

Betting Markets Example

Consider the following example of sports betting.

The 'Money Line' is simply Sportsbook speak for 'Who will win?' Odds are associated with each team involved in the Money Line bet based on their probability of winning.

Want to bet a basketball game between New York and Philadelphia? You can be sure that a small wager on New York will bring a big payout, while it'll take a much larger wager on Philadelphia (the favored team to win) in order to get that same payout.

Philadelphia	-250
MONEYLINE	250.00
Potential Payout: \$350	
New York	+190
MONEYLINE	20.00
Potential Payout: \$58	

The quote of -250 for Philadelphia means that a bet of \$250 will yield $\$250 + \$100 = \$350$ if Philadelphia wins and \$0 if it doesn't. If this bet is fair, the state price of Philadelphia winning is $\$1 \times \$250/\$350 = \0.7143 . That is, for each \$0.7143 invested in bet, you will earn \$1 if Philadelphia wins.

The quote of +190 for New York means that a bet of \$100 will yield $\$100 + \$190 = \$290$ if New York wins and \$0 if it doesn't. If this bet is fair, the state price of New York winning is $\$1 \times \$100/\$290 = \0.3448 . That is, for each \$0.3448 invested in bet, you will earn \$1 if New York wins.

What is the state price of getting \$1 for sure, that is getting \$1 regardless of whether Philadelphia wins or New York wins? It equals the state price of Philadelphia winning plus state price of New York winning. That is, $\$0.7143 + \$0.3448 = \$1.0561$.

Wait, you have to pay \$1.0561 to get \$1 for sure? Yes, because these bets are not fair. The dealer or the is taking a cut from bets. If the bets were fair, you would actually pay \$1. If the payoff will be in future, you should earn risk-free rate so you should pay less than \$1 for this deal. For example, if the payoffs from the bet are to be received in a month and the interest rate for a month is 0.5 percent, the sum of the two state prices should be $\$1/1.005 = \0.995 .

Like any other financial market, the prices in betting markets are set by demand and supply and help aggregate beliefs of investors. Regulations vary across states and countries about which kinds of betting are legal. The website <https://www.predictit.org/> hosts bets on political events. See <https://sportsbook.draftkings.com/featured?category=live-in-game> for examples of bets on sports events.