Introduction to the Rebate on Loss Analyzer

Contact: JimKilby@usa.net
702-436-7954

One of the hottest marketing tools used to attract the premium table game customer is the "Rebate on Loss." The rebate on loss is an agreement between the casino and the customer whereby the player's losses are discounted. For example, a 10% rebate on loss means that a player who loses will only pay the casino 90% of the amount actually lost. This marketing scheme can be found throughout Asian casinos and is now used by casino marketers in both Nevada and Atlantic City.

A profitable rebate on loss program must be carefully structured. It sounds like a simple proposition but in actuality is extremely confusing. Why wouldn't a 10% rebate on loss only cost 10%? The answer lies in the fact that the casino does not keep what losing players lose! Rather, the casino keeps the difference between what losing players lost and winning players won. Consequently, this lack of understanding is resulting in casinos offering programs that are actually losing money.

A rebate on loss effectively reduces the casino's advantage and is most often used in baccarat marketing. In other table games, the casino's advantage is reduced by altering either the probabilities or the payout odds. For example, in roulette a 50% reduction in casino advantage can be accomplished by offering a roulette wheel with only the single zero as opposed to the traditional U.S. wheel with both the single and double zeros. In roulette, to compensate for the reduction in casino advantage, the players have to either play twice as long or bet twice as much.

With a single zero roulette wheel, the player enjoys a 50% reduction in casino advantage on every bet and every spin. This reduction remains constant and is not dependent upon the length of play or amount wagered. However, a reduction in casino advantage as a result of a rebate on loss varies and is dependent upon the Game Played, the Betting Pattern, and the amount of the Rebate.

The Casino Marketing Manager can be used to evaluate a customer's historical play or to develop a Rebate on Loss play schedule. The play schedule will stipulate the rebate earned at differing total rounds or spins played. In addition, multiple trips of a single player can be grouped together for analysis.

Actual Cost of the Rebate

The Actual Cost of the Rebate displays the true effect of the Rebate on the Casino Advantage.

If the bettor was wagering the player side in baccarat, receiving a 10% discount and had made the following bets:

Total Bet Per Rounds		# of Rounds
$25,000	x	250
$50,000	x	50
$750	x	40

The Actual Cost of the Rebate will display 24%. This means that a 10% discount on loss equates to a 24% reduction in theoretical win with the above scenario.

After Rebate Casino Advantage

A rebate on loss effectively reduces the casino's advantage. The After Rebate Casino Advantage indicates the casino's theoretical advantage after deducting the rebate's true effect. If the bettor was wagering the player side in baccarat, receiving a 10% discount and had made the following bets:

Total Bet Per Rounds		# of Rounds
$25,000	x	250
$50,000	x	50
$750	x	40

The After Rebate Casino Advantage field will display .939%. A player not receiving the rebate has a disadvantage of 1.235%.

After Rebate Theoretical Win

The theoretical win is the amount the casino should expect to win. If the bettor was wagering the player side in baccarat, receiving a 10% discount and had made the following bets:

Total Bet Per Rounds		# of Rounds
$25,000	x	250
$50,000	x	50
$750	x	40

The Theoretical Win will display $108,440 and the After Rebate Theoretical Win will display $82,431. The difference is the actual cost of the Rebate.

Average Bet

The average bet field indicates the weighted average bet for the trip.

Total Bet Per Rounds		# of Rounds
$25,000	x	250
$50,000	x	50
$750	x	40

Equates to a weighted average bet of $25,824

Betting Pattern

- **Total Bet per Round**

The more volatile the betting, the more the rebate reduces the casino's advantage. Casino management will typically describe a player's action in terms of "average bet." As far as rebates on loss are concerned, the average bet is not a true indicator of the actual reduction in casino advantage unless the average bet is the result of flat bets.

If playing Blackjack, the total bet per round should be the total of every spot wagered. For example, if the player bet $1,000 in each of 5 spots per round for 50 rounds, the input should be with 5 spots selected under Game Played:

Total Bet Per Rounds		# of Rounds
$5,000	x	50

Any rebate on loss is a sacrifice in the casino advantage. The best case scenario for casino management is when the average bet equals a flat bet. As the variance in the betting increases, the sacrifice in casino advantage increases because player wins become larger and player losses become larger.

