A WINNER IS YOU: REEXAMINING THE EXISTENCE OF A WINNER'S CURSE IN BASEBALL FREE AGENCY

by

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Introduction

Major League Baseball allows players (given a certain level of big league service time) who are without any current contracts to sign with any team in the league who he may come to terms with. These free agents may be thought of as goods up for auction who are bid on by teams who desire their abilities. In this study I used the Burger and Walters (2008) methodology to test for the existence of a winner's curse in the Major League Baseball free agency classes of 2005 through 2007[1]. Although simply finding evidence of the curse was the main goal, I was also interested in finding the magnitude of overbidding in relation to the study conducted on the 1998 and 1999 free agency classes.

Two different tests (*ex post* and *ex ante*) were conducted in order to determine whether the winner's curse occurred during the free agency period that was studied. The *ex post* approach evaluates the performance over the life of the contract versus the salaries paid to free agents signed during the study period. By calculating whether the player produced more, in terms of revenue, than they were paid over the life of their free agent contract, it is possible to determine how much the contracting team overpaid (or underpaid) for these free agents. In contrast, the *ex ante* approach takes into account only the information that the bidders had at the time of the auction. By creating a model to predict the free agent's future production, this approach determines whether the teams properly correlated the production potential of a player with the winning contract offer.

In agreement with Burger and Walters's (2008) study, I found evidence of overbidding on free agents by Major League Baseball franchises over the 2005-2007 sample period. Furthermore, the losses on these free agents are much higher with the more recent sample than the late 1990s cohort. Clearly, the free agency auctions that occur every offseason are a difficult activity for teams to profit

1 All data is available upon request.

by. Consequently, the players are now getting paid far more than they are, seemingly, worth and the gap has only gotten larger since the late 1990s.

Background Information

In a standard (unit) auction an item is put up for bid while competing buyers successively and increasingly announce an amount that they are willing to pay for the item until the highest bidder is alone in bidding. Subsequently, the item is sold to the highest bidder for the amount of his or her final bid (Wilson 1979). The result of an auction where the value of the item is known and consistent is predictable. As long as two or more bidders are competing, the bids will increase until the final bid is exactly equal to the value of the item. The winning bidder will then pay this sum to the seller in exchange for the item. However, the true value of auctioned items are usually unknown and are therefore estimated independently by each bidder. According to Thaler (1988), auctions of this sort usually: (1) exhibit an average bid that is much less than the true value of the item (thus bidders are biased in a risk averse fashion); (2) the final bid will be greater than the actual value of the item. The scenario in which the winning bidder pays more than the real value for the auctioned item is a concept known as the “winner's curse.”

The winner's curse concept was first published by three oil company engineers, Capen, Clapp, and Campbell (1971). Assuming that the auction is a *common value* auction (the item up for bid has the same realized value to all bidders) and that the bidder's estimates are unbiased (the average bid is equal to the actual value of the item), the estimated value of the item will vary across all bidders. Some bidders will bid below the actual value of the item, whereas others will bid above. Even if the bidders decide to bid somewhat less for the item than what they have estimated its value to be (in an attempt to thwart the curse), the likely outcome of the auction is that the bidder with the highest estimate (an estimate that is also higher than the real value of the item) will be the winner. However, the fact that the winning bid is above the real value of the item, resulting in the winner losing money, is the winner's curse.

The act of a Major League Baseball (MLB) free agent taking bids from teams and then signing with the highest bidder is an example of an auction. According to the winner's curse concept, the winning bid (placed by the team with which the free agent decides to sign) is inflated above the actual value that the player brings to his new team and the team loses on the contract by paying the player more than he is providing in additional revenue. This is an *ex post* analysis of the results of a free agent contract as, the signing is only considered a success if the player was at least as productive as his salary would warrant over the life of the contract. The first such study was conducted on free agents between 1976 and 1979 by Cassing and Douglas (1980). The study concluded that 28 of 44 (64%) free agent contracts observed were not financially profitable and that the players were paid 20% more than their estimated marginal revenue products (MRPs). Thus, the results of the study are consistent with the winner's curse. However, their study relied on basic approximations of the players' marginal products. Their study merely used slugging percentage[2] (for hitters) and strike out/walk ratio (for pitchers) as proxies for player production and assigned a monetary value to each point that the player achieved for each statistic. Since the game of baseball is heaven to a statistician, new statistics are constantly being created to more accurately measure player performance.

