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Book Review

Capital Ideas and Market Realities

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Capital Ideas and Market Realities deals with modern financial theories, financial engineering, and causes of financial crashes. There is a brief foreword by Nobel Prize winner Markowitz. Incidentally, Jacobs, although a holder of a doctorate in finance from the Wharton School of the University of Pennsylvania, is a principal in a successful quantitative portfolio management firm (Jacobs Levy Equity Management) with over \$5B under management. He thus can bring both theory and experience to the problem of managing market risk.

Much of the book discusses the major market crashes of recent years, notably the market crash of 1987. The Dow-Jones lost 22.6% of its value on one day, October 19, 1987, the largest percentage decline in history. From its intra-day high on August 25 to the intra-day low on October 20, the market declined by 37%, eliminating over a trillion dollars in investment value. Jacobs makes a convincing case that the severity of the crash can be blamed on an esoteric financial technique called portfolio insurance.

A little financial background here may be useful. An American put option gives the privilege of selling a stock at a fixed price within a fixed period of time. Put options are frequently used to provide insurance against loss for a particular stock. For instance, purchasing a put at \$100 means you can always (within the term of the option) sell the stock for \$100. Worried about the risk of a stock going down, individual investors sometimes buy put options to assure that they do not lose too much if it declines, while retaining the chance of making a profit if it goes up. Other investors who write (sell) the puts are providing the "insurance" in exchange for the price paid for the put. This is conceptually similar to a standard insurance contract. However, portfolio insurance is a trading strategy for managing risk, not a real insurance contract that transfers risk.

Modern financial theory shows that if stock prices move without gaps, one can construct the equivalent

of a put option by a suitable trading strategy (an appendix explains how this works for the non-specialist, and another appendix discusses option theory). In the eighties such strategies (often called portfolio insurance) were marketed to institutional investors (notably by Leland, O'Brien, Rubinstein Associates). These investors wanted to participate in the rising equity market, but were worried about the losses they could encounter in a market decline, what such losses would do to their clients and to their relationships with their clients. While the earlier plans provided for trading stocks, most of the later plans provided the desired exposure to stocks by trading index futures.

Part of the book deals with the case against portfolio insurance, and why it is likely to be an unwise strategy for institutional investors. The theory behind portfolio insurance requires that price changes be smooth, but in practice gaps occur. Obviously, if the option replication strategy depends on sales at a particular price, and the market drops suddenly to below that price, a key assumption behind the strategy is not met. Portfolio insurance strategies are designed to limit losses over a specified period, often one year. This is inconsistent with optimal (rational) behavior for investors whose planning period is much longer than a year (such as the pension funds and endowments insurance was sold to). The arguments against portfolio insurance are powerful enough that one wonders why managers of at least 68 billion dollars in assets (total of list on p. 140) bought into such a strategy. The answer probably relates more to good salesmanship by the vendors of such schemes and to the desire of managers to be protected against loss of their jobs in the next market decline than to rational managers making decisions in their clients' interest. However, portfolio insurance and related strategies have what economists call externalities. They increase the risk of market crashes, and increase the number of Americans who suffer large market

losses. By increasing market risk they discourage investment in both financial and real assets.

Jacobs makes a strong case that portfolio insurance explains why the 1987 crash was as severe as it was. Portfolio insurance is a trend-following trading system. As markets go down, the formulas call for selling stocks or futures (insurers sell about 2% of their portfolio in response to a 1% market decline). This selling puts downward pressure on stock prices, causing the insurance formula to call for more selling. The result is a cascade of self-reinforcing selling, which produced the incredible 1987 one-day decline of 22.6%.

Admittedly, most of the portfolio insurance selling was of stock index futures, not of stocks. However, index arbitrageurs sell stocks and buy futures whenever a profitable opportunity exists. Thus, sales of futures by portfolio insurers should have led to sales of stocks by arbitrageurs, and normally would have. However, in the confused conditions of the crash, the normally tight link between the futures and stock markets was broken, and futures were forced down to an abnormal discount (see diagrams on p. 155). Apparently arbitrageurs, uncertain of prices, and with limited capital, traded less than would have been required to keep futures at stock market equivalent levels. Many portfolio insurers, seeing that selling futures would be uneconomical, sold many fewer futures than their computer programs called for. However, the portfolio insurers' formulas called for such heavy selling after declines that even the part of the required selling that was actually done was a major cause of the severity of the crash.

Because portfolio insurance is a formula-trading system that involves selling when the market goes down (irrespective of any information as to whether the market will rise soon again), it is inherently destabilizing, and contributes to the risk of future crashes.

While the inability of portfolio insurers to make all of the sales their formulas call for moderates the immediate destabilizing effect of the strategies, it also constitutes one of the weak points of the strategy. If the sales were made at the depressed prices for the futures, the losses would have been even greater than intended. To the extent the sales were not made, the insurance proved ineffectual. Thus, when put to the test, portfolio insurance proved not to provide the promised protection.

Not surprisingly, after the 1987 crash many institutions discontinued their portfolio insurance programs (see their Figure 13.4). However, Jacobs argues that trend-following trading systems continue to exist; and in discussing other, more recent crashes (1989, 1991, and 1997), he argues that they played a contributory role. The most fascinating account

concerns the recent (1998) collapse of the hedge fund Long Term Capital. Once again there was the illusion that with the aid of modern financial theory, and its quantitative practitioners, risk could be avoided. This firm was able to borrow massive amounts, and then to use derivatives to add further to its leverage. When its strategies failed to work, its efforts to unwind the positions played a major role in producing a market decline. Part of the decline was because investors were not certain whether it would be compelled to liquidate its positions in a hurry. Finally, the Federal Reserve organized a bailout in which 90% of the equity was purchased by major financial institutions, thus reducing the risk of a forced liquidation.

Jacobs argues that while there is much less portfolio insurance now than there once was, similar dynamic hedging strategies are still being employed, and have a potential to contribute to future market meltdowns. Institutions still want downside protection. With the weaknesses in portfolio insurance having been shown, institutions are now frequently purchasing over-the-counter puts written by brokerage firms and other financial institutions. These firms often lack the capital to cover the losses that would be incurred in a major market decline. There appears a shortage of individuals and firms willing to take an offsetting position to the institutions (i.e., to write puts). Thus, the brokerage firms must hedge many of these puts through one of several dynamic trading strategies. Such a firm can be in a hedged position if it offsets the losses it would incur in a market decline by selling stocks short (in a decline the shorts would make money, offsetting the losses), or by selling futures, or by engaging in more elaborate hedging operations.

However, the size of the short position required to hedge a put increases as the market goes down. Thus, such hedging calls for selling into a market decline. Jacobs, noting the vast quantity of over-the-counter puts written, argues that a decline can feed on itself with the firms that wrote the puts being forced to sell more and more as the market declines, forcing the market steadily lower. There is no way for other market participants to know which selling is a purely mechanical response to the market decline, and which reflects information about bad news yet to come. As a result, other participants become unwilling to take the opposite side of the trades required by the sell orders, and the decline accelerates. The result is potential for a scenario similar to that of 1987, except that the selling is not coming from portfolio insurers, but from firms that have written puts.

This is the truly worrisome message of the book.

Edward M. Miller