



How Much Is Too Much? The Case of the Anheuser-Busch INBEV Takeover

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Abstract: On June 11th, 2008 InBev made a \$65/share bid to buy Anheuser-Busch stock and was rejected. InBev devised a plan to oust the management of Anheuser-Busch and selected another management team to take their place. This is, to date, the largest hostile bid in U.S. history. This paper extends Margrabe's (1978) stochastic option model by applying it to hostile takeovers. The model in this paper is applied to Anheuser-Busch and InBev to: (1) estimate the probability of a takeover, and (2) determine the point at which a hostile suitor needs to change strategies. The hostile premium option model demonstrates general applicability to hostile bids in the form of proxy contests or tender offers, as well as to both domestic and foreign corporations.

Keywords: Takeover, proxy contests, InBev, Anheuser-Busch, hostile bid, option pricing, tender offers, Black & Scholes.

1. Introduction

While struggles for corporate control are not new, dating back to the 1800s, it is interesting to note that the takeover method in vogue changes from time to time. For example, historically, friendly changes in ownership were predominately accomplished through mergers while hostile changes frequently resulted in proxy contests. However, beginning in the late 1960s, tender offers began to rival that of the old mergers/proxy contest bids. By the 1990's Mulherin and Poulsen (1998) suggest a growing trend towards using tender offers and proxy contests as complementary mechanisms for taking control of a firm.

Tender offers and proxy fights determine who possesses the right to manage corporate resources. In a tender offer, the bidder makes a direct offer to the firm's shareholders to purchase their shares and consequently to capture their voting rights. In a proxy contest, insurgents conduct a campaign to persuade shareholders how to vote on contested issues and board seats. Of the two approaches, the most personal, difficult and thus costly takeover method is the proxy contest.

This paper expands the application of Margrabe's (1978) paper by applying the model to InBev's hostile bid for control of Anheuser-Bush (AB). The model presented in this paper is applicable to both tender offers and proxy contests. As such, management may use the model to provide insight into the probability of a successful takeover and the cost-level at which a new strategy should be considered by the bidder. Margrabe's (1978) model is used to place a dollar value on the right to exchange one risky asset, the value of the firm under 'old' management, for another, the value of the firm under 'new' management. While the AB-

InvBev takeover is now history, the situation and circumstances are repeated with regularity across the globe resulting in a need for additional tools which provide management with guidance to aid in decision-making.

This paper first reviews some of the background issues and relevant information for takeovers in general and then presents the *hostile premium option (HPO) model* along with the findings for the case of Anheuser-Busch versus InBev.

2. Background

Hancock (1989, 1992) and Hancock and Mukherjee (1992) expanded the application of Margrabe's (1978) exchange option model to value the exchange of an incumbent management team for a new management team in the event of a proxy contest. It was shown that the model could be used as a framework by dissident shareholders to gauge the impact of waging a proxy contest. In addition, the model identified the variables which impact the cost of waging a hostile bid. Margrabe's model extended the Black-Scholes (1973) option pricing model by applying it to value the right to exchange one risky asset for another risky asset. In this case, the central question to be answered is: *what is the value of the exchange of AB under its current management for AB under the new InBev management?*

After the AB management rejected a \$65/share bid by InBev, a hostile bid ensued threatening a major impact on the Midwest United States economy. The takeover returned to friendly ground after InBev took legal steps to remove the AB board of directors and subsequently increased its offer price to \$70/share. The results presented in this paper were developed using data prior to the \$70 bid to demonstrate the applicability of the HPO model. The model proved to be accurate in both its estimation of the probability of a takeover (100%) and the premium associated with a hostile bid (\$11.25).

Anheuser-Busch employs approximately 31,000 full-time individuals in various capacities with 12 breweries and 600 distribution centers in the U.S. InBev has equally impressive numbers on a *global* scale, employing more than 89,000 full-time individuals in more than 21 countries with pre-takeover sales of \$22.5 billion. A hostile takeover of AB by InBev, the Belgian-based firm, will have repercussions throughout the world-wide beer market since AB is the leading U.S. beer brewer and InBev is the leading global brewer. InBev has minimal U.S. market share and AB has minimal global market share, so a combined firm would create a powerful leading global brewer.

