Honors College Theses

5-2017

Wage Penalties in Major League Baseball

Thomas Kraemer
University of Massachusetts Boston

Follow this and additional works at: http://scholarworks.umb.edu/honors_theses

 Part of the Sports Management Commons

Thomas Kraemer

Honors Thesis

Spring 2017

Advisor: Emily Wiemers PhD.

Wage Penalties in Major League Baseball

I. Introduction:

Wages and salaries differ systematically by gender and race. For example, in the United States, women working full-time earn only $0.79 for every dollar earned by their male counterparts (Blau and Kahn 2016) and, even controlling for education, experience, metro status, and region of residence, black men earn $0.78 for every dollar earned by white men (Wilson and Rogers 2016). Differences in occupation, skills, and job characteristics may explain some of these differences in wages but discrimination in the labor market is also prevalent (Blau and Kahn 2016, Bertrand and Mullainathan 2003). This study examines discrimination both by race and by foreign-born status in the context of Major League Baseball [MLB].

Becker (1951) outlines three sources of taste-based discrimination in labor markets: employer-based, employee-based, and customer-based. In the case of sports, employers who are biased against one type of player may be less willing to pay players equally based upon this prejudice. Players who are biased against a type of player may request more money to work with players whom they are biased against. Finally fans may be less willing to attend games or pay money to watch players whom they are biased against. Customer discrimination can be determined empirically by the effects on fan attendance of the addition of a player with a certain set of characteristics, while employer- and employee-based discrimination can be shown empirically by wage penalties for players with different characteristics. The goal of this study is to determine if employer-based discrimination is present in the MLB by looking for average differences in wages amongst groups and by looking for differences in returns to on-field output for players of different groups.

The MLB is an interesting industry to look for evidence of discrimination because it is one of the few industries where employee output is clear to see and compensation information is widely available, which is unusual for labor market studies. Economic discrimination studies in the MLB can still use the same tools that other studies of discrimination use but differences between groups can be shown more clearly than in general labor market studies where workers are employed in broad range of industries. Sports is an interesting laboratory for economic ideas because even though the players make up a small percentage of people in America and earn substantially more than the average person, sports in America are thought of as capturing the ideals of America where hard work and dedication are rewarded (Kahn 2000). The MLB also has a long history of segregation prior to the beginning of integration in the League in 1947 (Hansenn 1998) and evidence of wage penalties in the MLB has also been found as recently as 2001 (Palmer & King 2006).

The Mincer equation from Jacob Mincer's 1958 article "Investment in Human Capital and Personal Income Distribution" is the tool I use to estimate discrimination. This model decomposes wages into different causal factors for homogenous groups and is based upon human

capital theory where earnings are a function of investments in human capital, i.e. training and experience. The inclusion of a dummy variable into a Mincer equation allows us to account for non-numerical, categorical factors that affect wages, such as race and nativity which take form of wage penalties and wage premiums between groups. These wage penalties are only robust if the Mincer equation accurately captures the relationship between human capital and wages. Lemieux (2003) finds that the Mincer Equation, with a few modifications, is still an accurate and useful tool today.

Using the MLB as the context to study discrimination solves some of the prototypical problems seen in labor market studies. Most studies suffer because they focus on industries where employee output is not clear to see and wage information may not be available and because the choice of industry may itself be caused by discrimination. This problem of not being able to directly measure ability is not present in the MLB because a player's ability is readily seen in their performance statistics measured on an individual level. Not only is a player's output directly observable, their salary information is readily available to the public as well, making the MLB a unique labor market where employer-employee contracts are directly observable while employee output and other factors that affect wages are simultaneously discernible. Therefore, the Mincer equation is an ideal equation to use for studying discrimination in the MLB because we can measure the direct effect of visible inputs of human capital on wages.

II. Literature Review:

1. General Economic Studies of Discrimination

Studies of economic discrimination focus on two key ideas: long term inequalities based upon a group's characteristics and differences on returns to inputs of human capital for different categories of people based upon those characteristics. Studies of economic discrimination focus upon these inequalities for groups as a whole rather than at an individual level, because if discrimination is present it would present itself in a systematic and widespread manner. Neoclassical economists consider discrimination to be distaste for a specific type of worker, where employers are willing to subject themselves to costs in order to allow their discrimination to take place. (Chakraborty 2016) Other authors such as Arrow (1973) call discrimination the placing of value on something other than productive inputs in labor markets. Becker (1951) famously follows the taste-based theory of discrimination where he views employers, coworkers, and customers as sources of discrimination. Some economists do not find issue with certain types of discrimination. For instance, Phelps (1972) believe that during some forms of discrimination are useful, like statistical discrimination, where firms use rational information to maximize utility. Statistical discrimination is when group averages are used as approximations for actual information about an individual, which is not against the law.

2. Discrimination Studies in Major League Baseball

Studies of economic discrimination in sports blossomed in the 1970s. One of the first studies, Scully (1974), looks for evidence of racial discrimination in all major league sports following desegregation and finds mixed evidence in the MLB. Scully finds that black players were more often placed in non-leadership roles, such as in the outfield, but that black players outperform white players even in positions where they are underrepresented. Scully finds that black players are not paid on average less than white players when only salaries are compared but black players are paid less for creating similar offensive output to white players. Scully also finds that black players earn incrementally more for each additional year of experience than white players do, which Scully attributes to the entry barrier where black players have to consistently outperform white players to stay in the Major Leagues. However, in the 1970s, the difference in returns to experience was not enough to overcome the white/black salary gap over the average career in the Major Leagues. Scully also looks at the effects of the addition of black players on fan attendance and finds that the addition of black players led to decreased team revenue because of decreases in fan attendance. Scully links the wage penalty for black players to the customer-based taste discrimination described by Becker (1951).