A more recent study by Burger and Walters (2008) used newer baseball statistics to revisit the contracts signed by the free agents in the Cassing and Douglas study (as well as the free agents of 1998 and 1999) in order to more accurately test for evidence of the winner's curse. Another attribute of the Burger and Walters study is the allowance of different MRPs for different markets. In short, a larger market gains more revenue per win than a smaller market does. However, the fact that player production has a different value to teams across the league means that baseball free agency is not a

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2 Slugging Percentage = total bases / at bats

common value auction, which is usually a standard assumption (Burger and Walters 2008). Goeree and Offerman (2003) suggest that most auctions have elements of both common and private value auctions and that an increase in the number of bidders increases the seller's revenue as the private value component outweighs the common value component. Burger and Walters's baseball study confirms this as the number of bidders and average salary were positively correlated for the 1976 – 1979 free agents. This group of players was auctioned off with a published number of bidders in a form of free agency that is no longer used. Therefore, the assumption that baseball free agency is a common value auction is not a barrier to this study.

Lind and Plott (1991) studied the existence of the winner's curse in a laboratory setting with repeated experiments and determined that the frequency or size of the curse diminishes over time without completely disappearing. With increasingly detailed and accurate measures of player performance, a reduction in the severity of the winner's curse in baseball free agency over time is an expected result. Coupling the advanced statistical factors with the *learning by doing* that team front offices experience while working[3], one would expect the winner's curse to dissipate over time. However, Burger and Walters (2008) found that the overbidding became more commonplace by the late 1990s. Free agency has officially existed in baseball since 1976[4], giving clubs over twenty years to refine their bidding practices in order to overcome their overbidding problems, yet the problems seem to have only become more intense. Their "findings highlight the difficulty of making efficient decisions in a competitive, high-stakes environment when the elements influencing an asset's value are many, complex, and volatile" (Burger and Walters 2008). Essentially, they have determined that baseball free agency is too complicated and unpredictable to accurately account for the winner's curse,

3 Although the turnover of managers in struggling front offices each season should not be ignored, replacement personnel should be able to learn from past managers' mistakes with both learned experience and information that is readily available to them via the club's archives.

4 See http://www.sptimes.com/News/102299/Sports/Free_agency_era_opens.shtml

even over time.

Methodology

Given the assumption of no asymmetric information, a team that is profit maximizing should be paying a salary to a player that is no more than his expected MRP[5]. This would allow each team to make a profit (or break even) on each of its players. In order to examine whether this is indeed the case for baseball free agents, an initial test for evidence of efficient bidding is to perform an *ex post* examination of winning (from the team's perspective) on free agent signings. Consequently, if teams' general managers are eliminating systematic errors while estimating a free agent's value and/or taking risk and uncertainty into account while bidding for players, on average a player's salary will be less than or equal to their actual MRP and teams will realize returns that are greater than or equal to zero.

The fashion in which to measure a player's MRP was developed by Scully (1974). First, by econometrically estimating the relationship between a team's win total (this can be considered a proxy for the amount of enjoyment the team's fans consume from a full season) and its revenue, the marginal revenue garnered from each extra win is estimated. Secondly, the marginal win value (MWV) calculated for each team is multiplied by the player's marginal output of wins[6] to compute a player's MRP.

Every study on the topic of overbidding in baseball prior to Burger and Walters (2008) suffered from a common flaw: The revenue generated by a win was assumed to be consistent for all teams in the league, regardless of market size or other factors. For example, the notion that one extra win by the New York Yankees (MLB's highest valued team) is equal in its revenue generation to one extra win by the Florida Marlins (traditionally MLB's lowest valued team) is laughable to an informed baseball fan.

5 MRP is equal to his expected marginal productivity multiplied by the value that this productivity provides to the team.
6 Rather than using slugging percentage and strikeout/walk ratio (as Cassing and Douglas did), a statistic that specifically measures a players win output in a season is used. The statistic will be discussed in more detail later.

If the differences in marginal revenues across the league are ignored by researchers, a fundamental question is being overlooked by the studies: Are teams formulating their bidding practices on the value that the free agent brings to their roster, regardless of the value that another team may reap from the services of the player?[7] To solve this problem, this study has taken the Burger and Walters (2008) approach of first estimating team specific revenue functions and MWVs for the 2005 through 2007 seasons. These MWVs are used in the *ex post* analysis to determine the returns to contracts that were signed during the '05, '06, or '07 off seasons and have run their course (the free agents could only be signed through the 2009 season).

For the *ex post* approach, I used pooled time-series and cross-sectional data to estimate the required team revenue functions. The dependent variable in the regression was total revenue for team *i* in year *t*. The independent variables of interest in the regression for calculating the market specific MWVs were pop_{it}, the population of team *i*'s metropolitan statistical area (MSA) in year *t*; $wins_{it}$, team *i's* win total in year *t*; and $popwins_{it}$, an interaction term, population times wins for team *i* in year *t*. The regression also included two control variables: $stadium_{it}$, a dummy variable indicating whether team *i* played in a stadium constructed within a decade of year *t* (as a new stadium can attract attendance by novelty), and $stadage_{it}$, a continuous variable indicating the age of the stadium that team *i* played in in year *t* (to allow for decay in the stadium to negatively affect revenue).