A proxy contest, or hostile bid, occurs when there is active competition between two or more groups, the incumbent management and dissidents, to solicit sufficient proxies to elect their respective candidates or to vote-in desired policies. In the case of the AB-InBev takeover, the dissident shareholders of AB believed that the management should have voted to accept InBev's \$65 per share bid. However, the rejection of the bid, led dissidents to believe that the firm's future value was diminished. The dissidents expressed their displeasure of the rejection by pushing to force an election to replace the incumbent management with a new board. InBev had already selected a new board at the time of the hostile bid.

In order to determine the profitability of a potential takeover, the acquiring firm's management (InBev) evaluates whether the net present value of future cash flows generated by the target firm (AB) under the old management team (NPV_o) plus the cost of the bid (C_b) is greater than the bid price (S_b). If $[NPV_o + C_b] > S_b$, the acquiring firm's value will increase as a result of the takeover. However, if $[NPV_o + C_b] < S_b$, the acquiring firm's value will decrease as a result of the takeover. The net present value is accordingly used as a 'benchmark' for decision making in that it provides the acquiring firm's management with

information concerning the variables important in determining both the target firm's price and intrinsic value. The cost of a hostile bid includes items such as: solicitation costs, filing fees, legal fees, public relations expenses and the like.

Several early authors, such as Whetten (1959), Austin (1964) and Aranow and Einhorn (1968) studied the causes of proxy contests and some of the major causes found are:

- (i) Nepotism
- (ii) Inadequate disclosure to shareholders
- (iii) The desire to be in control or have power
- (iv) Management indifference to shareholders
- (v) Poor management performance and stagnant growth
- (vi) Excessive executive salaries and benefits
- (vii) Illegal or self serving activities by management

The point at which a hostile contest for control is imminent is when dissident shareholders perceive the value of the firm under a new management team (NPV_n) to be greater than the current value of the firm plus the cost of surrendering (C_s) the firm, or: $NPV_n > [NPV_o + C_s]$.¹ This paper specifies C_b , the premium associated with the battle, C_s and the probability of an AB takeover by InBev, $N(d_1)$.

The results suggest that the probability of an InBev takeover of AB is 100% and the probability of paying at least the current stock price of \$58.35/share is also 100%. Under the circumstances that existed on June 11th, 2008, when InBev's offer of \$65 was rejected, the model suggests that InBev would be better off to raise its bid to \$69.60 (current stock price + hostile premium) rather than pursue a hostile \$65 bid.² The result of a continuation of a hostile \$65 bid would result in a total cost of \$76.25 per share (offer price + hostile premium).³

3. Existing Evidence

The method used to take control of a firm is determined by the costs associated with each approach and the probability of success. Schleifer and Vishney (1986) and Manne (1965) argue that the hostile proxy contest is both expensive and uncertain. This results in a tendency toward tender offers as the preferred method to acquire an unfriendly firm. However, unfriendly tender offers are not without costs, and can be expensive if defensive lawsuits are filed or shareholders are divided, as in the case of AB-InBev.

Controversy exists over whether any type of hostile takeover activity actually helps or harms the value of a corporation. At the core of this debate lies the question of what factors cause takeover attempts to occur. According to the *Chartered Financial Analyst Institute*, if the incentives that induce a takeover are positive, then it is likely that the takeover will exert a positive influence on the value of the corporation. However, if the cause of the takeover is 'perverse', then the value of the firm will deteriorate as a result of the takeover. Studies have identified at least four primary motivations for takeovers. These include:

¹ Surrender costs include such things as golden parachutes, labor agreements, distributor covenants etc... and can be estimated using Put-Call parity: $C_s = 11.25408964 + 58.35e^{-(30/365)} - 65 = \0 .

² $58.35 + 11.25 = \$69.60$.

³ $65 + 11.25 = \$76.25$.

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- (i) Disciplinary takeovers occur when the target firm's pre-bid performance has been poor and they usually result in the removal of the target's key management after the deal is completed.
- (ii) Hubris takeovers occur when a new management team believes they are far superior to that of an incumbent management team.
- (iii) Undervaluation takeovers occur when the bidder feels the stock price of the target is currently less than by the intrinsic value of the stock.
- (iv) Synergistic takeovers occur when there is a suggestion that the two firms, when combined, can operate more efficiently and are worth more together than they are worth separately.