Customer-based discrimination is not consistently found to be the source of wage penalties. Gwartney and Hayworth (1974) study the effects of the integration of Major League Baseball and the Negro League after 1947, where experienced black players became available to Major League Baseball teams. Teams that added more black players saw an increase in their winning percentages from 1952-1956. Gwartney and Hayworth (1974) find that black players are more productive than whites on field and that the increase in productivity on team winning percentages led to an overall increase in team attendance, at a rate of 60,000 increased fans in attendance per black player that was added, rather than a decrease in attendance—evidence against consumer discrimination. Gwartney and Hayworth (1974) find that this figure holds even amongst teams with losing records because of the "superstar effect" where fans go to see players with exceptional talent regardless of the players ethnicity or the team's overall ability to win.

Later studies found little to no evidence of discrimination in the MLB. Kahn (2000) reviews several studies from the 1980's and finds little to no evidence of discrimination in the MLB. Palmer and King (2006) found evidence of salary discrimination limited to lower salaried Hispanic players and lower salaried black players as compared to similar lower salaried white players in the 2001 season.

Studies have also looked into the impact of foreign players on Major League Baseball. Tainsky, Scott, and Winfree (2010) study the effects of international players on attendance in Major League Baseball from 1985 to 2005. Initially, adding a foreign-born player of any race to a team produced a decrease in attendance at a diminishing rate until 1993, but increased game attendance from 1993 until the 2005, but also at a diminishing rate so the effect peaked in 2000. Tainsky, Scott, and Winfree (2010) believe that the increase in attendance was due to teams getting a larger percentage of players that match the demographics of their area as well as an

increase in global interest in baseball. Though not directly relevant, Ottenson (2014) looks at the social costs of Major League Baseball for Latin American and Caribbean countries and posits that the relationship between the MLB and that Caribbean is similar to past models of colonialism because of the less restrictive rules governing signing players from the Caribbean as compared to Japan.

3. Studies of Major League Baseball Wage Determination

A. Players Studied

Studies of wage determination in the MLB have attempted to capture the returns to ability, experience, and other characteristics on player earnings. These studies inform my choice of control variables in my empirical specification. These studies have had to break down the larger group of all MLB players into groups of similar composition in order to determine these driving factors of wages. The most obvious breakdown is pitchers and non-pitchers as these two types of players generally have opposing roles: run creation and run prevention, respectively. Most studies have followed this division by focusing solely on pitchers or non-pitchers. Palmer and King (2006), Wiseman and Chatterjee (2003), and Yilmaz and Chatterjee (2003) focus solely on non-pitchers, while Krautman et al. (2003) focuses on pitchers. Palmer and King (2006) further broke their study of non-pitchers into groups based on salary levels, while Krautman et al. (2003) broke their study down further into pitcher types.

B. Factors of Salary other than Ability

Aside from the effect of ability on earnings, studies of wage discrimination in the MLB have tried to partial out the effects that different individual, team, and demographic factors have on player earnings. Scully (1974), Depken (2000), and Sommers and Quinton (1982) look not only at team performance, but the size of the metropolitan area that teams play in, as players who play in larger, more urban areas have a larger fan base than players in smaller cities. Tainsky and Winfree (2010) look at the effect of the price of attendance, and the demographics of the cities that teams played in, and the quality of the stadium when they studied the effect of foreign-born players on attendance. Hanssen (1998) notes the differences in uptake of players in different leagues, as the National League was more willing to accept non-white players and, for a period of time, was known to focus on hiring players based solely on ability, while the American League was slower to hire non-white players. Depken (2000) looks at the effects that a team payroll has on earnings and the effect of having players with large disparities in earnings on team performance. The consideration of non-race based, individual factors aside from output has also been studied. Kahn (1993) looked at the effects of being arbitration eligible and being a free agent on player earnings and contract length in the MLB. Sommers (1982) found that players who are not in free agency are paid below their marginal product of revenue. Yilmaz and Chatterjee (2003) also considered the effects of owner's goals on player earnings and found that players who maximize fan attendance help owners meet their goals of winning and increasing

revenue. Lucifora and Simmons (2003) discuss the effects of superstars in sports on wages overall.

III. Methods:

The goal of my research was to determine if economic discrimination based upon a player's race and nativity is present in the MLB. To test for this I looked for average differences in earnings amongst groups and differences in returns to offensive output for groups with different ethnicities and nativities. I used a Mincer Equation in order to determine the effects of race and nativity on average differences in wages and on differences in returns to output. The Standard Mincer Equation is:

$$\text{Log (earnings)} = \beta_0 + \beta_1 \text{Years of schooling} + \beta_2 \text{Years of experience} + \beta_3 \text{Years of Experience}^2 + \upsilon$$

In this equation, years of schooling is a rough approximation of an individual's ability and years of experience is the number of years in the labor force that someone has with a squared term to show the marginal returns to an additional year of labor force experience changes with the level of experience. In the MLB, ability does not need to be approximated by a stand-in variable like education because it is directly observable and quantified in numerous statistics. Therefore in my model I replace the variable education with a variable that shows the player's on-field output, which allows me to precisely estimate the returns to a player's ability.

Different control variables can be added to a Mincer Equation in order to capture the effects of other factors on wages aside from the returns to experience and ability. After looking at previous studies of wage determination in the MLB, I decided to add variables that took into account the specific characteristics of the player, specific characteristics of the team that the player was on, and the specific characteristics of the location of the team. Bivariate variables that represented a player's race and nativity were added to the equation in order to show the average differences in wages for players of different races and nativities. When these bivariate variables are interacted with the variable for a player's output the differences in returns for output based upon race and nativity are shown.