In addition, I attempted this regression using a playoffs dummy variable (whether the team qualified for postseason play). However, there were three issues with this: (1) the estimated coefficient on the variable was insignificantly different from zero; (2) the alternative specification did not exhibit much variation in overall explanatory power and estimated MWVs; (3) the dummy variable would

7 Another question, that goes beyond the scope of this paper, is whether a team may purposely overbid on a player (purely on the MRP definition) in order to prevent a rival from acquiring the player and taking away wins from the winning bidder. For example, does the Boston Red Sox overbidding on player X to ensure that the Yankees do not sign him give the Red Sox a net profit if the damage that player X does not do to the Red Sox as a member of the Yankees is accounted for?

affect an accurate calculation of MWVs because it does not specify which marginal player (or players) pushed a team into the postseason (and increased the team's marginal revenue by the amount according to the estimated coefficient).

The amount of wins that a player contributed over the life of his contract was used with the team-specific MWVs to determine the total amount of revenue that the free agent contributed while under that contract – his MRP. The statistic used to calculate the amount of wins that a player contributed in a given season is “wins above a replacement player” (WARP). WARP is a statistic that measures the amount of runs created or prevented by a player through many common baseball statistics (homeruns, hits, strikeouts, fielding, etc.) and produces a precise estimate of a player's contribution to his team's win totals (above that of a replacement player[8]). Since the statistic estimates the additional wins created by a real baseball player above a hypothetical replacement player, the cost of these additional wins gained is not the real player's annual salary, but is that annual salary minus the salary that the team would have to pay the hypothetical replacement player (who, by assumption, would be paid the league's minimum salary). This minor calculation may have been computed by Burger and Walters (2008), however they did not explicitly state that it was taken into account.

Prior to the Burger and Walters (2008) paper, studies on this subject used less complete statistics as proxies to determine the contribution to wins by a single player. The issue with this approach is that it discounts the productivity of a player who specializes in the type of play that is not accounted for in the chosen proxy. Burger and Walters (2008) determined that by using slugging percentage as a measure of production, Cassing and Douglas (1980) estimated Pete Rose's annual MRP in the late 1970s and early 1980s as less than half of the annual MRP that is estimated if WARP is used. The difference was enough to shift Rose's contract from a loss to a win, from the team's perspective. The

8 A replacement player is defined as one who is freely available, a typical (and hypothetical) minor league player. The potential output of this player varies by position.

issue was that Pete Rose contributed to his team's win total in ways that slugging percentage could not take into account. Among other statistics, WARP does not measure on-base percentage or the ability to play multiple positions, particularly the more difficult ones. As with all approaches to MRP calculation, the the WARP approach also cannot take "star appeal" into account. This attribute is too subjective to be accurately measured in a quantified manner.

Of course, hindsight is 20/20 and it is easy to accuse teams of overbidding from an *ex post* perspective. According to Burger and Walters, negative realized returns on winning bids might indicate evidence of the winner's curse, but no player's future performance is ever known for certain or guaranteed. When teams are bidding for a player's services, they only have past performance data in which to estimate the future production of a given player.

Therefore, in order to determine whether teams efficiently synthesized the information available to them at the time of the auction, an *ex ante* test was conducted by creating a model of each free agent's expected future productivity and correlating this with the winning contract offer. More specifically, this study regressed the average annual salary paid to each free agent by the team that won the auction, given the contract that he signed between 2005 and 2007, on the following explanatory variables: trend, a time variable (1-3) to control for the general salary inflation that occurs over time; $warpavg_j$, player *j*'s average annual output of marginal wins (estimated by the WARP statistic) over the three seasons prior to signing the free agent contract; $warpvar_j$, the variance in player *j*'s WARP over the three seasons prior to signing the contract; age_j, player *j*'s age in the first year of the free agent contract; exp_j, the number of years of major league experience[9] for player *j* in the first year of his free agent contract; pop, the size of the winning bidder's market in the year that the contract is first signed

9 Experience, according to this study, is defined as every season of MLB played after their rookie season. A rookie season was considered to be the first season in which a position player had at least 50 at bats or a pitcher pitched at least 30 innings.

(proxied by MSA's population); and $teamchange_j$, a dummy variable that equaled 1 if the free agent signed a contract with a new team and 0 if the player resigned with his current team while a free agent[10].

