

Preface

I am in a business called professional baseball where no quarter is asked and no quarter is given,—highly competitive, where we put a dollar mark on the muscle...

—Branch Rickey¹

As much as I like watching the action on the baseball diamond, I have to admit that I enjoy the space between the World Series and spring training nearly as much. And I am not alone. Popular websites like MLBTradeRumors.com experience their highest traffic of the year when teams aren't even on the field. Newspapers, websites, and friendly gatherings erupt with exchanges that have nothing to do with tape-measure homers or web-gems that normally spur baseball chatter. The MLB Network replaces its signature television program *MLB Tonight* with *Hot Stove*.

The off-season marks the beginning of the “hot stove league,” when fans follow a different type of game. In this league, it's not the athletic feats of baseball players that attract fans; instead, players are individual parts, which when properly assembled, produce a championship contender. Journalists and fans aren't just spectators; they're participants who discuss the moves that teams make, don't make, or should make. Each team has different needs: an ace starter, shoring up the bullpen, acquiring a back-up catcher, etc.; and, every fan thinks he/she has identified the missing puzzle pieces to complete the team.

The main event of the hot stove league is the opening of free agency, where teams purchase player services on the open market. While most people I know don't normally enjoy watching other people shop, baseball's free-agent market

draws significant attention. It is easy for fans to ponder the contents of the free-agent pool and imagine what each player might do for their team. Players compete against players to sell their services to the highest bidder, and owners compete against owners to purchase the best players for the lowest possible price. The players flirt with many teams as player agents plant rumors in the media about their clients' desires and expectations, often playing general managers off each other in the hope of bidding up salaries. At some point, all a player's suitors but one are gone. The general manager with the highest bid calls a press conference where he drapes a new jersey on the back of his smiling prize.

The off-season is also a time when teams tinker with their rosters by swapping players between clubs, a tradition from the old days of baseball when bartering was the main way that players switched major-league teams. Trades are often more exciting to fans than free-agent acquisitions; because, while the expected financial worth of players is not immediately obvious, comparisons between traded players are simple to make.

No matter the course of a player's arrival, fans are generally excited when their team lands a new weapon; yet, some fans can't help but feel the sting of the winner's curse. "If we were willing to pay more for this player than any other team, did we overpay?" Or, "if this guy's so good, why was another general manager willing to give him up for players we didn't want?" A general manager might be incompetent or genius, but how can fans know?

Economists are a curious breed of thinkers. We tend to be quite imperialistic in wielding our methods to answer questions in all aspects of life. The tools that economists use to study important but mundane topics like financial crises, budget deficits, and unemployment can be applied to other, more-interesting aspects of daily life. Baseball's labor market has been a frequent topic of analysis among economists for more than half a century. The methods economists have used to analyze this market provide tools useful for informing hot stove debates.

Whether the transaction is a \$100 million free-agent contract or a three-team trade, judging the deal requires knowing the value of the player(s) involved; but, putting precise dollar values on the things players do on the field is no simple task. This book presents the steps needed to answer the hot stove league's most pertinent question: *what is a player worth?* The methods I use provide general ballpark (pardon the pun) estimates of player worth in real dollar terms. Each

transaction has its own characteristics that makes capturing precise values difficult; however, the estimates can serve as a guide to curious fans as well as provide practical advice to general managers, player agents, and fantasy-team owners. The valuation process requires identifying how the things players do on the field translate into dollars in owners' wallets. The methods I employ are grounded in a rich economic literature on baseball's labor market—largely unknown to the general public—modifying past analyses with more-detailed data, advanced techniques, and an updated understanding of how baseball performance translates into winning and revenue.

An analytical approach to baseball may be new to some readers, but there exists a group of fans who have been thinking about baseball in this manner for many years. As Alan Schwarz details in his book *The Numbers Game*, researchers have been using data from baseball games to examine strategy and tactics since the mid-twentieth century. George Lindsey, Earnshaw Cook, and Harlan and Eldon Mills all used the game of baseball as a laboratory; however, Bill James is the Johnny Appleseed of this type of analysis.

James dubbed his work and the similar work of his contemporaries *sabermetrics*, in homage to the Society for American Baseball Research, which is more commonly known by its acronym SABR. The field of sabermetrics spawned a large following of stat-savvy baseball fans who soon found the Internet to be a conduit for sharing their unique passion for the game. The discussion has greatly enhanced our knowledge of the game in many areas, with a few sabermetric discoveries infiltrating mainstream commentary. The metrics I use to evaluate player performance in this book were largely developed and popularized by sabermetricians. However, when it comes to valuing players—a frequent topic among sabermetricians—I rarely see the work of economists Simon Rottenberg, Gerald Scully, or Anthony Krautmann mentioned, despite the fact that their analyses of baseball's labor market are the gold standard for economists. Their work will receive significant attention in this book, because understanding their models is an important first step in properly valuing players. I believe my contribution will help us better value players—benefiting the economics and baseball analysis communities—while entertaining and informing curious baseball fans.