The Casino Marketing Manager allows the entry of differing bet sizes during a given trip. For example, if a player were to wager the player in baccarat and bet $25,000 for 250 rounds, $50,000 for 50 rounds, and $750 for 40 rounds, the input would appear as follows:

Total Bet Per Rounds		# of Rounds
$25,000	x	250
$50,000	x	50
$750	x	40

- **# of Rounds**

The greater the number of rounds played, the lower the cost of the rebate on loss. The cost of the rebate will never become less than the agreed to amount. For example, a 10% rebate on loss will never equal less than 10% of the theoretical win. However, as the number of rounds played increases, the cost of the rebate approaches the stipulated rebate.

Blackjack Casino Advantage

The BJ Casino Advantage is input by casino management and is calculated by adding the casino's advantage over a basic strategy player to an estimate of how much his typical play will deviate from basic strategy.

The only research dealing with how much the general public's play will deviate from basic strategy is published by Peter Griffin in "Gambling Ramblings" (Las Vegas, NV: Huntington Press, 1991, page 154). His research focused on quantifying the mathematical expectations for the public's play in casino blackjack.

A small segment of his survey dealt with blackjack players betting at least $100 per hand. This is the only information available for estimating the skill level of the premium blackjack player. Mr. Griffin found that these larger bettors played with a disadvantage of about .47% worse than basic strategy. I would recommend using the casino's advantage over a basic strategy plus .47% as the BJ Casino Advantage.

Click on "Miscellaneous" on the toolbar and then click on "BJ Casino Advantage." This table allows you to input your casino's rules and arrive at the casino's advantage over a basic strategy player.

Casino Advantage

The casino advantage is the theoretical advantage the casino enjoys over the player. For example, if you select the player side in baccarat, the Casino Advantage will indicate an advantage of 1.235%.

Non-Rebate Equivalent Bet

Often the true value of a marketing scheme is lost in the apparent average bet. If the Average Bet field indicates an average bet of $1,000, the Equivalent Non-Rebate Bet of $609 means that a bettor not receiving the discount only has to wager $609 to generate the same After Rebate Theoretical Win as a $1,000 per round Rebate player.

A player with the following betting pattern:

Total Bet Per Rounds		# of Rounds
$25,000	x	250
$50,000	x	50
$750	x	40

has a weighted average bet of $25,824 and a non-rebate equivalent bet of $19,630.

Game Played

A rebate on loss customer can play any game. The games most often played are baccarat, blackjack, and roulette. Every game has a different casino advantage and each possible bet within the individual game has either a different casino advantage or probability of winning and losing. Both the casino advantage and probability of player loss affect the ultimate cost of a rebate on loss.

BJ Spots Played per Round provides a means of accurately analyzing a player who plays multiple spots each round. If analyzing historical play and the specific game played and betting pattern is unknown, always use the worst case scenario. If the play involved baccarat, use the banker as the game. If the player occasionally played 2 or 3 spots each round in blackjack, select 2 spots. If the player plays between 3 and 5 spots each round, select 3 spots. These worst case scenarios will yield the correct non-rebate theoretical win and assure the maximum after rebate theoretical win for the casino.

Probability of Player Loss

If the bettor was wagering the player side in baccarat, receiving a 10% discount and had made the following bets:

Total Bet Per Rounds		# of Rounds
$25,000	x	250
$50,000	x	50
$750	x	40

The Probability of Player Loss will display .585 which means that 58.5% of the time the player will lose. The balance of the time, the player will have either won or broke-even.

Rebate

This is the amount that you will discount the player's loss. For example, if the player's losses will be discounted 10% for all losses, click the button to the left of **"Same rebate applies to all losses"** and enter **10% of all losses.** If the rebate is variable, the form allows for 4 "tiers." The following entry would return 5% of all losses between $0 and $75,000, 7% on losses between $75,000 and $150,000, 9% on losses between $150,000 and $300,000, and 11% on all losses over $300,000.