This model postulates that, while controlling for his age and experience level, the winning bid for player *j* should be a positive function of his expected productivity over the life of the contract offered (proxied by $warpvar_j$). Also of interest is whether the winning bidder accounted for the effects that the other variables could have on player *j*'s future performance. Evidence that the winning team adjusted its bid for a player's historical variance in performance ($warpvar_j$), the size of the bidding team's individual market (pop), and the possible asymmetric information issues that stem from signing a player from another team ($teamchange_j$) are also important to note.

The latter two of these explanatory variables have expected effects that are straightforward. Franchises that play in more populous areas should be willing to pay more for a given expected level of productivity as it will generate more marginal revenue for them than for a team in a smaller market (although, as detailed in the *Results* section, this effect is not as strong in the 2005-2007 period as it was in the 1998-1999 period). By contrast, a team bidding for a free agent that played previously for a different team should be cautious in its approach to signing the "new player." This is because, *ceterus paribus*, the free agent's most recent employer is likely to have inside information on his physical status, motivation while not playing for a new contract, etc. Thus, the signs for pop and $teamchange_j$ are expected to be positive and negative, respectively.

Greater variation in a free agent's prior performance ($warpvar_j$) should increase the expected variance in that player's future performance. A player who has proven to be inconsistent in the past should be expected to be inconsistent in the future. Therefore, the bidding franchises should be more

10 Any player that resigned with his current team while under contract by said team is omitted as no auction occurred for the player's services.

cautious in their bidding strategy for a risky player than for a consistent player. A greater variance also raises the expected amount by which the greatest value will exceed the realized value, so a rational bidder will adjust their bids downward. In a private-value auction, the bidders are simply attempting to place a bid that exceeds the next highest bidder's valuation; greater variance in estimated value increases the expected gap between each bidder's individual valuations and a downward adjustment of bids occurs. Consequently, a negative sign is expected on $warpvar_j$. However, a wage premium for players with "upside potential" might be expected. Lazear (1998) argues that this allows employers to value "high ceiling" workers because the upper tail of their productivity distributions may be kept and the lower tail removed, so the risk creates option value in this individual worker. Bollinger and Hotchkiss (2003) explored this in the context of baseball prospects with high potential production. They discovered support for the Lazear (1998) theory in baseball's labour market, but only for players who were ineligible for free agency. Player's that are ineligible for free agency tend to be younger players who, consequently, have more time to develop and improve than a veteran free agent does. Due to the limited number of free agents each offseason and the great costs incurred to sign them, removing under-performing players from a list of potential pickups can be costly.

Typically, studies testing the existence of a winner's curse use *ex ante* approaches. However, the issue with this approach is the difficulty in predicting future player productivity. Many things must be taken into account that affect all players to a different degree. For example, it is common for many (but not all) professional athletes to have better-than-average seasons in the years before they become free agents. How large this effect is depends on the player and is difficult for the bidders to model.

This downside does not affect the *ex post* approach as the results are calculated after the contract is realized. Also, the *ex post* test has results that are easier to make sense of: It will show either that the player produced more for the team than he was paid (and by how much) or that he did not (and also by how much). For these reasons, I preferred the results of the ex post approach, but have conducted both in similar fashions to Burger and Walters (2008).

Data

Team revenue was reported in Forbes' "The Business of Baseball" team valuations[11]. The article is updated annually by the magazine. Burger and Walters used team revenue from an official Major League Baseball document that is available online. There was no official source for team revenues between 2005 and 2007, therefore the Forbes articles are used in this study as educated guesses.

The Populations for American cities used are estimates from the United States census[12]. Toronto's populations were taken from the Statistics Canada Censuses of 2001 and 2006 with linear interpolations used to calculate the populations for 2005 and 2007. For all cities, the greater metropolitan area populations are used rather than the populations of the city proper. For two team markets[13], the population is divided in half.

A team's first full year in a stadium is considered to be the first year of a stadium's life[14]. If a team moved into a stadium that was built previously for another tenant (the Tampa Bay Rays use of Tropicana Field, for example) the year the stadium was built is considered to be the first year of the stadium's life.

11 For an example, see http://www.forbes.com/2005/04/06/05mlbland.html
12 See http://www.census.gov
13 New York, Chicago, and Los Angeles.
14 All team and stadium data is from http://www.baseball-reference.com

Table 1: Team and Market Summary Statistics

	Mean	Standard Deviation	Minimum	Maximum
Population (in millions)	4.21	2.04	1.54	9.45
Wins	81	9.98	56	100
Stadium < 10 Years Old	0.4	0.49	0	1
Stadium Age	22.69	22.96	1	95
Revenue	170.88	38.35	114	327
Population x Wins	349.74	193.67	109.68	913.04
Team MWVs	1.54	0.26	1.18	2.08

All contract data was taken from Cot's Baseball Contracts, the most complete collection of recent baseball contract data[15]. All free agents in the dataset were signed as free agents between 2005 and 2007 (some players are included more than once) to contracts that expired at or before the end of the 2009 season. Any free agent without prior MLB experience (a Japanese professional, for example) was omitted from the study.

