SHORTCUT FOR MORE ACCURATE PLAYER RATINGS IN BLACKJACK

By Bill Zender

Many table game properties struggle with a player tracking system that provides player reinvestment values similar to the system used in slots and video games. With the exception of video poker machines, the mathematical house advantage subject to each and every handle pull on an electronic device is constant based on the type of device and, in some situations, the number of coins played. The mathematical advantage with video poker machines is generally based on the optimal strategy used to play each poker game type; however most players do not use an optimal strategy and are actually subject to a slightly higher mathematical advantage.

Some table games are on a par with their electronic counterparts. Roulette, for example, is subject to a fixed mathematical house advantage. There is no decision strategy for playing roulette other than betting strategies that do not alter the final mathematical outcome. Baccarat is similar in the fact that the player is not given a decision strategy option; however the player does have a choice between wagering on the player or banker hand, each of which has a different mathematical edge (side bets not included). Both roulette and baccarat are quite simplistic while the different numbers of possible wager options in a game like craps, or the different strategy decisions in a game like blackjack, render these games a downright player rating nightmare.

By far, the majority of questions I receive regarding player tracking issues focus on how to accurately determine the mathematical edge or house advantage metric that can be used for the game of blackjack. The confusion level is not a big surprise. First, the game is subject to a huge mathematical swing in house edge based on the game's vast number of hand strategy decisions. This variance can encompass a range as high as 2 percent based on uneducated play, down to a low of 0.5 percent (or lower depending on game decks and rules) for the optimal strategy player. Second, the number of decks used and the different rules employed by management offer a secondary shift in mathematical advantage.

For example, a single deck game using the rules of stand on all 17s, double after splitting and surrender, which was offered by a Las Vegas Strip casino in the '60s and '70s, allowed the basic strategy player to achieve a "player positive" advantage of 0.3 percent. Today, the same casino that offered this player-favored single deck offers a blackjack game that deals six decks with the rules of hitting soft 17, doubling down restricted to 10-11 only and pays 6:5 on blackjack. The game supports a house advantage of 2.3 percent if the player is smart enough to play perfect basic strategy. Note: The basic strategy player would stay away from this game at all costs, and the game would only entice play from the uneducated player. The uneducated player probably gives the casino an additional 1.2 percent due to poor hand decision plays that are subject to an overall house advantage of approximately 3.5 percent.

If this isn't complicated enough, let's throw in side bets to the game of blackjack. Side bets present the casino with an additional cash flow while providing players with an alternative gambling option while they play the main game. Since side bets are considered a gambling option, all players do not engage in this side wager equally. Some customers wager the side bet on occasion, a few are passionate side bet players and wager it every hand. However, a majority of the players rarely, if ever, place a wager into that side bet area. Based on all these variables, how could any casino input an accurate mathematical house advantage into their player tracking system? Following are several situations that the wise casino executive needs to consider.

Situation #1: How Side Bets Affect Blackjack's House Advantage

Two variables need to be established before calculating the effect of side bets. First, let's establish that the average house advantage at your casino is 1.4 percent. This is calculated by adding the effect of the number of decks and rules used based on optimal strategy. A common blackjack game in North America uses six decks, hits soft 17 and allows for doubling after splitting. The total mathematical effect of these decks and rules give us a mathematical house advantage of 0.6 percent played using basic strategy. Based on past research of observed blackjack customer's hand playing strategy, the average North American blackjack player gives back approximately 0.8 percent to the casino through bad play. Reference: *Casino Enterprise Management Magazine*, April 2009, "Player Error Factors in Blackjack: How Poor are Poor Players?"

Second, let's pick a common side bet that is known to receive continual play by the individuals choosing a side wagering option. The side bet of "21+3" offers the house a 3.24 percent return based on a payoff of 9:1 on a three card combination (dealer plus player first two cards) of a flush containing a pair or higher. Table 1 is a spreadsheet example depicting a blackjack customer who wagers $20 on the main bet and $5 on the 21+3

side bet. Each bet is then multiplied by the house advantage to calculate a theoretical win, or T-Win. Note that the overall T-Win is $0.44 for a total wager of $25. By dividing the total wager into the total T-Win we can calculate the average mathematical advantage of a wager of this type. Although the house average percentage on the main wager is approximately 1.4 percent, when a customer wagers on the side bet as illustrated in Table 1, the percentage raises to an average of 1.77 percent.