Theoretical Win

The theoretical win is the amount the casino should expect to win. If the bettor was wagering the player side in baccarat, receiving a 10% discount and had made the following bets:

Total Bet Per Rounds		# of Rounds
$25,000	x	250
$50,000	x	50
$750	x	40

The Theoretical Win will display $108,440.

Trip Standard Deviation

Naturally, the actual results will vary from the expected results. The Trip Standard Deviation added to and subtracted from the Theoretical Win represents the actual results the casino can expect 68.26% of the time. A Theoretical Win of $108,440 and a Trip Standard Deviation of $504,470 means that 68.26% of the trips actual win/loss will fall within the interval of $108,440 +,- $504,470 or -$396,030 to +$612,910.

Using the Casino Marketing Manager

To analyze a particular style of play or player:

- Select the Game Played. If Blackjack is selected, you must enter the number of spots bet per round of play and the BJ Casino Advantage.
- Enter the Betting Pattern. A typical casino customer does not flat bet. Rather, their betting is within a range. The Rebate on Loss Analyzer allows for real world betting variances. For

example, if a player were to wager the player in baccarat and bet $25,000 for 250 rounds, $50,000 for 50 rounds, and $750 for 40 rounds, the analyzer allows the input of varying bets within a given player trip.

- Click Rebate Entry and enter the proposed or agreed to Rebate.

Limited Bankroll

Casino players do not have an unlimited bankroll. Consequently, the amount of credit or cash available determines the ultimate cost of the discount. Whenever the player has a limited bankroll, it results in decreasing the total hands played per trip.

Blackjack Rebates

The cost of a rebate on loss in the game of blackjack is a function of:

1. The rules,
2. number of decks in use,
3. the skill of the player, and
4. the player's betting pattern.

The final cost of a rebate is extremely sensitive to the skill of the player. The Casino Marketing Manager assumes a per-hand variance arrived from 6-deck blackjack, doubling after splitting is allowed, pairs can be re-split 3 times (4 total hands), and the house stands on soft 17.

The calculated cost of the rebate, assuming the player is not a card counter and actually plays with a disadvantage, should be viewed as being a worst case scenario for the casino.

Rebates in blackjack are perilous. Before you enter into any agreement you should conduct analysis specific to that player.

Promotional Chips

On the expense input form, the cost of promotional chips can be computed and included in the cost. A promotional chip is a chip that is typically given the player as an incentive to visit the casino. There is no cost to the player for this chip. However, the chips must be wagered until lost. In the process of losing the chips, winning players will be paid in negotiable chips. The amount of the cost is the face value less the casino advantage multiplied by the number of times the chip must be wagered before it is lost.

Dice

The cost of the rebate given a dice player can be calculated using the Casino Marketing Manager. Enter the pass line or don't pass bet. Next enter the average decisions per hour. A pass line bet will be decided once in every 3.376 throws and a don't pass bet will be decided once in every 3.472 throws. If you know the average throws be hour, you can estimate the average decisions per hour.

Enter the hours played and click on the odds multiple if applicable. Notice how sensitive a rebate on loss is to the odds wager.

Roulette

The roulette module analyzes the cost of a rebate on a roulette player with known play characteristics. At the top of the form, the box 0 & 00 Effect on Even Money Bets refers to rules found in Atlantic City and in many European casinos. In Atlantic City, if an even money bet is placed and a 0 or 00 were spin, the players even money bet loses only half. For instance, if $100 was bet on the color black and a 0 were spin, the player would lose only $50.

European casinos often have what is known as en prison. This means that if a 0 is thrown, the even money bets will be decided by the next spin. Therefore they are imprisoned for another spin. If the player loses on the next spin, the bet is lost. If the player wins the next spin he is allowed to keep his bet (no winnings).

Both policies effectively reduce the casinos advantage on the outside bets by about 50%.

Dead Chips

Introduction

If styled properly, a dead chip program provides casino marketing with a viable tool to attract the premium casino customer. The purpose of this paper is to outline the procedure for creating a successful dead chip program.