All WARP[16] data was collected via the Baseball Reference website. Any player without three previous seasons worth of major league WARP data was ommitted from the *ex ante* study as the average WARP and WARP variance variables would be affected.

15 See http://mlbcontracts.blogspot.com for more information.
16 See http://www.baseball-reference.com/bullpen/Wins_Above_Replacement_Player for a detailed explanation of the WARP statistic.

Table 2: Free Agent Summary Statistics

	Mean	Standard Deviation	Minimum	Maximum
Contract Length (seasons)	1.87	1.08	1	5
Average Annual Salary (over life of Contract)	4.94	3.84	0.5	17.4
Total Salary (over life of contract)	10.44	13.14	-0.38	73.19
WARP (over life of contract signed during study period)	1.92	3.08	-1.8	15.7
Average WARP (over three seasons prior to signing contract)	1.43	1.34	-0.73	5.97
WARP variance (over three seasons prior to signing contract)	4.77	7.94	0.01	74.16
Age (when contract is signed)	33.64	3.59	26	44
Experience	10.96	3.71	5	24

All monetary figures are in millions of 2006 dollars.

Results

The effect of market size on teams' marginal revenue in this study is relatively weaker when compared to the Burger and Walters (2008) study. For example, the smallest market in between 2005 and 2007 was Milwaukee and the marginal revenue that the team made from an extra win was only $1.18 million (in 2006 dollars). By comparison, the largest market was New York and both teams in that city earned $2.08 million dollars per extra win. Burger and Walters's (2008) study also found New York to be the largest market in the late 1990s, but they estimated the team's MWV as $3.12 million (when converted to 2006 dollars). However, the differences between the two samples' estimated team-specific MWVs are not as large for the median markets. In Burger and Walter's (2008) study the median market is Florida (Miami) with a MWV of $1.24 million (also converted to 2006 dollars). In comparison, this study estimated the revenue generated by an extra win in the median market (Detroit) as $1.52 million. The shrinking of the gap between the MWVs in the biggest and median markets is attributed to smaller market teams increasing ability to take advantage of MLB's revenue sharing policy that was enacted in 1997. Essentially, teams were able to benefit from free agents more equally in the later period.

Table 3: Estimated Team Revenue Functions and Marginal Win Values

VARIABLES	1995-2001 (B&W)	2005-2007
Trend	5.90** (0.843)	13.59** (3.126)
Population	-13.1** (5.08)	-0.424 (5.928)
Wins	0.114 (0.278)	1.007** (0.130)
Population x Wins	0.239** (0.061)	0.114* (0.0652)
Stadium < 10 Years Old	40.0** (5.40)	25.16** (6.593)
Stadium Age	-2.36* (0.915)	0.593** (0.141)
Adjusted R-squared	0.546	0.981
F-Statistic	-	764.64

The dependent variables in each regression is real team revenue (1998 and 2006 dollars, respectively). Standard errors are in parentheses. Population variable is in millions. B&W did not publish f-statistics.
* Significant at the 10% level.
** Significant at the 1% level.

The Cassing and Douglas (1980) study on this subject concluded that MLB teams were victims of the winner's curse from 1975-1980. Their *ex post* approach determined that team's lost money on most free agent contracts signed over that period. In contrast, the Burger and Walters (B&W) study determined that there were significant gains by teams signing free agent contracts over the same period. Their identical study of free agent signings for the 1998 and 1999 seasons yielded results in the same direction (teams made money on free agents), but of a lesser magnitude. The study which I conducted found that negative returns were the standard for free agent contracts and only a handful of players (around 20%) earned more revenue for their team than what they were getting paid for doing so.

Table 4 shows the results of the *ex post* study conducted for this paper and for B&W's. The table sorts contracts into two categories: those in which the revenue produced by a free agent exceeded his salary over the life of the contract (a “win” for his employer) and those in which the salary paid to the player exceeded the revenue that he produced (a “loss”). The study found that teams won only 37 of the 179 (20.7%) free agent contracts signed over the period 2005-2007[17]. By contrast, B&W reported finding that teams won 95 of the 203 (46.8%) contracts signed in the 1998 and 1999 seasons.

17 Only the contracts whose life was completed by the 2009 season were accounted for.

Moreover, the aggregate return[18] to bidders in the free agent market over the 2005-2007 period was estimated as a whopping -70%. B&W calculated the average return for contracts signed in 1998 and 1999 as +3.28%. Therefore, franchises lost money on more free agent signings in the later period and also lost more money in aggregate.