	Wager	H/A%	T-Win
Main Bet	$ 20.00	1.40%	$0.28
Side Bet	$ 5.00	3.24%	$0.16
	$ 25.00		$0.44
Total H/A%			1.77%

Table 1 – Average H/A% for a Primary and Side Bet Wager

This example is based on a customer wagering $20/$5. What if a customer wagers more or less money? How can house average percentage be calculated?

To establish an accurate average advantage, the best course of action would be for the casino executive to determine the average ratio between the amount of money wagered on the main bet and the amount wagered on the side bet. After conducting 1,000-plus observations of blackjack players wagering on the main and side bet, the executive can develop a good idea as to the true bet ratio used in his or her casino. In Table 2, the example shows an estimate that players wager on both the main bet and side bet are subject to a ratio of 80 percent/20 percent. The example in Table 2 uses an 80/20 ratio that is equal to wagering $20/$5, and can be compared to the previous Table for accuracy.

	Wager %	H/A%	Total H/A%
Main Bet	80%	1.40%	1.12%
Side Bet	20%	3.24%	0.65%
Total H/A%			1.77%

Table 2 – Average H/A% Based on Wager Ratio

Once a reasonable and rational average house advantage percentage is obtained, the casino executive can add an additional rating category to his or her player tracking computer. In this situation, a blackjack player who only wagers on the main bet is subject to a house average percentage in the computer of 1.4 percent and uses this percentage multiplied by his average wager to achieve an average per hand T-Win. The blackjack player consistently wagering on the side bet as well as the main bet will be entered into a second blackjack computer category that is subject to a 1.77 percent house advantage. This house average percentage is multiplied by the total average of both the main and side bet to achieve an average per hand T-Win.

By using these simple steps to determine an accurate T-Win for the blackjack side bet customer, the casino can allocate the correct reinvestment to this higher per hour T-Win customer. The casino now has the ability to reward the blackjack side bet player, and if it uses this additional amount properly, it can motivate an increase in side bet play.

Situation #2: Don't Forget the 6 to 5 Blackjack Game Customers

Many casinos forgo side bets and bolster the game's house advantage by adding the rule of paying six units for five units when a player receives a winning blackjack. By "shorting" the blackjack payoff, the casinos increase the house advantage by an astronomical 1.36 percent to 1.38 percent, and in most cases, 6:5 blackjack payouts almost double the game's mathematical house advantage. Table 3 illustrates the total house advantage when considering the number of decks, hitting soft 17, other rule adjustments, addition of 6:5 payouts on blackjacks and the average player hand decision error factor.

	Deck Adv	H17 ADV	Rule ADV	6:5 ADV	Plyr Error	Total H/A%
Single Deck	0.00%	0.20%	0.23%	1.38%	0.83%	3.64%
Double Deck	0.32%	0.20%	-0.14%	1.38%	0.83%	2.57%
Six Decks	0.51%	0.20%	-0.20%	1.38%	0.83%	2.73%

Reference: http://wizardofodds.com/games/blackjack/calculator

Table 3 – The Effect 6:5 Blackjack Payouts Have on the House Advantage

A number of years ago, the author engaged in a discussion about the house advantage used in the player tracking computer with a casino executive from a larger Las Vegas Strip property. She advised the author that the casino used one house advantage percentage number in its player tracking/reinvestment computer for all blackjack games including its 6:5 games. She was advised against continuing this strategy. First, the system rewarded tough basic strategy players the same as it would the average or poor strategy players. Second, the system failed to reward blackjack customers who opted to play the 6:5 game with a much higher house edge. Isn't the purpose of player reinvestment to reward the customers for the games they play?

Situation #3: A Skill/Game Speed Short-cuts; Take It Out of the Floor Supervisor's Hands

Most casino reinvestment systems are set up to provide at least two skill levels for each game type. Certain games like roulette require only one skill level. Unless continually wagering the five-number bet, no one can play worse than 5.26 percent mathematical advantage. Craps on the other hand could use several different levels for line and come bettors, line and come bettors who make place/buy bets, line and come bettors who make prop bets, etc.; the list could go on. In some instances blackjack player rating systems allow for three levels: poor, average and tough players.

Guess who gets to determine at which level a certain customer qualifies? It's the floor supervisor. The same individual who is required to watch six to eight games (and sometimes up to 12) is expected to guarantee accurate ratings for all players? To make a correct assumption as to the person's playing ability, the floor supervisor would need to watch almost every hand decision in order to separate the tough players from the average players (poor players aren't difficult to spot). Floor supervisors have a hard enough time determining time on table, what the player left with in chips and the average bet. Do you really think they will determine the customer's playing ability correctly?