Mechanics of Dead Chips

Dead chips are specially designed by the casino and ordered through traditional chip manufacturers. These chips are purchased by program participants at the casino cage. The chip itself plays like any other gaming chip with one exception, it cannot be redeemed for cash.

That is, it can only be wagered. In the process of game play, the program participant wins some hands and loses others. When the player loses a dead chip bet, the losing chip is normally dropped in the games drop box. When the player wins a dead chip, he is paid with a negotiable chip and retains his dead chip until the chip is lost. Therefore, in the process of losing the dead chip the player will win and those winning hands are paid with clean chips. The dead chip players objective is to lose all his dead chips.

The motivation provided the customer is that something more than the face-value of the cash buy-in is returned in dead chips. For example, a $100,000 cash buy-in purchases $101,000 dead chips.

Similar Marketing Tools

In baccarat, winning banker wagers are charged a 5% commission. Often, casinos will reduce this commission to 4% to attract premium players. This reduction effectively decreases the bettors disadvantage on banker wagers about 43%, i.e., from 1.06% to .6%. Unfortunately, for the bettor, this decrease in house advantage applies only if he is betting the banker.

In roulette, casinos frequently provide single zero roulette games versus the more traditional double zero games. This decreases the players disadvantage from 5.263% to 2.703% or about 48.65%.

A dead chip program can offer the same benefits as 4% commission baccarat **but,** unlike 4% commission baccarat, the decrease in house advantage applies to **both** the banker and player bettor. And just like single zero roulette decreases the house advantage, a dead chip program can be styled to decrease the house advantage by as much or as little as necessary.

Another comparison exists between dead chips and rebates on loss. Whereas rebates on loss is a reduction of the amount of the actual loss, the dead chip program is a reduction in theoretical loss.

Mathematics of the Dead Chip

The game of baccarat has the following probabilities:

Wager	Probability	Casino Advantage
Banker	.4585974	1.0579%
Player	.4462466	1.2351%
Tie	.0951560	

In 4% commission baccarat, the reduction in house advantage occurs at the end of the play when the total commission owed is decreased 20% (from 5% to 4%). With a dead chip program, the reduction in player disadvantage occurs at the beginning of play when x in dead chips is purchased for y amount in cash. On face value, y is always something less than x. For example, a player could purchase $102,000 in dead chips for $100,000 in cash. This equates to a 2% dead chip bonus. It is important to remember that all the cage buy-in is in dead chips, not just the bonus. This assures management that all the chips must be lost or what is

commonly called washed. Some casinos not completely understanding the dead chip mechanics have awarded only the bonus in dead chips. For instance, a $100,000 cash buy-in purchases $100,000 in negotiable chips plus $2,000 in dead chips. This results in a player bonanza.

With the previous probabilities in mind, and, for the moment, consider how many times a $1 banker wager chip must be wagered before it is lost to the casino. The banker wager chip is lost when the player hand wins or 44.62466% of the time.

.4462466 **X** = $1
X = 2.24091

Therefore, a $1 banker wager chip must be wagered 2.24091 times before being lost. In the process of making $2.24091 in wagers, the house enjoys an advantage of 1.0579% per dollar wagered or .02371 in total theoretical win (1.0579% x $2.24091).

What if the casino wanted to decrease their advantage over the player by 50%? To do so, the player would have to have lost one half the .02371 Or .01185. The casino could, after the chip is lost, return half the theoretical loss (.01185), **or** half the theoretical loss could be returned when the chip is purchased by paying only .98815 for a $1 dead chip ($1 - .01185 = .98815). In this case, if a .98815 buy-in purchases a $1 dead chip, the casino is awarding a 1.2% dead chip bonus ($1 ÷ .98815 = 101.2%) . After the dead chip bonus of 1.2%, any bettor betting the banker wager is making wagers at a game where the house advantage has been decreased 50%. **We also know that every $1 in dead chip purchases at .98815 will generate .01185 or 1.2% in casino theoretical win after the dead chip bonus.**

Since the player and banker probabilities are not the same, the same 1.2% dead chip bonus does not equate to a 50% decrease in the player wager disadvantage.