When the sample was split into large- and small-market[19] winning bidders, similar results to the full sample are observed. Teams in large markets won 21 of 104 (20.19%) bets on free agents, whereas those in small markets won 16 of 75 (21.3%). Conversely, large markets fared better than small markets when considering the aggregate returns to free agent signings. This study estimated large market teams' aggregate returns on free agent contracts at -67.87% and small market teams at -75.52%. This means that, although big market teams "won" on fewer free agents in a case-by-case basis, they fared better than small market franchises when the effectiveness of all signings was aggregated. Essentially, big market teams were able to afford more chances on free agents and had a better success rate than small market teams when everything was factored into aggregate returns. The aggregate return effects found in the 2005-2007 period slightly mirror the effects found in 1998-1999, as B&W also concluded that large market teams enjoyed a higher aggregate return on free agents than small market teams. However, their study concluded that large markets made money on their free agents (58-44 and +25.18%), whereas small markets lost out on their signings (37-64 and -28.84%).

When testing for any asymmetric information effects on free agent signings, the results in this study contrast what B&W concluded. Teams that signed free agents from other teams won only 30 of 141 (21.28%) cases with an aggregate return of -69.11%, whereas players who resigned with their teams had a win-loss record of 7-31 (18.42%) and an aggregate return of -77.35%. Therefore, it appears that teams do not have any advantage in estimating the future production of their own free

18 Aggregate return = (total revenue produced by the players observed divided by the total salary paid to these players) – 1
19 Large markets = above average markets, small markets = below average markets (by MSA population)

agents over other bidders who did not have exclusive information on the product. These findings are the opposite of what B&W determined. Their results found that teams fared better when resigning their own free agents than when signing new players (37-30 and +34.63% compared to 58-78 and -10.77%). The findings of this study also contrast the "home town discount" hypothesis that a player accepts a lower salary in order to remain on the same team for reasons of stability and environment familiarity.

Table 4: *Ex Post* Evaluation of Free Agent Contracts signed 1998-1999 & 2005-2007

	1998-1999 (B&W)	2005-2007
Full Sample		
W-L Record	95-108	37-142
Sign Test	($p = 0.200$)	($p = 0.0000$)
Aggregate Return	3.28%	-70.78%
t-test (null: MRP ≥ salary)	($p = 0.653$)	($p = 0.000$)
Large Markets		
W-L Record	58-44	21-83
Sign Test	($p = 0.979$)	($p = 0.0000$)
Aggregate Return	25.18%	-67.87%
t-test (null: MRP ≥ salary)	($p = 0.978$)	($p = 0.000$)
Small Markets		
W-L Record	37-64	16-59
Sign Test	($p = 0.005$)	($p = 0.0000$)
Aggregate Return	-28.84%	-75.52%
t-test (null: MRP ≥ salary)	($p = 0.001$)	($p = 0.000$)
Player Changed Teams		
W-L Record	58-78	30-111
Sign Test	($p = 0.051$)	($p = 0.0000$)
Aggregate Return	-10.77%	-69.11%
t-test (null: MRP ≥ salary)	($p = 0.122$)	($p = 0.000$)
No Change of Team		
W-L Record	37-30	7-31
Sign Test	($p = 0.836$)	($p = 0.0000$)
Aggregate Return	34.63%	-77.35%
t-test (null: MRP ≥ salary)	($p = 0.978$)	($p = 0.000$)

W-L record reports the number of free agents for which MRP > salary (a win for the owner/team) compared to the number of signees for which salary > MRP (a loss). Aggregate return reports the proportion by which the revenue generated by free agents over their entire contracts exceeded (or was exceeded by) the total amount spent on their salaries. Sign test reports the probability that the observed number of wins (or less) occurs under the null hypothesis of a 50-50 distribution; *t*-test reports the probability that the observed aggregate return will occur under the null hypothesis that MRP ≥ salary (one-tailed test).