IV. Data and Measures:

1. **Data Sources:**
Player Salary information comes primarily from USAToday.com, which lists the salaries of all starting players in the MLB by season, with supplementary salary data coming from Spotrac.com for players not included in the USAToday.com data. Salaries were available for 3,264 of the original 3,322 player-season observations for MLB players with a minimum of 200 at bats. Player on-field output statistics were attained from Fangraphs.com for all players in the data sample. Demographic data came from a variety of sources. Player race was not self-reported and was determined from pictures of the players found on Google Images, at my own discretion based upon phenotypes. Citydemographic data was taken for the cities that each team plays in

from the 2010 Census, which is the most recent year for this data available. The data for Toronto demographics was taken from the 2011 Canadian Census, also the most recent available data. Team statistics regarding divisional information and playoff appearances come from MLB.com. Team Opening Day Payroll Information comes from stevetheump.com.

2. **Sample Definition:**

I use an independently pooled cross section of MLB players over the last two Collective Bargaining Agreements, from 2007-2016 based off a three selective factors. First, a player had to have at least 200 at bats in a single MLB season. Second, their salary information had to be available online. Third, the player had to be on only one team per season in order to accurately account for team and demographic effects. The at bats qualifier was chosen for multiple reasons. First, this level of at bats indicates that a player's offensive output was representative of their true ability not subject to large variances due to the limiting effects of a small sample size. Second, this number of at bats excluded two categories of players who would disrupt the positive correlation between offensive output and salary, pitchers and marginal players.

A pitcher is more likely than other position player to have their salary based primarily upon their defensive capabilities, rather than their offensive capabilities. This means that their lack of offensive output may make it appear that high returns for lower abilities in offensive output. By removing pitchers I also eliminate problems associated with quantifying defensive output which is intrinsically harder to measure than hitter output (Krautman et al, 2003). Further, Krautmann et al. (2003) shows that measuring output for pitchers requires breaking pitchers down into different categories and using different metrics of ability whereas all hitters can be evaluated using the same offensive output statistic. These problems were not seen in aggregating offensive output amongst players of different positions as all players offensive output can be measured using the Weight Runs Created Statistic: wRC (described in Appendix A).

The at bat sample floor also prevented the inclusion of marginal players into the study. The inclusion of marginal players would be subject to two pitfalls. First, their performance would be limited to a small data sample, which means that their offensive output may not be truly representative of their abilities. Second, there is also an issue in comparing the correlation of output to salaries of marginal players to players who are in the MLB full time because of contract rules. The minimum salaries for marginal players differ significantly from those of full time MLB players. Over the past two collective bargaining agreements the minimum salaries of full time MLB players has ranged from a low of $380,000 in 2007 to a high of $505,500 in 2016. Meanwhile the highest MLB minimum salary for marginal MLB players has only peaked at ~$90,000 in 2016 (2012-2016 MLB Collective Bargaining Agreement).

After the requirements for entry to the data sample were met, players were broken down into three categories based upon years of experience. This follows Palmer and King (2006) who broke their sample down into three categories based on income. My categories were based upon the different contractual periods of an MLB player who enters through the Rule 4 draft: being restricted to fielding offers only from his team (Years 1-3, being eligible for contract arbitration with that team (Years 4-6), and free agency (Years 7+) where players can field offers from multiple teams. Foreign born players (other than Puerto Ricans and Canadians) do not enter through the Rule 4 draft and are free agents immediately. However, I still include them in their respective experience category rather than classifying them immediately as free agents. Players who enter through the Rule 4 Draft are subject to fielding offers from only the team that drafts them & they cannot entertain offers from any other teams until they reach free agency.

My study uses years of MLB experience as a proxy for the type of contract that an MLB player has, as contract type directly influences player salary levels. Even though players from outside the US, Canada, and Puerto Rico receive free agency status inherently from their start, I believe that these contracts are not as long and lucrative as free agent contracts for MLB players with more than 6 years of experience as teams may be hesitant to pay these players at a level similar to MLB players with 7-plus years of experience, as they would not have MLB-proven levels of ability that are shown to be above average in the MLB. Years of experience are an appropriate approximation for these groups, as players with similar levels of MLB experience are more directly comparable than players with vastly different levels of experience.

With all of these restrictions, the sample includes 3,170 player-season observations: 839 player-season observations were for players in the first 3 years of their MLB service, 923 player-season observations were for players in their 4th-6th years of service, and 1408 player-season observations were for players who had reached free agency status. The 3,170 player-season observations represent 25.1% of the 12,606 total MLB player-season observations of players with at least 1 at-bat from 2007-2016.

3. **Data Measures:**

Variable interpretation remains constant throughout the 6 different models. ForeignBorn is a bivariate variable that varies by individual and is equal to 1 if the player was born outside of the United States, Canada, or Puerto Rico (meaning that the player did not enter the Major Leagues through the Rule 4 Draft). This bivariate variable was set equal to 1 if this player did not have any draft data present on fangraphs.com Black is a bivariate variable that varies by individual and is equal to 1 if the player if the player is Black. Hispanic is a bivariate variable that varies by individual and is equal to 1 if the player is Hispanic. Individual characteristics are continuous variables that vary by individuals and through time which include: the player's years of experience in the Major Leagues, that term again, squared, and the players offensive output measured in units of wRC (see Appendix A). Team characteristics vary by individuals and through time and are measured by: the team's overall payroll for a season as a continuous variable; a bivariate variable for whether or not a team was in the playoffs in the past season, the winning percentage of the team for that season, and the team payroll measured in logs. Demographic characteristics are continuous variables that vary by individual, but all data is from the 2010 Census so they do not vary over time. The demographic characteristics include the size of the population in logs, the percentage of that city that is black, the percentage of the city that is Hispanic, and the percentage of the city that is from an immigrant background. Season fixed effects vary by time and capture the average change in wages per season relative to the 2007 season.

