The Mathematics of Gambling: Letters from Readers

by Edward O. Thorp

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Q: I read and reread Beat the Market and then proceeded to short 1,800 shares of Loews T warrants at an average price of $17.18 per share and buy long 600 Loews Common at $46.10 per share. My question is, are the principles still applicable today? Also, I have a gut feeling that you have a strategy for options that is more exciting than the warrant hedge.

L.C.

A: I wish that you had read Beat the Market more carefully. Loews warrants has a senior security which can be used at par to exercise the warrants. I refer to the ASE LTRW warrants expiring 11/20/80 with an exercise price of $40. The senior security is the 6.875 percent bond of 1993. As of July 16, the bond price was $78. This gives an effective exercise price of $31.54 and a tangible value or conversion value for the warrants of $18.21. The warrant price, then, was $18.63. That means that there was only about 42 cents of premium in the warrant to capture, and it would take more than a year to do so.

The yield on the common was about 2.4 percent. Therefore, the expected yield on your position was very low. If I had the position you describe, I would have closed it out at this time. Since I don't know when you entered the position and don't have the corresponding bond price, I can't tell you if you made a good choice, initially. At the prices I quote, I see that you are losing $1.45 per warrant, or a total of $2,610 on the short side, and you are gaining $3.65 per share of common, or a total of $2,190 on the common for a net loss before liquidating commissions of $420.

You could avoid mistakes like this by taking the Value Line Op-

Q: I recently finished reading Beat the Market and as always, I was impressed by the quality of your work. Perhaps you would consent to enlighten me even more on a few points.

What is the general equation for the family of curves in figure 6.3? And what is the first derivative of that function with respect to S/E? You see, I own a microcomputer, and those two equations would make it easier for me to compute both W/E and the mix than to obtain them from figure 6.3.

Have there been any important changes since your book was written?

And finally, do you have any advice for a beginning investor like myself? My funds are limited, and my ability is untested, but my enthusiasm is unbounded.

K.F.

A: Please refer to my above letter to L.C. I add that since Beat the Market was written, the Black-

(Next month: Bearing Off)
Scholes option evaluation formula has been developed and replaces the various curves, formulas and graphs in Beat the Market. This option evaluation formula applies to warrants as well as to options. The detailed use of the formula is somewhat involved and requires considerable specialized financial background.

Judging from your letter, it would be unwise for you to make investments in the warrant or option area unless and until you are comfortable with the use of that formula. Even then, I recommend caution because the area is highly competitive and filled with very skilled and knowledgeable people. It is no place for a beginning investor. It is also no place for someone whose funds are limited. A book which may be helpful to you is The Stock Options Manual by Gary Gastineau. Thank you for your favorable comments.

Q: As an amateur blackjack player, I have read both your original book as well as the revised version and enjoyed them very much. I wonder if you might help me with a few questions.

Sports Illustrated recently ran an article about an individual who programmed a microcomputer to keep track of cards and indicate strategy for blackjack. If such a computer were available to a person, what strategy should be programmed? Would, for example, your point count or 10's count strategies be appropriate? Or is there a more complete and powerful strategy which could be employed, given a computer capability?

Is it actually against the law in Nevada to use a concealed computer to keep track of cards and strategy? The article indicated the detected individuals were turned over to the police, who arrested them and charged them with “swindling and bunco steering,” but the charges were later dropped.

And finally, do both your point count and 10's count strategies work equally well for both single and multiple decks, or do the strategy tables need to be modified for a multiple deck? And why doesn’t your point count strategy call for keeping track of excesses or lack of aces and adjusting the predict-
ed advantage accordingly, as described for the 10's count strategy?

R.J.

A: If a microcomputer were used to determine blackjack play, I think that a suitable strategy would be one which closely approximated the exact calculation of best play. The various card counting strategies don’t do this as well as a specially programmed computer could. One idea is to follow the approach Roger Bamford used for his “black box,” as described in the 1967 edition of Richard Epstein’s book, The Theory of Gambling and Statistical Logic. So the answer to your question is, given a computer capability, a more complete and powerful strategy than any of the card count strategies currently used by humans could and should be employed.

I don’t think it is against the law in Nevada to use a concealed computer to track cards and develop playing strategy. However, I’m not offering you legal advice, and if you want to be sure, you ought to talk to a lawyer.

The point count and 10 count strategies are given in Beat the Dealer for one deck. They are almost correct for multiple decks: however, small changes are needed to make them fully correct. But the difference between using the one deck strategy for several decks, instead of using the correct several deck strategy, is on the whole, small.

If I wrote another edition of Beat the Dealer, I would certainly include the refinement of the point count theory in which the player keeps track of an excess or lack of aces and adjusts the predicted advantage accordingly. That's a good improvement, and it's one I've known about and used since 1961. I thought at the time I wrote Beat the Dealer, it would be too burdensome to include. However, as you know, the good strategies being marketed today include that feature as a player option.

From a letter to Allan Wilson, forwarded to E.O.T.

Q. Is there a formula for figuring the optimal percentage of your bankroll to bet on a number of simultaneous, independent events, in all of which you have an advantage?

A: As you know, Dr. Wilson has forwarded your letter to me for my response to you. Your question has been answered by mathematicians. Here is the “formula.”

Suppose at a given time there are $N$ independent favorable bets. Then you should allocate to each of those bets fractions $f_1, f_2, \ldots, f_N$ in such a way that the mathematical expected value of the logarithm of your capital after the bets are resolved is maximized.

To understand what this means and how to use it, if you have a mathematical background or a mathematical consultant available,
you can read the articles which I have written on the subject. The articles also have additional references.


You can find these papers in a large university library. I must warn you, though, that they are mathematically involved. You can use the general formula to produce a specific simple formula in any example like the football example that you discussed. I will explain how to do some of these things in next month's column on money management.

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