The difference between the two studies in terms of both wins-losses and aggregate returns, is staggering. Why did so many more free agent signings from 2005 to 2007 end up as losses at the conclusion of the contract, in contrast to signings from the late 1990s? The difference in MWVs between the two studies is the answer. Although (as stated above) the median markets had a higher MWV in the more recent study, the largest market's MWV actually fell by about 30% between the two studies. More specifically, the makeup of the coefficient estimates on marginal revenue from an extra win differed greatly between the two periods (see table 3). The coefficient on $wins_{it}$ was about seven times higher (after factoring in inflation) in the more recent period, whereas the coefficient on $popwins_{it}$ shrank by about 60% between the two periods. What this means is that the difference between team-specific MWVs is smaller in the more recent sample, just as the coefficient on $popwins_{it}$ is smaller in the 2005-2007 sample than in the late 1990s sample. Since that coefficient is the only source of a difference between the two samples' MWVs, the more recent sample experienced less variation in team specific MWVs. Presumably, this caused the free agent auctions to be more competitive (and have more competitors) as the products were now worth closer to the same amount to all franchises which caused these auctions to became more like a common value auction. According to Kagel and Levin (1986), common value auctions with more bidders are more likely to be affected by the winner's curse as bidding practices become more aggressive. Perhaps there was a "keeping up with the Joneses" effect for MLB teams (where the Joneses are played by the rich New York Yankees). Therefore, as the "playing field" leveled, more teams were able to take part in free agent auctions, and thus overbidding increased in terms of both frequency and intensity.

The *ex post* analysis of free agent signings determined that a majority of the free agents signed over the 2005-2007 period contributed less revenue than what they were getting paid in salary by their teams. An *ex ante* analysis to test the efficiency of free agent bidding over the same period are contained in the salary regressions presented in table 5, which displays regression results for both this study's free agent period and the late 1990s sample used by B&W. The estimated coefficients for historical player productivity ($warpavg_j$) and age had expected signs with the $warpavg_j$ coefficient being highly significant. This means that, *ceterus paribus*, winning bidders predictably paid more for more productive players and less for simply older ones. On the other hand, the control for a free agent's experience (exp_j) was the opposite sign of what was expected (and computed by B&W). Apparently, winning bidders in the more recent period rewarded free agents who had less major league experience. More importantly, however, are the impacts of variation in past player productivity and the winning bidder's market size.

Like Burger and Walters (2008), here the coefficient on pop is positive but with stronger significance than the prior study. This suggests that franchises understood the positive correlation between a market's size and the value that a player brought to the specific market in the late 1990s and adjusted their bids in the correct direction, but it was not until the 2005-2007 period in which they were truly able to make market-specific bid adjustments of the right size.

The estimated coefficients on $warpvar_j$ in table 5 are positive but insignificantly different from zero for both samples. This suggests that bidders in both eras failed to adjust their bids downward for higher risk and inconsistent free agents. According to Bulow and Klemperer (2002), overbidding is a result of the winning bidder being the most over-optimistic about the investment's real value without making appropriate adjustments to account for the possibility of overbidding. The failure to reduce bids for inconsistent free agents (never mind paying a premium for it!) would appear to be too much optimism in regards to the estimated future value of the product. The fact that $warpavg_j$ is positive for both samples means that teams of both periods took into account a player's recent performance while attempting to sign him, but the positive (albeit insignificantly different from zero) coefficients on $warpvar_j$ in both eras might suggest that the franchises put too much stock into his good seasons and too little weight into his bad ones while bidding. Although, the fact that these estimated coefficients are insignificantly different from zero suggests that the bidders became better at using the variation of a player's past performance since the advent of free agency[20].

Finally, the estimated coefficient on $teamchange_j$ in the more recent period is positive but insignificant. This may suggest that asymmetric information issues are negligible in the free agency market. If anything, bidders were over paying for players that they may not have had a complete picture of between 2005 and 2007 (which matches what the asymmetric information effect predicts). Burger and Walters (2008) suggest that the insignificance which their estimated coefficient on $teamchange_j$ also suffered from may be attributed to “intensive scouting and exchanges of medical reports” that are more commonplace in recent MLB seasons. All of the detailed information gathered by the bidders allows them to know as much about free agents as their former teams – symmetric information for all bidders.

20 Burger and Walters (2008) also note a positive coefficient on warpvar for the free agents signed between 1975 and 1980. The difference is that the early sample's coefficient is strongly significant. So, it is possible that the bidders learned to account for this as the free agency process evolved over time.

Table 5: Salary Regressions for Free Agents Signed 1998-1999 & 2005-2007

VARIABLES	1998-1999 (B&W)	2005-2007
trend	0.243 (0.249)	1.036** (0.262)
warpavg	1.04** (0.069)	2.236** (0.185)
warpvar	0.022 (0.035)	0.0209 (0.0314)
age	-0.119* (0.069)	-0.0495 (0.0409)
exp	0.016 (0.068)	-0.0111 (0.0836)
teamchange	-0.152 (0.263)	0.724 (0.529)
pop	0.096* (0.052)	0.197* (0.0964)
Adjusted R-squared	0.619	0.812
F-Statistic	-	121.08
Observations	203	194

The dependent variables in each regression is the average annual salary over the contract. Standard errors are in parentheses. B&W did not publish f-statistics.

