive". (Wall Street Journal, January 1988).

V. Lessons for Academics

The October crash was most likely caused by a classic speculative bubble which was encouraged by blind trust into certain trading strategies and it eventually burst because they turned out to be flawed. Undoubtedly, investors, traders and regulators will learn from this recent boom-and-bust experience. However, the share market collapse was unique in the sense that scholarly theories appeared to have significantly contributed to it. The efficient market hypothesis led to index funds and the *Black-Scholes* options pricing model engendered portfolio insurance (*Sloan and Stern*, 1988). Thus we might ask, does the share market crash also contain a lesson for academic writers? This appears to be indeed the case. The reputation of the efficient market hypothesis undoubtedly has suffered. The *Brady* report's emphasis of the enormous concentration in the ownership and management of securities and the concomitant ability to make prices, conflicts with the assumption of this hypothesis that all participants are price takers. After Black Monday advocates of the efficient market hypothesis are less likely to find a gullible audience (see *Jüttner*, 1987b, for a discussion of some pre-crash views of speculation.)

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Zusammenfassung

Fundamentalfaktoren, Seifenblasen und Handelsstrategien: Sind sie die Ursachen des Schwarzen Montags?

Dieser Artikel versucht, die Ursachen zu ergründen, die Mitte der achtziger Jahre zum Boom am Aktienmarkt führten und zum darauf folgenden Zusammenbruch im Oktober 1987. Die herkömmliche Finanztheorie gibt wenig Aufschluß über Aktienkursaufschaukelungen. Obwohl Fundamentalfaktoren, und in geringerem Umfang Dividendenerhöhungen, eine Rolle gespielt haben, bleiben die ausgeprägten Schwankungen der am Aktienmarkt verlangten Ertragsrate ungeklärt. Die Aktienkursbewegungen gleichen dem Aufblähen und Zerplatzen von Blasen. Allerdings impliziert die Seifenblasen-Hypothese im wesentlichen irrationales Verhalten; diese Beschreibung steht im Gegensatz zu den Annahmen in der Literatur. Nach der rationalen Seifenblasen-Theorie spielen die Teilnehmer der Finanzmärkte ein wohl kalkuliertes Spiel, das es ihnen auszusteiern erlaubt, bevor der unausweichliche Sturz spekulativ überhöhter Kurse eintritt. Die Schwankungen im Rahmen des letzten Aktienkurszyklus wurden durch die weit verbreitete Übernahme von Handelsstrategien verstärkt, die ironischerweise aufgrund der effizienten Markthypothese entwickelt wurden. Durch Portfolio-Versicherung und andere Handelsstrategien wurde die Krise noch verschlimmert, und Index-Arbitrage wurde wirkungslos.

Summary

Fundamentals, Bubbles, Trading Strategies: Are they the Causes of Black Monday?

This paper attempts to shed some light on the causes of the sharemarket boom of the mid 1980s and the subsequent crash in October 1987. Traditional finance theory offers little to explain the share price gyrations. Although fundamentals and to a lesser extend dividend growth, have played a role, we are left in the dark about the pronounced fluctuations of the required share market yield. The stock price movements resemble the inflation and the bursting of a bubbles. The bubble hypothesis, however, essentially entails irrational behaviour; this description contrasts with the assumptions made in the literature. According to the rational bubbles theory, participants in asset markets play a calculating game that allows them to retreat before the inevitable collapse of speculatively inflated prices. The swings of the last share market cycle were magnified by the wide-spread adoption of trading strategies which, ironically, were developed on the basis of the efficient market hypothesis. Portfolio

insurance and other trading strategies aggravated the crisis and index arbitrage became ineffectual.

Résumé

Principes essentiels, illusions, stratégies commerciales: sont-ils les causes du lundi noir?

Cet article essaie d'éclairer les causes du boom du marché des valeurs survenu au milieu des années 80 et le krach boursier qui suivit en octobre 1987. La théorie financière traditionnelle ne permet pas d'expliquer les girations des cours des actions. Bien que les principes essentiels et, d'une façon moins importante, la croissance des dividendes, aient joué un rôle, nous ne savons rien des fluctuations prononcées du revenu exigé du marché des valeurs. Les mouvements de la bourse des valeurs ressemblent à l'inflation et à la fin de chimères. L'hypothèse d'illusions cependant comporte essentiellement un comportement irrationnel. Cette description contraste avec les hypothèses faites dans la littérature. Selon la théorie d'illusions rationnelles, les participants aux marchés des placements jouent un jeu calculé qui leur permet de se retirer avant l'inévitable effondrement des prix inflationnistes dus à la spéculation. Les oscillations du dernier cycle du marché des valeurs ont été amplifiées par l'adoption étendue de stratégies commerciales qui, par ironie, ont été développées sur la base de l'hypothèse de marché efficace. L'assurance de portefeuilles et d'autres stratégies commerciales ont aggravé la crise et l'arbitrage d'indices est devenu inefficace.