The bivariate variables that are included for race act as a means of separating the average difference in wage of that variable from the average wage of a non-Black, non-Hispanic player, it would have been ideal to also estimate the effect of being Asian but the portion of the sample that is non-black and non-Hispanic is 99.09% white (and there are almost zero non-foreign born Asian players in the MLB), so effectively these average differences are in comparison to the average wages of a white player. The bivariate variables that are included for nativity act as a means of separating out the average difference in wages of foreign born players from the average wage of a player born in the United States, Canada, or Puerto Rico. The interactions between race/ethnicity and nativity allow for comparison of those players to white players born in the United States, Canada, or Puerto Rico. When foreign-born status is interacted with race and

ethnicity, the foreign born category represents foreign-born Asian players because all foreign born players are either Hispanic, Hispanic and Black, or Asian.

The interactions between race and offensive output, nativity and offensive output, and the interactions of race, nativity, and offensive output allow us to determine the average additional effect of being a player in one of the corresponding categories on wages for differing levels of offensive output relative to white players for race/offensive output interactions and relative to white/Asian players born in the United States, Canada, or Puerto Rico for race/nativity/output interactions.

4. **Means Table:**
   Means Tables can be found in the attached appendices in the tables & Figures Section in tables 1a, 1b, 2a, & 2b. The means table shows that my sample consists mainly of white players and that most players tend to have been in the league for multiple seasons, which makes sense as my at bats floor drives up the average ability of players.

1. Models

Six models were devised in order to capture differences in average wages between groups and the differences in returns to output between groups based upon race and nativity. Models 1 and 2 test for differences in wages by race and nativity separately, with Model 2 having a team fixed effect variable added for a robustness check. Models 3 and 4 test for differences in wages by race, nativity, and their interaction, with Model 4 having an additional team fixed effect added for a robustness check. Model 5 tests for differences in productivity on wages by race and nativity separately. Model 6 tests for differences in productivity on wages by race, nativity, and their interaction. All four samples of MLB players were run on these models. Please note, that for the sample containing all MLB players, two additional variables were added into each equation, a bivariate variable that was equal to 1 if the player was in years 4-6 of his MLB service, as that is when MLB players who enter the league through the Rule 4 Draft (the general MLB draft) become arbitration eligible and a bivariate variable that was equal to 1 if the player was in years 7+ of his MLB service, as that is when all players become free agents. These variables were added to capture the effects of contract type on earnings as described in the sample definitions. Additionally, fully defined models can be viewed in the Appendices in Appendix B.

A. Differences in Wages by Race and Nativity Separately:

Formally Model 1 is:

Log(wage)= β_0+ β_1ForeignBorn$_i$ + β_2Black$_i$ + β_3Hispanic$_i$+ $\beta_{4\text{-}9}$individual characteristics$_{it}$+ $\beta_{10\text{-}13}$team characteristics$_{it}$ + $\beta_{14\text{-}17}$demographic characteristics$_i$+ β_{18}season fixed effects$_t$+μ_i

Where i indexes individuals, t indexes time based on MLB seasons and μ_i denotes the individual unobserved error.

B. Differences in Wages by Race and Nativity Separately with the Inclusion of Team Fixed Effects:

Formally Model 2 is:

$Log(wage) = \beta_0 + \beta_1 ForeignBorn_i + \beta_2\ Black_i + \beta_3 Hispanic_i + \beta_{4-9}individual\ characteristics_{it} + \beta_{10-13}team\ characteristics_{it} + \beta_{14-17}demographic\ characteristics_i + \beta_{18}season\ fixed\ effects_t + \beta_{19}team\ fixed\ effects_i + \mu_i$

Where i indexes individuals, t indexes time based on MLB seasons and μ_i denotes the individual unobserved error.

C. Differences in Wages by Race, Nativity, and their interaction:

Formally Model 3 is:

$Log(wage) = \beta_0 + \beta_1 ForeignBorn_i + \beta_2\ Black_i + \beta_3 Hispanic_i + \beta_4 ForeignBorn*Hispanic_i + \beta_5 ForeignBorn*Black*Hispanic_i + \beta_{6-11}individual\ characteristics_{it} + \beta_{12-16}team\ characteristics_{it} + \beta_{17-20}demographic\ characteristics_i + \beta_{21}season\ fixed\ effects_t + \mu_i$

Where i indexes individuals, t indexes time based on MLB seasons and μ_i denotes the individual unobserved error.

D. Differences in Wages by Race, Nativity, and their interaction with the Inclusion of Team Fixed Effects:

Formally Model 4 is:

$Log(wage) = \beta_0 + \beta_1 ForeignBorn_i + \beta_2\ Black_i + \beta_3 Hispanic_i + \beta_4 ForeignBorn*Hispanic_i + \beta_5 ForeignBorn*Black*Hispanic_i + \beta_{6-11}individual\ characteristics_{it} + \beta_{12-16}team\ characteristics_{it} + \beta_{17-20}demographic\ characteristics_i + \beta_{21}season\ fixed\ effects_t + \beta_{22}\ team\ fixed\ effects_{it} + \mu_i$

Where i indexes individuals, t indexes time based on MLB seasons and μ_i denotes the individual unobserved error.