Raj and Forsyth (2004) studied the four motivations and found that there is a definite market reaction to the underlying motivation for the takeover. One of the interesting findings that relates to the present study is that the positive performance of hostile bidders over the long-run is reduced due to the increased costs incurred to complete the takeover.

While some research shows that hostile bids discipline the target firm's management, other studies such as Scholten's (2005) found only weak evidence that a hostile takeover bid plays a disciplinary role. Improved corporate governance in terms of increased shareholder involvement, greater focus on stock price performance, and proper board incentives appear to provide viable alternatives to the market for corporate control. Given the few hostile attempts and the evidence that hostile targets do equally well during acquisitions, one must question how well and how quickly the external control market can act in disciplining managers for making value-reducing acquisitions. Hostile offers are rarely successful in forcing the resignation of top executives, however they may induce firms to make improvements. Interestingly, InBev took early steps to avoid this issue by making it clear that August Busch IV would be retained as CEO while the remainder of the board would be removed in the event of a hostile takeover.

Early research by Austin (1964) and Austin and Duvall (1965) found that proxy contested firms have lower rates of return on equity and lower profit margins both *before* and *after* the proxy contest. In hostile contests for control, Austin found that 1/3 of the firms no longer even existed seven years after the contest.

Edelman and Thomas (2005) examined whether proxy contests, tender offers, or some combination of the two, offer the highest value maximizing outcomes for shareholders when target companies are able to deploy defensive tactics. The authors use a probabilistic version of a standard weighted voting model that explicitly incorporates the various corporate constituents and their different voting behavior. The authors found that there is no one method that will always lead to a desirable outcome for the shareholders of a target company. Most importantly they found that with each type of acquisition technique, the bidder's success in obtaining control of the target company results in some value decreasing transactions.

Ikenberry and Lakonishok (1993) studied proxy contests using a sample of 97 elections from 1968-87. They found that target firms had deteriorating performance prior to the announcement of a proxy contest. Interestingly, after the contest, continued negative abnormal returns were observed in cases where the dissident shareholders were successful in acquiring board seats but not in cases where the incumbent management retained control.

It should be noted that not all authors find evidence that target firms underperform prior to the bid. Agrawal and Jaffe (2003) find evidence that target firms as a group do not underperform prior to takeovers, so correction of underperformance is not likely to be a

primary motive for a takeover. This type of takeover may be motivated by ‘perverse’ incentives that will reduce the value of the post-contest firm.

In general the evidence shows that most firms become targets because incumbent management has inefficiently allocated free cash flow to unprofitable investments. However, even if the takeover attempt is successful, the performance of the contested firm after the contest does not necessarily improve and may even deteriorate. The lack of improvement in the post-contest period is contributed to the cost of fighting a hostile bid rather than continued management inefficiency.

Research to date supports the need for a model to estimate the premium associated with a hostile bid so that contests estimated to cost in excess of the hostile premium can be avoided.

4. The Model And Data

Daily stock price data over the period July 2nd, 2007 to June 27th, 2008 for both InBev and Anheuser-Busch was used to estimate the variables necessary for the hostile premium option model. The level prices were transformed using a simple natural logarithmic function.

The task faced by dissidents is difficult, and the costs of preparing and executing a fight can be substantial and are borne directly by dissident shareholders who can only expect compensation if they are successful. There are also regulatory constraints to consider that not only add to the cost of a contest but reduce the dissidents’ chance of success. The model presented below suggests that if cost estimates exceed \$11.25/share, then InBev should either drop the bid or increase the bid price in order to avoid a decline in the value of the firm after the contest. Note that an increase in the bid price would only be an acceptable strategy if it resulted in a friendly acquisition.