The short cut for establishing more accurate house advantage percentage metric is to have the floor supervisor focus on the blackjack customer's average bet. The average bet speaks a lot about the person's ability to play the games. It speaks toward the speed of the game as well. For example, a person who wagers close to table minimum is usually an occasional player who is not familiar with any hand decision strategy past "getting closer to 21." These players usually give back an additional 1 percent to 1.5 percent to the casino on bad hand decisions alone. Blackjack players who wager four to five times the table minimum are a more consistent blackjack gambler and usually play what is known as a "common" hand strategy. The common strategist usually gives back around 0.8 percent of each dollar wagered through error deviations from basic strategy. The higher limit player usually wagers in chip increments that will place him closer to the table maximum wager limit. These players are usually quite seasoned and well-versed in basic strategy.

Although not 100 percent basic strategist, they make few playing errors on the whole and give back about 0.2 percent to 0.4 percent of every dollar wagered.

Game speed accuracy is subject to the same estimation problems as game skill. Most player tracking systems that use three skill levels also consider the effects of three different speeds; fast, average and slow. Slow games are usually ones that are crowded with lower limit players. Subsequently, the lower average wager player will be subject to fewer decisions than a player wagering higher limits. Medium-level bettors will experience medium speed games because they usually play on games that accommodate three to four player hands. Fast games usually have one or two higher limit players on the table who have a tendency to request and receive private games.

Based on the previous breakdown on player skill and game speed based on average wager, the following levels can be created for our new player tracking/reinvestment system:

A. $5 to $24 Avg. Bet - Level 1
Skill level: 1.5 percent H/A—Speed: 60 Rounds per Hour

B. $25 to $99 Avg. Bet - Level 2
Skill level: 1.2 percent H/A—Speed: 85 Rounds per Hour

C. $100 to $500 Avg. Bet - Level 3
Skill level: 0.7 percent H/A—Speed: 140 Rounds per Hour

Of course these numbers and levels are only an example that could apply to a medium size casino. Large casinos with higher table limits could break into four or five skill/speed levels based on average bets and specific blackjack game types.

Applying These Situations to Your Player Tracking Software

In addition to adding more levels to the average blackjack player rating system, games offering 6:5 payouts might dedicate two additional and separate levels just for that type of game. This could also be done for games with frequently wagered side bets. A flexible player tracking system could have multiple possibilities that take into consideration the customers wagering on the main blackjack games, ones who wager on both the main game and side bet and players who wager on non-standard games such as 6:5 blackjack, blackjack switch, etc. If your casino uses a software system that isn't as flexible, consider establishing different levels based on game types along with minimum betting limits. The minimum betting limits of the table usually dictate the range of average bet. In some instances, table numbers could be used to dictate the skill level and the decision speed of the customer.

It is also important to note that each casino operation needs to determine the number of levels its blackjack business requires, the average house advantage for each level and the average rounds per hour dealt. Time and resources will be required for obtaining the correct metrics for each level, but in the long term, taking these decisions out of the floor supervisor's hands will provide the casino with a more accurate T-Win and subsequent player reinvestment values.

Increasing the House Advantage Through Mandatory Side Bet Wagering

In a previous article, this author questioned the ability of a $3 minimum blackjack game to produce a positive return for the casino after labor cost. Reference: *Casino Enterprise Management Magazine*, July 2014, "Is Your Casino Undervaluing Table Game Minimum Limits?" Not necessarily so, commented Bill Burt, vice president of casino operations, Station Casinos. Bill explained in his email that the casino I called into consideration, the Henderson Fiesta, was operating a very profitable $3 minimum game. Why? Because the Fiesta used a mandatory side bet wager along with the main bet to earn a higher per hand T-Win. The Fiesta $3 game requires a $2 flat bet and a mandatory $1 minimum side bet in order to fill out its $3 minimum as advertised. Players who bet $5 or more are not required to make the mandatory side bet. As seen in Table 4, the mathematics of this game and the mandatory side bet wager, assuming a side bet such as 21+3, makes it quite profitable. Using a side bet with a higher mathematical edge would only increase the T-Win and average house advantage percentage. The blackjack game played with six player hands, at the minimum required $3 wagers, would produce an approximate per hour revenue of $22. This game would earn enough to cover the cost of labor and gaming equipment necessary for operating this blackjack game.

	Wager	H/A%	T-Win
Main Bet	$ 2.00	1.48%	$0.03
Side Bet	$ 1.00	3.24%	$0.03
	$ 3.00		$0.06
Total H/A%			2.05%

Table 4 – Increased H/A% Utilizing a Mandatory Side Bet Wager

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