E. Differences in Productivity on Wages by Race and Nativity separately:

Formally Model 5 is:

$Log(wage) = \beta_0 + \beta_1 ForeignBorn_i + \beta_2 Black_i + \beta_3 Hispanic_i + \beta_4 Black*wRC_{it} + \beta_5 Hispanic*wRC_{it} + \beta_6 ForeignBorn*Hispanic*wRC_{it} + \beta_7 ForeignBorn*Black*Hispanic*wRC_{it} + \beta_{8-12}individual\ characteristics_{it} + \beta_{13-16}team\ characteristics_{it} + \beta_{17-20}demographic\ characteristics_i + \beta_{21}season\ fixed\ effects_t + \mu_i$

Where i indexes individuals, t indexes time based on MLB seasons and μ_i denotes the individual unobserved error.

F. Model 6: Differences in Productivity on Wages by Race, Nativity, and their interaction:

Formally Model 6 is:

Log(wage)= β_0+ β_1ForeignBorn$_i$ + β_2Black$_i$ + β_3Hispanic$_i$ +β_4ForeignBorn*wRC$_{it}$ + β_5Black*wRC$_{it}$ + β_6Hispanic*wRC$_{it}$ + β_7ForeignBorn*Hispanic*wRC$_{it}$ + β_8ForeignBorn*Black*Hispanic*wRC$_{it}$ + β_{9-13}individual characteristics$_{it}$+ β_{14-17}team characteristics$_{it}$ + β_{18-21}demographic characteristics$_i$+ β_{22} season fixed effects$_t$ + μ_i

Where i indexes individuals, t indexes time based on MLB seasons and μ_i denotes the individual unobserved error.

V. Results:

Tables of the Regression models can be found in the attached appendices in the Figures & Tables section.

1. **Differences in Wages by Race and Nativity Separately**

Table 3 Reports the Results of Model 1. After fixing player, team, and city demographic characteristics, being a player from outside the United States, Canada, and Puerto Rico with any contract type, is associated with an average wage premium of 9.4% as compared to players from the United States, Canada, and Puerto Rico of all contract types, which is significant at the 5% level of significance. Additionally, the fixture of player, team, and demographic characteristics finds that black players of all contract types are not paid statistically significantly differently than white players of all contract types, but Hispanic players of all contract types have an average wage penalty of 7.57% as compared to white players of all contract types. The wage premium seen by players of all contract types from outside the United States, Canada, and Puerto Rico is likely a continuation of the initial wage premium that these players see in the first three years of their contract, as they have more bargaining power for their initial salaries than players from the United States, Canada, and Puerto Rico.

Once the sample is broken down into groups by contract type and player, team, and demographic characteristics are fixed, players in years 1-3 of MLB service that are from outside the United States, Canada, and Puerto Rico are found to see a large wage premium of 41.8% as compared to similar players from the United States, Canada, and Puerto Rico, significant at the 1% level of significance. This premium declines through time as arbitration eligible players from outside the United States, Canada, and Puerto Rico are found to not have statistically significantly different wages than arbitration eligible players from United States, Canada, and Puerto Rico. This initial wage premium becomes a wage penalty for free agent players as players from outside the United States, Canada, and Puerto Rico are found to have a 10.7% wage penalty as compared to free agent players from the United States, Canada, and Puerto Rico at a 10% level of significance. The disappearance of the wage premium is most likely caused by players

who enter the MLB through the Rule 4 Draft becoming eligible to field offers from multiple teams.

Additionally, when the sample is broken into groups based on contract types and player, team, and demographic characteristics are fixed, black and Hispanic players in years 1-3 of MLB service are found to have wage penalties of 9.7% and 11.7% respectively as compared to white players with 1-3 years of MLB service, at the 10% level of significance. Hispanic players with 4-6 years of experience continue to see this wage penalty, as they are paid an average of 13% less than white players with comparable levels of experience, at the 10% level of significance, but this wage penalty disappears in free agency where Hispanic free agents are not paid statistically significantly differently than white players. Black players see a reverse trend from Hispanics, as black players in years 4-6 of their MLB service are not paid differently than white players and black free agents have an average wage premium of 16.7%, statistically significant at the 1% level of confidence, as compared to white free agents. These average wage penalties for players in years 1-3 could be a result of employer discrimination and are similar to the results of Palmer and King (2006). Scully (1974) found that black players produce more offensive output than white players and have a higher marginal return to each year of experience than white players do, which may lead to this wage premium. This premium could also be caused by the superstar effect of players on their own wages, which drives up their salary as described by Lucifer and Simmons (2003).

Figure 1 shows the regression results in terms of average predicted wages for players of each category grouped by race and nativity separately. FB shows the average predicted wages for players from outside of the US, Canada, and Puerto Rico. These players in Figure 1 are shown to have a significant wage premiums for players from outside the United States, Canada, and Puerto Rico that appear during the first three years of a players contract and lasts through the period where players are arbitration eligible. White players are also predicted to have higher wages through initially and through the arbitration eligible period, but during free agency, black players average predicted salary surpasses that of whites, the Hispanic player average predicted salary never catches up. Figure 1 shows that the type of contract a player has affects how big the real change in salary is i.e. the 41.8% premium for players from outside the United States, Canada, and Puerto Rico is equal to an average wage premium of ~$162,000 while the 16.7% wage premium for black free agents is equal to an average wage premium of ~$900,000.