Margrabe (1978) extended the Black-Scholes (1973) option pricing model in order to value the exchange of one risky asset for another risky asset. In Margrabe’s model both the exercise price and the stock price are assumed to be random variables. Hancock (1989, 1992) and Hancock and Mukherjee (1992) found that Margrabe’s model can also be applied to proxy contests to estimate the economic feasibility of such a takeover. The assumptions underlying the model are:

1. *The short-term interest rate is known and constant.* During the period of this study interest rates are fairly low and the yield curve relatively flat. The variability in short-term rates was also low and fairly constant over the period studied.
2. *Stock prices follow a random walk in continuous time with a variance rate proportional to the square of the stock prices.* Thus the distribution of possible stock prices at the end of any finite interval is lognormal and the variance of the rate of return on the stock is constant. The variance of both AB and InBev are low, exhibiting very little change over the period studied.
3. *The effect on P_n or P_i of any dividends paid during the contest period is adjusted such that the premium is not adversely affected.* AB paid a dividend on June 9th, 2008, just prior to the beginning of the contest period, and another on September 9th, 2008. InBev pays an annual dividend on the last day in April of each year. No dividends were paid during the contest period.
4. *There are no transactions costs in either buying or selling the stocks.*
5. *There are no short-sale penalties or restrictions.*

6. *The debt-to-equity ratio under the new management is equal to that under incumbent management.* AB has a low debt-to-equity ratio of less than 5%. Since InBev also has a very low debt-to-equity ratio of less than 1%, there is no reason to believe that a new management would substantially alter the debt.

The proxy contest model is:

$$P = P_n * N(d_1) - P_i * e^{-t/365} * N(d_2) \quad (1)$$

where:

P = the premium for a hostile bid;

P_n = the value of the target firm under the new management team i.e. the tender offer;

P_i = the value of the target firm under the incumbent management team on the day the offer was made;

$N(*)$ = the cumulative normal density function; and,

t = the number of days from when the bid was made until the next annual meeting or the termination of the contest.

The hostile bid premium, P , is the costs incurred for the unfriendly exchange of the firm under incumbent management (AB) for the firm under a new management (InBev). On June 11th, 2008, it is a reasonable initial assumption that InBev viewed the value of AB under new management, P_n , to be worth at least the offer price of **\$65** per share. The value of the firm under the incumbent management, P_i , on that day was **\$58.35**. The variable t is the number of days from June 11th, 2008, when the bid was first made, until July 11th, 2008, the next annual meeting, or **30 days**.

Finally, the cumulative normal density functions, $N(d_1)$ and $N(d_2)$, are specified in the proxy contest model in a slightly different format than the original Black-Scholes (1973) model as shown in equations (2a) - (2c) below.

$$d_1 = \frac{\ln(P_n/P_i) + (\sigma_{i,n}^2/2)(t/365)}{\sigma_{i,n}(t/365)^{1/2}} \quad (2a)$$

Where:

$$\sigma_{i,n}^2 = \sigma_n^2 + \sigma_i^2 - 2 * \sigma_n * \sigma_i * \text{Corr}_{n,i} \quad (2b)$$

and,

$\sigma_{i,n}^2$ = The joint variance of changes in P_i and P_n ;

σ_n^2 = The variance of $\ln(P_{n,t}/P_{n,t-1})$;

σ_i^2 = The variance of $\ln(P_{i,t}/P_{i,t-1})$; and,

$\text{Corr}_{n,i}$ = The correlation between $\ln(P_{n,t}/P_{n,t-1})$ and $\ln(P_{i,t}/P_{i,t-1})$.

$$d_2 = d_1 - \sigma_{i,n}(t/365)^{1/2} \quad (2c)$$

Note the sign of the relevant correlation coefficient in equation (2b) is negative. This is because the portfolio consists of P_n and negative P_i , i.e. $P_n - P_i$. This is equivalent to a portfolio with a long position in $N(d_1)$ shares of P_n and a short position in $N(d_2)$ shares of P_i . The higher (lower) the correlation between the two assets, the lower (higher) the joint variance, so the low correlation between AB and InBev does not provide significant risk reduction. The variance is:

$$\sigma_{i,n}^2 = (0.024193)^2 + (0.014283)^2 - 2(0.024193)(0.014283)(0.101736) = \mathbf{0.0718996\%}$$

$$\sigma_{i,n} = 2.6814\%$$

and the areas under the normal curve are:

$$d_1 = \frac{\ln(65/58.35) + (0.0007189962/2)(30/365)}{(0.026814)(30/365)^{1/2}} = 14.04354833$$

$$d_2 = 14.04354833 - 0.007686188 = 14.035861$$

$$N(d_1) \approx N(d_2) \approx 1$$

So, the hostile premium is:

$$P = 65 * 1 - 58.35 * e^{-(30/365)} * 1 = \underline{\underline{\$11.25408964}}$$