* Significant at the 10% level

** Significant at the 1% level.

Summary and Concluding Remarks

This reworking of Burger and Walters's (2008) inquiry into the existence of a winner's curse in the market for Major League Baseball free agents leads to some tentative and differing conclusions. Unlike B&W's study, this study's *ex post* analysis determined that teams did, in fact, lose money on aggregate free agent signings between 2005 and 2007. This could be considered evidence of a "strong form" of the winner's curse. Furthermore, the *ex ante* analysis indicated that franchises failed to use all information that was available at the time of bidding while formulating efficient bids. This also suggests that the bidders' returns might have proved disappointing (further evidence of a winner's curse, albeit a weak form). Specifically, teams overvalued free agents with high fluctuation in past production, failing to discount their bids for prior variance in performance.

When examining the 1998-1999 and 2005-2007 samples, realized returns fell drastically between the two eras. Also, the likelihood that a winning bidder would lose money on an individual contract increased. In addition, this study found that bidders continued to have difficulty in efficiently adjusting their bids for available information. Despite another half-decade of experience predicting outcomes in the free agent market, winning bidders continued to fail to discount their bids for inconsistency and risk. Furthermore, small and large market teams failed to limit their bids to levels consistent with players' MRPs in their individual markets as both large and small market types lost money on contracts they signed in the later period (although large market teams fared relatively better). Finally, higher realized returns on free agents who switched teams might signal that their new employers accounted for a possible information asymmetry in this market, discounting their bids for this source of risk. The other explanation is that so much information on players is freely available now, meaning that the asymmetric information problem is not as much of an issue as it was for B&W's

sample.

These findings support considerable experimental evidence that when bidders are faced with a complex problem involving multiple elements affecting valuations, their behaviour is often consistent with bounded rationality. Of particular interest is the persistence of the bidding inefficiencies identified through the *ex ante* analysis. Although the stakes in the free agency market are high and many resources have been allocated to improving decisions made over the decades of free agency in MLB, it is evident that franchises have not learned how to avoid earning disappointing returns, perhaps due to certain biases (overoptimism, false uniqueness, etc.) that are simply hard to ignore.

Of course it is possible to argue that the pursuit of profits by a franchise owner is second to the desire to win. Although this hypothesis cannot be ruled out, the two goals are not necessarily mutually exclusive. The resources available to a team (either its revenues or the personal wealth of its owner) are finite, and there may be serious opportunity costs to being inefficient while spending in the free agent market. Inefficient funds could alternatively be channeled into additional coaching, scouting, or the acquisition of talented players who are ineligible for free agency (younger players on other teams). Additionally, it is hard to believe that the indifference towards efficiency affects all teams in the league. These free agent signings that are seemingly losing money must be contributing in some way to their team, potentially in a fashion that is unobservable to outsiders.

References

Bollinger, Christopher R. and Julie L. Hotchkiss. 2003. The Upside Potential of Hiring Risky Workers: Evidence from the Baseball Industry. *Journal of Labor Economics* 21:923-944.

Burger, John D., and Stephen J. K. Walters. 2008. The Existence and Persistence of a Winner's Curse: New Evidence from the (Baseball) Field. *Southern Economic Journal* 75:232-245.

Bulow, Jeremy and Paul Klemperer. 2002. Prices and the Winner's Curse. *The RAND Journal of Economics* 33:1-21.

Cassing, James, and Richard W. Douglas. 1980. Implications of the Auction Mechanism in Baseball's Free Agent Draft. *Southern Economic Journal* 46:110-121.

Capen, E. C., R. V. Clapp, and W. M. Campbell. 1971. Competitive Bidding in High-Risk Situations. *Journal of Petroleum Technology* 23:641-653.

Goeree, Jacob K. and Theo Offerman. 2003. Competitive Bidding in Auctions with Private and Common Values. *The Economic Journal* 113:598-613.

Kagel, John H. and Dan Levin. 1986. The Winner's Curse and Public Information in Common Value Auctions. *The American Economic Review* 76:894-920.

Lazear, Edward P. 1998. Hiring Risky Workers. In *Internal Labour Markets, Incentives and Employment*, edited by Isao Ohashi and Toshiaki Tachibanaki. New York: St. Martin's Press, pp. 143-158.

Lind, Barry and Charles R. Plott. 1991. The Winner's Curse: Experiments with Buyers and with Sellers. *The American Economic Review* 81:335-346.

Scully, Gerald W. 1974. Pay and Performance in Major League Baseball. *American Economic Review* 64: 915-930.

Thaler, Richard H. 1988. Anomalies: The Winner's Curse. *The Journal of Economic Perspectives* 2:191-202

Wilson, Robert. 1979. Auctions of Shares. *The Quarterly Journal of Economics* 93:675-689.