2. **Model 3: Differences in Wages by Race, Nativity, and their interaction:**

When Model 1 is changed to add interaction between players' race and nativity the results, shown in Table 5, change significantly when player, team, and city demographic characteristics are held fixed. Only players of all contract types from outside the United States, Canada, and Puerto Rico who are non-black and non-Hispanic (i.e. Asian) or are from outside the United States, Canada, and Puerto Rico and are Hispanic, but not black see statistically significant average wage differentials from white players from the United States, Canada, and Puerto Rico. Players of all contract types from outside the United States, Canada, and Puerto Rico who are Asian have an average wage premium of 41.6% as compared to players of all

contract types who are white and from the United States, Canada, and Puerto Rico. Players of all contract types from outside the United States, Canada, and Puerto Rico who are non-black and Hispanic have an average wage premium of 1.1% as compared to players of all contract types who are white from the United States, Canada, and Puerto Rico. This is the sum of the statistically significant coefficients for foreign-born Hispanic players. These premiums again are probably due to the initial earnings premium that players from outside the US, Canada, and Puerto Rico see due to their ability to field multiple offers from teams that lasts through time.

When this model is broken down into samples by years of experience again, only players from outside the United States, Canada, and Puerto Rico who are Asian or are from outside the United States, Canada, and Puerto Rico and are Hispanic, but not black see statistically significant average wage differentials from white players from the United States, Canada, and Puerto Rico during their first three years in the Major Leagues and years 4-6. During the first 3 years of their MLB service, Asian players from outside the United States, Canada, and Puerto Rico have a 94.3% average wage premium, significant at the 1% level of significance, as compared to white players from the United States, Canada, and Puerto Rico with comparable years of service. While in years 4-6, Asian players from outside the United States, Canada, and Puerto Rico have a 46.7% average wage premium, significant at the 1% level of significance, as compared to white players from the United States, Canada, and Puerto Rico with comparable years of service. The larger wage premium for Asian players is likely due to the formal process of hiring players from Japan and South Korea described by Ottenson (2014), while no formal process exists for teams to bid on players from South America, Mexico, and the Caribbean. This premium appears to continue through the player's career until all players reach free agency where this premium disappears as it did for all players from outside the United States, Canada, and Puerto Rico in model 1. The wage premium for all players from outside the United States, Canada, and Puerto Rico is likely driven by the large wage premium for Asian players. This smaller premium could be due to the informal process of hiring a player that is not from an Asian League or it could be due to discrimination.

During the first three years of MLB service Hispanic, non-black players from outside the United States, Canada, and Puerto Rico see a 24.6% wage premium, statistically significant at the 1% level of significance, as compared to white players with similar experience from the United States, Canada, and Puerto Rico. During the arbitration eligible period of MLB service Hispanic, non-black players from outside the United States, Canada, and Puerto Rico only see a 3.8% wage premium, statistically significant at the 1% level of significance, as compared to white players with similar experience from the United States, Canada, and Puerto Rico. Again, this smaller premium could be due to the informal process of hiring a player that is not from an Asian League or it could be due to discrimination. It is interesting to note that players from outside the United States, Canada, or Puerto Rico who are Hispanic and black do not see the same wage premiums that non-black Hispanics do.

Figure 2 shows the average predicted salaries of players from model 3, based upon their race and nativity status. Here, we see the predicted wages of Figure 1 broken down into narrower categories, which provides more detail to the study. Asian players that are not born in the US, Canada, and Puerto Rico are predicted to be paid significantly more than players from the US and Canada and Puerto Rico during the first 6 years of their contract, while Players from outside the US, Canada, and Puerto Rico who are black and Hispanic only see an average wage premium during the first 3 years of their MLB service. As seen in Figure 1, players who are black or black and Hispanic see significantly higher average predicted wages than white or Hispanic players,

regardless of nativity status. Black and Hispanic players from the US, Canada, and Puerto Rico are not predicted to see an average wage premium, but a wage penalty as compared to the average predicted salaries of white players through the first six years of their contracts following the results of Palmer and King (2006).

3. **Differences in Productivity on Wages by Race and Nativity separately:**

Table 7 reports the results of Model 5, which takes a different approach than the previous two models. This model looks to see if players receive different compensation for offensive output, by seeing if there is an extra effect on wages for players based on nativity and race. The term for wRC, which measures offensive output, was interacted separately in Model 5 with race and nativity. After fixing for player characteristics aside from output, team characteristics, and city demographic characteristics, players of all contract types from outside the US, Canada, and Puerto Rico do not see an average differences in wages as compared to players of all contract types from the US, Canada, and Puerto Rico, nor do they see a difference in returns to increases in wRC compared to players of all contract types from the US, Canada, and Puerto Rico. Players from outside the United States, Canada, and Puerto Rico who are in the first 3 years of their MLB service also do not see an average wage differential from players from the United States, Canada, and Puerto Rico, but they do see a 0.55% additional return to every marginal increase in wRC as compared to players from the United States, Canada, and Puerto Rico, significant at the 5% level of significance. Given that the average ranges of wRC range from 40-110, this can be a substantial wage premium for players from outside the United States, Canada, and Puerto Rico. As expected, there is no average wage premium or difference in returns to offensive output for premium for players from outside the United States, Canada, and Puerto Rico as compared to players from the United States, Canada, and Puerto Rico when all players reach free agency. This means that the wage premium seen for players from outside the US, Canada, and Puerto Rico in model is mostly likely driven by their increases in returns to offensive output.

Hispanic players in their first 6 years of MLB service see a statistically significant average wage penalty as compared to white players in their first 6 years of MLB service, -29.8% in years 1-3 and -33.7% in years 4-6, both significant at the 5% level of significance, but they see a larger return to offensive output as compared to white players in years 1-3, but not years 4-6. This is enough to make up the average wage penalty for Hispanic players in years 1-3, as long as the player is at least of average ability (wRC greater than 55). Black free agent players see a statistically significant average wage premium of 59.1%, statistically significant at the 1% level of significance, as compared to white free agent players with a- 0.07% decrease in returns to offensive output as compared to white players. This means that black free agents are paid on average more than white players, but they are compensated less for each run produced, which may be evidence of discrimination. This higher average wage premium, again, could be due to other effects such as the superstar effect of players on their salaries rather than just higher returns to player output as Scully (1974) suggests.