Unlike the Black-Scholes model the risk-free rate is omitted in both equations (1) and (2a) because a riskless loan denominated in P_i will be zero since the appreciation of the value of the firm under incumbent management over the period of the 'loan' is equilibrium compensation for the investment and the risk. That is, a lender of one share of P_i will demand one share of P_i as repayment of principal and the appreciation is the interest compensation. Taking P_i as the numéraire, the option to exchange P_i for P_n is a call option on P_n with an exercise price equal to unity and interest rate equal to zero. This is a special case of the Black-Scholes model.

Another notable difference between the proxy contest model and the Black-Scholes model is the variance. The relevant variance used in the proxy contest model is the joint variance of the returns under the new management and the incumbent management as shown in equation (2b). Evidence in the literature, see, for example, Battacharya (1980), has suggested that the variance of the underlying stock returns is not constant while the option is alive. This violates one of the basic Black-Scholes assumptions. However, this is not found to be the case in the proxy model.⁴ Even so, the HPO model suffers from the weakness of using a variance prior to the life of the option rather than the one that exists while the option is alive. In the case of InBev and AB this results in very little bias since the variance of returns is low and relatively constant.⁵

The data shows two surprising results. First, the variance of both InBev's stock returns and AB's stock returns are very low, 0.000585301 and 0.000204004, respectively.⁶ Second, the correlation of 0.101736 between AB's returns and InBev's returns is much lower than expected given that they are both in the same industry. The value of the dollar was explicitly considered in calculating the correlation but had very little impact on the result. The low correlation suggests diversification benefits that support a higher bid price beyond that suggested simply by a change to a new management.

A call option will only be purchased if the buyer anticipates that the value of the stock, on or before expiration, will exceed the exercise price plus the premium paid. In terms of takeovers, a new management will only challenge an incumbent management if the anticipated value of the firm under new management is expected to exceed the value under incumbent management plus the premium associated with the bid, P . In order for monetary benefits from the takeover to be realized by the dissidents (InBev), the value of AB under new management must be greater than \$69.60.

⁴ See Hancock (1989, 1992),

⁵ The results do not change when the variance is measured while the option is alive.

⁶ The betas are also very low. InBev has a beta of 0.5067 and AB has a beta of 0.4818 in both cases the S&P 500 was used as a measure of the market. In addition, it is interesting to note that there is a low correlation of 0.20 between movements in the global markets and the U.S. markets over the time period studied.

Walker (2000) cautions acquiring firm managers to carefully consider the bid price because the premium has a statistically significant impact on the market's response. This implies that the market incorporates a 'reasonable' level of expenses in a hostile bid. The HPO model provides a point estimate for such expenses. A positive option premium indicates that the anticipated value of the firm under a new management team is higher than the present value of the firm under the incumbent management, but the higher the premium, the higher the necessary value of the firm after the takeover in order to make the fight worthwhile. A negative option premium indicates that the option will expire worthless since the anticipated value of the firm under new management is less than under the incumbent management.

The option considered in this paper is simultaneously a call option on P_n with an exercise price of P_i and a put option on P_i with an exercise price of P_n . In the case of AB, the standard deviation of stock returns over the past year has been so low (1.4283%) that the model results are not sensitive to the date selected to determine P_i . However, in the case of a volatile stock, some consideration for the incorporation of the information of a takeover into the stock price over a period of time may be more appropriate.

5. Conclusion

Previous research suggests a need for a model that can be used to estimate the premium associated with a hostile bid. This paper uses the largest hostile bid in U.S. history, AB-InBev, to provide an example of the use and interpretation of the hostile premium option model. The model was used to: (1) estimate the probability of a takeover, 100%, and (2) determine the cost level at which InBev would need to change strategies, \$11.25/share. The estimated premium of \$11.25 suggests that InBev will prefer a friendly bid, ranging from \$69.60 to \$76.24, to a \$65 hostile bid. A hostile bid of \$65/share means a total cost to InBev of \$76.25. The friendly bid of \$70/share was eventually accepted and resulted in a savings of \$6.25 to InBev had the firm continued to pursue a hostile takeover.

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