Organization of the Book

The book begins by explaining the players-as-assets framework for valuing players. It is a mistake to value players solely on their athletic contributions, because some players excel while drawing small salaries, and other players have been signed to contracts (mistakenly) that well-exceed their revenue-generating contributions. To teams, players are assets—a bundle of rights to probabilistic income streams. Converting performance into dollars requires a basic framework for evaluating players as financial instruments. Chapter 1 explains why it is important to consider the financial obligations to players along with their on-field performance in order to estimate expected returns. Failure to incorporate both aspects can result in erroneous declarations of one team getting the better end of a trade. In this framework, one seemingly lopsided trade—Johnny Estrada for Kevin Millwood—doesn't seem so unbalanced.

The task of valuing players requires properly assessing player performance on the field. While baseball fans often rely on traditional measures of player performance like batting average and earned run average, other metrics do a better job of gauging the things that players do to generate wins and revenue for their teams. Incorrectly measuring performance means that any estimated dollar values based on these evaluations will improperly value player contributions. Chapter 2 presents criteria for judging the usefulness of player performance metrics to aid in the selection of the most appropriate measures of player performance for translating on-field play into dollars.

Valuing players as assets also requires knowing how player performance changes over time as a result of aging. Chapter 3 discusses the importance of age on players' careers—going all the way back to little league—and uses historical performance records to identify aging patterns of players. The results support the conventional wisdom that players gradually improve through their 20s peaking just before 30, when they begin a gradual descent.

With the basic framework for valuing players in place, Chapter 4 presents the method for the converting performance into dollars so that players are valued according to the revenue they generate for their teams. Chapter 5 offers a critical examination of the estimates and identifies baseball's best and worst deals. Though some players may outperform their peers on the field, the labor rules

governing player compensation sometimes cause less-experienced inferior players to be more valuable as assets than more-experienced superior players. The estimates reveal why baseball players tend to earn seemingly exorbitant salaries and that many players consistently earn salaries less than their worth.

Beyond evaluating individual deals, estimates of individual players' worth also shed light on how well ballclubs manage their rosters. Is your favorite team putting a good team on the field at the cheapest possible price? Winning and winning efficiently are the signs of a well-managed organization. Chapter 6 rates teams according to how wisely they spend their resources, and uses the information to identify the best- and worst-managed franchises of the past decade.

Player contracts are not normally annual agreements, renewed every season according to each player's performance. In most cases, players and teams reach long-run deals that require taking into account factors that affect player value over time; therefore, it is important to project how players' values are expected to change during the contract term. Chapter 7 incorporates aging and other factors that affect players' long-run value in order to project players' expected worth. C.C. Sabathia's recent seven-year, \$161 million deal with the New York Yankees provides an example for demonstrating how factors such as aging, league revenue growth, and team quality affect players' long-term value.

Another frequent type of transaction among clubs is the trade of veteran major-leaguers for minor-league talent. How can a player who has never played a day in the big leagues net a proven major-league regular? The answer lies in the probabilistic value of unproven talent, whom baseball insiders often refer to as "prospects." Major baseball news outlets like *Baseball America*, *Baseball Prospectus*, and ESPN devote significant resources to covering players who have yet to don a major-league uniform. In the bowels of farm clubs, prospects generate short-term negative returns, which organizations gladly suffer as good long-term investments. Not every prospect pans out, which means the returns are uncertain. Chapter 8 presents a model for estimating the expected worth of these volatile assets and reveals that the development costs may explain why players agree to below-market wages during their early years in the league.

The chapters are also accompanied by brief asides labeled “Hot Stove Myths.” In my many years of following the hot stove league, I’ve come across several mistaken ideas that are sometimes expressed as conventional wisdom. I discuss a few of these notions at the end of each chapter and explain why they are misguided. Though they draw on information presented in the main chapters, they can be read on their own.

After completing the book, it is my hope that readers will understand not only how much baseball players are worth, but also how I arrived at these values. The book is written for a wide audience that ranges from casual fans, who are just curious as to what baseball players are worth, to experienced researchers, who wish to know the intricacies of the analysis. Being as open about my methods sometimes requires going into technical details that may not interest some readers. Therefore, where the explanations become complicated I report the intuition behind the technical details so that readers will not become overwhelmed, but I include further details in endnotes and appendices. In addition, each chapter concludes with a brief summary of the main findings.

This book is the culmination of several years of research: building up, tearing down, and rebuilding models for estimating player worth. What began as a last-minute one-chapter inclusion in my previous book *The Baseball Economist* turned into what seems like an epic quest. Though the book contains many tables, figures, and equations I have tried not only to keep the analysis fun, including anecdotes that demonstrate the relevance of the results, but also to keep the mood light. I follow baseball because its a fun game to watch, and it is my hope that this book will add to your appreciation of the national pastime.

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Hot Stove Economics

Understanding Baseball's Second Season

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