4. **Differences in Productivity on Wages by Race, Nativity, and their interaction:**

Table 8 reports the results of model 6, which is similar to model 5, but includes interaction terms for offensive output with categories based on race and nativity. When characteristics of players outside offensive output, team characteristics, and demographic characteristics are held fixed a mix of results is found. Asian players from outside the United States, Canada, and Puerto Rico see large average wage premiums for players of all contract

types, which is driven by the large average wage premiums that they see in years 1-3 and 4-6, of 86.4% and 218.9% respectively, both significant at the 1% level of significance. However, during years 4-6, Asian players from outside the United States, Canada, and Puerto Rico see 3% less marginally for returns to increases in offensive output than white players from the United States, Canada, and Puerto Rico, significant at the 5% level of significance. Players from outside the United States, Canada, and Puerto Rico who are black and Hispanic do not see an average wage penalty or premium as compared to white players from the United States, Canada, and Puerto Rico, but in years 1-3 of MLB service they see -0.9% less for every marginal increase of wRC as compared to white players from the United States, Canada, and Puerto Rico, significant at the 5% level of significance, suggesting some evidence of discrimination.

Continuing to hold characteristics of players outside offensive output, team characteristics, and demographical characteristics fixed, players who are Hispanic, but not black from outside of the United States, Canada, and Puerto see average wage penalties of -16.9% during years 1-3 of MLB service and average wage penalties of -29.4% during years 4-6 of MLB service as compared to white players from the United States, Canada, and Puerto Rico, both significant at the 1% level of significance. However, Hispanic players in years 4-6 of MLB service do see 0.63% larger marginal returns to increases in wRC than white players from the United States, Canada, and Puerto Rico. These average wage penalties may also be evidence of discrimination in The MLB.

Finally, continuing to hold characteristics of players outside offensive output, team characteristics, and demographical characteristics fixed, black players who are from the United States, Canada, and Puerto Rico see an average wage premium of 50.5% during free agency as compared to white players from the United States, Canada, and Puerto Rico, statistically significant at the 5% level of significance. However, these players see -.6% less for each marginal increase of wRC than white players from the United States, Canada, and Puerto Rico. This smaller return to increases in offensive output suggests that the higher average wages of black players from the United States, Canada, and Puerto Rico is likely due to other factors aside from increases in wRC.

5. **Differences in Wages by Race and Nativity Separately with the Inclusion of Team Fixed Effects:**

When an additional variable for team fixed effects is added to model 1, creating model 2 for a robustness check, the results of Model 1 change slightly. This team fixed effect uses variation within teams rather than between teams. Table 4 reports the results of model 2. Before players are broken up by contract types, but player, team, and demographic characteristics are held fixed, players of all contract types from outside of the United States, Canada, and Puerto Rico still see an average wage premium of 8.17%, statistically significant at the 10% level of significance, as compared to players of all contract types from the United States, Canada, and Puerto Rico, which is slightly smaller than the premium from Model 1. Black players of all contract types are still not found to be paid differently than white players of all contract types at any conventional level of significance. Hispanic players of all contract types still see an average wage penalty as compared to white players of all contract types, but it is slightly smaller at -6.55%, statistically significant at the 10% level of significance. Although the coefficients may be slightly different the overall trends remain the same when variations within teams are considered rather than variations between teams.

When the sample is again broken down by player contract type and player, team, and demographical characteristics are held fixed, the results still hold similar to Model 1. Players in

years 1-3 of MLB service that are from outside the United States, Canada, and Puerto Rico are found to see an initial wage premium of 41.7% as compared to similar players from the United States, Canada, and Puerto Rico which is significant at the 1% level of significance. This premium declines through time as arbitration eligible players from outside the United States, Canada, and Puerto Rico are found to not have statistically significantly different wages than arbitration eligible players from United States, Canada, and Puerto Rico. This holds true for free agent players from outside the United States, Canada, and Puerto Rico as compared to free agent players from the United States, Canada, and Puerto Rico.

When looking at racial wage penalties, as Model 1 showed, black and Hispanic players with 1-3 years of experience face an average wage penalty as compared to white players with 1-3 years experience of -10.4% and -10.1% respectively, significant at the 10% level of significance and the 5% level of significance respectively. This penalty does not hold for black and Hispanic arbitration eligible players, as they are not found to have statistically significant wages than white arbitration eligible players. As in Model 1, Hispanic players still do not see a statistically significant difference in wages during free agency as compared to white free agents, but black free agent players see an average wage premium of 19.3% as compared to white free agents, which is statistically significant at the 1% level of significance. This is slightly larger than the wage premium for black free agents as compared white free agents in Model 1, but again, the trends remain the same.

6. **Differences in Wages by Race, Nativity, and their interaction with the Inclusion of Team Fixed Effects:**

Model 4 adds team fixed effects to Model 3, which again uses variation within teams instead of between teams. Table 6 reports the results of Model 4. Holding player, team, and demographical characteristics fixed, only players of all contract types from outside the United States, Canada, and Puerto Rico who Asian or are from outside the United States, Canada, and Puerto Rico and are Hispanic, but not black see statistically significant average wage differentials from white players from the United States, Canada, and Puerto Rico. Players of all contract types from outside the United States, Canada, and Puerto Rico who are non-black and non-Hispanic have an average wage premium of 39.6% as compared to players of all contract types, significant at the 1% level of significance, as compared to white players from the United States, Canada, and Puerto Rico. Players of all contract types from outside the United States, Canada, and Puerto Rico who are non-black and Hispanic have an average wage premium of 0.9% as compared to players of all contract types to white players from the United States, Canada, and Puerto Rico. This is significant at the 1% level of significance.