.4585974 **X** = $1
X = 2.18056

A $1 dead chip wagered on the player results in $2.18056 in wagers and .02693 in theoretical casino win. A 50% reduction in bettor disadvantage is achieved by returning .01347 (half the .02693 theoretical) once the chip is lost **or** at the beginning through a dead chip bonus. To realize the 50% theoretical reduction in dead chips, the $1 dead chip purchase should only cost .98653 ($1 - .01347 = .98653). This equates to a 1.365% dead chip bonus ($1 ÷ .98653 = 101.365%).

Now, not knowing which side the bettor will bet, lets compare a 1.2% dead chip program where the bettor is betting the player hand instead of the banker hand **and** a 1.365% dead chip bonus where the bettor is betting the banker hand instead of the player hand.

1.2% program with bettor wagering player hand

.4585974 **X** = $1
X = 2.18056

A $1 dead chip wagered on the player results in $2.18056 in wagers and .02693 in theoretical

casino win. If the bettor receives a 1.2% dead chip bonus, the dead chip would only cost .98814 (1.012X = $1, X = .98814) for a casino theoretical win reduction of .01186 ($1 - .98814). This reduces the casino theoretical win of .02693 by .01186 or 44%. Therefore, with a 1.2% dead chip bonus, the bettors disadvantage decrease ranges from 44% to 50% depending on the side wagered.

1.365% program with bettor wagering banker hand

.4462466 **X** = $1
X = 2.24091

A $1 banker wager must be wagered 2.24091 times before being lost. In the process of making $2.24091 in wagers, the house enjoys an advantage of 1.0579% per dollar wagered or .02371 in total theoretical win. If the bettor received a 1.365% dead chip bonus, he received a $1 dead chip for a purchase of .98653 (1.01365X = $1, X = .98653). This equals a .01347 decrease in theoretical casino win ($1 - .98653 = .01347) for a reduction in casino advantage of 1.347 ÷ 2.371 = 56.8%.

With a 1.365% dead chip bonus, the bettors disadvantage decrease ranges from 50% to 56.8% depending on the side wagered.

The following table gives examples of dead chip bonuses and their effect on the casinos advantage versus non-dead chip disadvantages of 1.058% Banker and 1.235% Player:

	Effective Casino Advantage	
Dead Chip Bonus	**Banker**	**Player**
1.50%	.40%	.56%
1.25%	.51%	.67%
1.00%	.62%	.78%
.75%	.73%	.89%

In styling any program, it is only necessary to use the above effective casino advantage in preparing the proforma. If one understands how the dead chip affects the casino advantage, it is simple to construct a profitable casino program. However, the amount of time necessary to generate the casino win is a function of the bet to buy-in ratio. That is, a 1.2% dead chip program with a $100,000 buy-in and the player betting $1,000 per hand will take longer to generate the same win than if the player were betting $2,000 per hand.

Basic Strategy

Blackjack rules vary from casino to casino. Often within the same casino, the rules will vary from game to game. In the late 1950's, a group of mathematicians developed what they termed "basic strategy." Basic Strategy is defined as "the correct way to play when you have no knowledge of the remaining cards." Short of counting cards, this is the worst case scenario from the casino's perspective.

The average player does not play perfect basic strategy. However, little information is available indicating how much the typical player will vary from basic strategy.

The only research on the subject was presented by Peter Griffin in his "Gambling Ramblings." His study found that the typical small bettor played with a disadvantage of about 1.5% worse than basic strategy. The larger bettors played with a disadvantage of about .47% worse than basic strategy. The basic strategy form provides a way for management to determine their advantage over the basic strategy player.

Multiple Game Analysis

The Multiple Game Analysis permits you to include several sessions including different games and/or bets. For example, assume the player's trip included the following sessions:

Simply enter each bet and hands played in the appropriate form and click Calculate. DO NOT ENTER ANY REBATES OR EXPENSES.

You are not limited in the number of sessions or games played. Once all sessions are entered, you will find all the entries are combined in the Multiple Game Analysis.

