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Playing the Odds

Computer Formulas Are One Man's Secret To Success in Market

Hunches, Analysts' Reports Are Not for Ed Thorp; He Relies on Math, Prospers

'I Call It Getting Rich Slow'

By JONATHAN R. LAING

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NEWPORT BEACH, Calif. — For relaxation, mathematician Ed Thorp likes to play a quick game of blackjack with his Hewlett-Packard 9830 computer, which "deals." More often than not, he wins because he uses a system he developed in the early 1960s to beat the house at the popular casino game.

Mr. Thorp, who teaches courses in probability and functional analysis at the University of California at Irvine, also has winning strategies for such other games of chance as baccarat, faro and roulette.

But in the past decade, the lanky, 42-year-old professor largely has deserted the gaming tables to concentrate on the supreme game of them all—the stock market. "From a mathematical standpoint the market is far more interesting than other forms of gambling because of the enormous number of variables and imponderables it encapsulates," Mr. Thorp declares. "Besides, the bulk of the past thinking about the market is nothing but alchemy and astrology."

Mr. Thorp's interest in the market is more than academic, however. For he claims to have found a mathematically based stock-trading system that not only consistently outperforms the various popular market indexes but also yields handsome profits whether the market rises or falls.

Accumulating a Fortune

Using the system, he has accumulated a tidy personal fortune starting with an initial stake of \$25,000 in Las Vegas gambling winnings in 1965. Moreover, he contends that a private investment pool that he started managing in late 1969 and that has since



most frequently with common stock and securities convertible into them, such as convertible bonds, warrants, convertible preferred stock and options. It is a conservative strategy in which the risk of individual positions is minimal.

How It Works

A hedger's success rests on his ability to identify convertible securities that are underpriced or overpriced relative to the underlying stock. If the convertible is underpriced, a hedger buys it, and if it is overpriced, he sells the convertible short, taking care to hedge his bets by taking the opposite position in the underlying stock. The profit comes from the tendency of a position in the underpriced convertible to rise more or drop less in price than the related stock and a position in an overpriced convertible to rise less or drop more in price than the stock.

While hedging isn't new, Mr. Thorp's technique is unique. He runs his funds without the usual panoply of security analysts' reports, market letters and economic forecasts. He makes no attempt to forecast the course of individual stocks or the market, believing it fruitless. In his world, there is little room for such traditional money-manager traits as hunch playing and intuition.

Instead, he relies on proprietary mathematical formulas programmed into computers to help spot anomalies between options and other convertibles and their common stock. The computer models tell him the price a convertible theoretically should be selling for, after such facts as the price of the underlying stock, its volatility and the conversions terms are fed into the computer. When a convertible's actual price is higher or lower than the theoretical one, his funds act accordingly. In some cases, the funds' trading is dictated completely by computer printouts, which not only suggest the proper position but also estimate its probable annual return.

"Remote Control"

"The more we can run the money by remote control the better," Mr. Thorp declares. "That way we can concentrate on important things like improving our theoretical formulas and getting the best executions possible on our trades."

Mr. Thorp's funds are an example of an incipient but growing switch in money management to a quantitative, mechanistic approach, involving heavy use of the computer. The trend, in part, is the product of the bear markets of recent years, which discredited many traditional money-management practices.

Among other things, the new approach has spawned the so-called "Beta Revolution"—an attempt to quantify the volatility of individual stocks and entire stock portfolios so that money managers can know precisely the risks of various investment decisions. But nowhere has the new style been more apparent than in the hedging and arbitrage field, which because of its complexity and pure mathematical relationships lends itself to such an approach.

Professors are developing valuation formulas for all types of convertibles at such

are Goldman Sachs & Co. and Donaldson, Lufkin & Jenrette Securities Corp. "While the model is just one of many tools we use in deciding positions, we feel it has given us a real mathematical edge," says Mike Gladstein, a Donaldson Lufkin vice president involved in its option operations.

Not surprisingly, the new computerized-trading approach leaves many traditionalist money managers cold. "The whole computer-bit is ridiculous because the real investment world is too complicated to be reduced to a model," one mutual-fund manager contends. "You just can't replace the money manager using security analysis and market feel with a machine."

A recent trade illustrates how the Thorp technique works. On June 11, the computer alerted the funds to an interesting situation that had developed with several Upjohn Co. securities. At the time, the stock was selling on the New York Stock Exchange at \$88 a share, and the Upjohn call option expiring at the end of July 1974 on the Chicago Board Options Exchange was selling for \$5 a share. A call is simply a right to purchase shares of a stock at specific exercise price during a given time period; though each call covers 100 shares, its price is customarily quoted on a per-share basis. The call the computer singled out had an exercise price of \$85 a share.

A \$14,377 Profit

According to the computer, the option was underpriced and should have been selling at about \$7.50 a share. So the fund bought 50 July Upjohn calls (for a total of 5,000 shares) for \$5 a share, or a total cost of \$25,452 after commissions. Simultaneously, it sold short 3,200 shares of the underlying stock for \$88 a share, or \$279,810 after commissions and taxes. (A short sale is, in effect, the sale of stock you don't own but anticipate will drop in value; at a given future date, you must "cover" your short sale by buying the stock at the then-current price. If the price has dropped, you have made a profit; if not, you lose.)

Two weeks later, the stock had dropped to \$75.50 a share and the option had plummeted to 62.5 cents a share. The fund then covered its short position in the stock at \$242,856 after commissions, making a profit of \$36,954 on the stock trade. At the same time, it sold the calls for \$2,875 after commissions, taking a loss of \$22,577 on the call position. Thus, in less than three weeks, it realized an overall profit of \$14,377 on a total investment of some \$170,000 (the fund only put up 50% margin on its stock short sale). The position was constructed to yield a profit if Upjohn's stock moved below \$80 a share or above \$94 a share, neither of which was an unreasonable expectation given the stock's historic volatility.

Mr. Thorp explains: "In hedging, you don't make a big killing with individual positions, but you rarely lose big either. If you hedge properly, you can win on nine out of 10 trades. I call it getting rich slow."

Mr. Thorp's preoccupation with system play goes back to the late 1950s, when he was an obscure mathematics instructor at MIT. The son of a Los Angeles security guard, he had yearned for a way to make