You now enter any assumed or actual expenses as well as the proposed rebate. The Casino Marketing Manager will calculate the cost of the rebate for the entire trip which includes all the individual sessions and different games.

Dice Simulation

The Dice Simulation form allows you to enter the player profile and the Casino Marketing Manager will simulate the number of trips and decisions you specify. It then calculates the average casino win and the standard deviation of the total trips simulated. The program writes the results to a file "Results.dat" on your C:\ drive. Once the simulated is finished, you then enter any anticipated expenses and rebates. The cost of the rebate and profit contribution is calculated from the actual simulation results on the hard drive. You can analyze different cost structures and rebates using the same simulation results on your hard drive. The simulation file will stay on your hard drive until your next simulation.

The program also stores the summary of each simulation in an archive. The archive is accessed by clicking "Simulation Archive."

If you have several sessions of different average bets and betting patterns, just simulate each session and enter the results of each simulation in the Manual Input form. The form is accessed through clicking the Manual Input command located on the Multiple Game Analysis form toolbar. The program will calculate the cost of the rebate using the combined played.

Example

Assume a player with a 3 hour session in dice whose average line bet is $1,000 with double odds. He also bet $660 inside, i.e., $150 each on the 5 & 9 and $175 each on the 6 & 8. The game is full and you estimate the game speed at 40 line bet decisions per hour.

1st: Enter the player profile.

Now specify the number of total trips to be simulated. The more trips simulated the more accurate the outcome.

2nd: Click simulate. On a 233mz computer, this 100,000 trip simulation took just under 3 minutes.

On this run, the actual win percentage was within .013% of the theoretical.

The average of all trips is a casino win of $2,913 and a trip standard deviation of $33,792.

3rd: You can now enter any expenses or proposed rebates. The results of all simulations are stored on your hard drive and can be accessed by clicking Simulation Archive on your toolbar.

Manual Input

On the Multiple Game Analysis form toolbar you will find a command titled Manual Input. If you would like to include the results from your simulations in the rebate analysis, simply input the data called for in the manual entry form: game played, average bet, decisions/rounds, theoretical/simulation win, and trip standard deviation. This information is provided by the simulation. Once entered in the multiple game analysis, the session or sessions are figured into the final cost of the rebate.

Rule Assumptions

Lists the rules assumed in the dice simulation.

1. Place and Buy Bets are off on comeout.
2. Buy bets charged 5% at time wager is made.
3. Place bets pay 7:5 on 5 & 9, and 7:6 on 6 & 8.
4. Only flat portion of come bets are lost on comeout throw. Odds are saved.
5. Listed average bet and casino advantage includes all odds wagered.
6. When comebets are in action, trip will only end on a SEVEN OUT.
7. Odds multiple will NOT be rounded up. Example, if $22 on passline, double odds will be limited to $44.
8. Player will not have a place or buy bet on the point, that is, player will not have a pass line bet and place or buy the same number. If you specified a line bet and the inside numbers placed and the point is 5, 6, 8, or 9, only the remaining inside numbers are placed.

Simulation Archive

The summary of every simulation you complete is saved in a file "Archive.txt." You can access the results of previous simulations through this command.

Decisions Per Hour

In games like blackjack, baccarat, and roulette, the casino's advantage is earned per hand or per spin. This is because a decision occurs after every hand, i.e., the player either wins, loses, or ties, and is free to increase, decrease, or remove his bet. In dice, it takes, on average, about 3.38 throws for the casino to earn its advantage on pass line bets. After a point is established, the pass line bet is in suspense and the player may not remove his bet until the hand is finished.

To estimate the decisions per hour, you must take the number of players at the game into consideration. With fewer players and less complicated bets, there are more throws per hour and more decisions per hour. Example, if you estimated that the dice were thrown about 160 times per hour, then the number of decisions per hour would be 160/3.38 or 47 decisions per hour.

Expenses

The Casino Marketing Manager allows the input of either actual or forecasted expense. If a tax rate is selected, the model will multiply the rate times the non-rebate theoretical.