When this model is broken down into samples by contract types again, only players from outside the United States, Canada, and Puerto Rico who are non-black non-Hispanic players or are from outside the United States, Canada, and Puerto Rico and are Hispanic, but not black see statistically significant average wage differentials from white players from the United States, Canada, and Puerto Rico during their first three years in the Major Leagues and while they are arbitration eligible. During the first 3 years of their MLB service Non-black Non-Hispanic players from outside the United States, Canada, and Puerto Rico have a 92.3% average wage premium, significant at the 1% level of significance, as compared to white players from the United States, Canada, and Puerto Rico with comparable years if service. While in the arbitration eligible period, Non-black Non-Hispanic players from outside the United States, Canada, and Puerto Rico have a 46.7% average wage premium, significant at the 1% level of significance, as compared to white players from the United States, Canada, and Puerto Rico with comparable

years if service. These trends are comparable to the results of model 3. These wage premiums, again are most likely due to the differences in contract status that was discussed in the results of model 3.

During free agency, the only group of players to see an average wage differential as compared to white players from the United States, Canada, or Puerto Rico is black players from the United States, Canada, or Puerto Rico, who have a 16.6% wage premium as compared to white players when player, team, and demographic characteristics are fixed. Model 4 differs only from Model 3 in the fact that is shows that black free agents from the US, Canada, and Puerto Rico earn more than white free agents from the US, Canada, and Puerto Rico. This is the same finding as in Models 1 and 2 showing that this equation holds up to the robustness check

VI. Discussion:

1. **Sample Biases**

There are several issues with my samples, models, and results that require further explanation in order to view the results in the correct context. Using an OLS regression model requires that several conditions be met in order for the predicted results to be able to be interpreted as predictions that are comprehensive for the entire population. One of which is most important is random sampling, which I did not use. For my study, random sampling of the population of Major League Baseball players would have made my analysis more difficult. Random sampling of players in the MLB would have included more players some who are only marginal players, who would not have the earnings that full time major league players have or adequate sample size to accurately correlate their output with their earnings as discussed in the sample description. Additionally, the inclusion of players with less than 200 at bats would include lesser-known players, fame would not normally be an issue with econometric analyses of labor markets, but the data for MLB players' salaries exists primarily for players who are well known, which tend to be players of higher ability. Having 200 at bats in a season as a floor additionally drives up the average level of ability upwards for players, as players who do not perform as well do not see as many at bats. This means that my findings may not be representative of players of lesser skill or who are only marginal MLB players. Therefore, my findings may not hold for the entire population of MLB players, as my sample only looks at 25.1% of total MLB player-season observations with at least 1 at bat from 2007-2016. Never the less, the results of my study hold true for the players in my data sample.

Additionally there are more issues with my data sample. First, race is not self-reported, so my interpretation of player's race may be different from their own interpretation or the interpretation of the owners of their team. My data also comes from a variety of sources, which increases the chance of discrepancies between data sources,. There was also the issue of not having enough player-season observation from players of Asian descent from the United States, Canada, and Puerto Rico to separate them from white players from the US Canada and Puerto Rico and the small number of player-season observations of players from outside the United States, Canada, and Puerto Rico who were black but not Hispanic.

Also, my sample contains 50% white player-season observation and significantly less observations of each category of non-white players which could be why significant changes in average salaries wages are seen when players are broken down by race and ethnicity. However, these small samples of players are more likely to show superstar effects than the larger samples

are, which is why it is permissible to potentially correlate the average wage premiums for black free agents to the superstar effects.

2. Model Design

The model that I designed was based off of models in previous studies that looked at how player, team, and demographic characteristics determine a player's salary that used the Mincer equation. These studies only used the Mincer equation with a squared term, as opposed to the higher order quadratic that Lemiuex (2003) suggests, so the effects of experience on salary may not correlate as well as they should. However, based on Krautmann et al (2003) I knew that I had to limit my model to non-pitchers because pitchers aren't readily aggregated due to inherent differences in their performance, so I did not want to focus my study on them. While ensuring that my results aren't affected by their inclusion, this leaves a large portion of the MLB unstudied. My models also lacks controls for a player's defensive ability, which again means that the results are based solely on a player's individual offensive output and therefore may not capture the full abilities of that player. My model also does not account for the superstar effect that has been shown in sports to drive a player's salary up and it does not account for factors that may make a team cautious to pay a player more such as frequent injuries and performance enhancing drug violations. However, these factors happen on an individual basis instead of at a group level so the factors that I included allow for an estimate of how each input affects wages. The model that I designed took into account not only player characteristics, but team characteristics and the characteristics of the location where a team plays into effect as well. The inclusion of these factors is important as wages are affected by factors outside of the player's control in addition to personal characteristics. Holding these features fixed reduces the bias in my results because teams with different abilities to attract players could compensate players in different manners.

3. Overall Trends in Results

Players from outside the US, Canada, and Puerto Rico see a wage premium as compared to players from the US, Canada, and Puerto Rico in the first 6 years of their MLB service, which is most likely due to the contract structure in the MLB, where these players enter the league as free agents and can negotiate with one team, unlike players who enter through the draft who only get to negotiate with the team who drafted them. This effect wears off, as expected, when all players with similar levels of experience can field multiple offers from different teams. The recurrence of average wage penalties for players of Hispanic descent and those initially present for black players, as well as the differences in returns to offensive output seen by black players in free agency show some evidence of economic discrimination in the MLB. These suggest that inequalities in the MLB may be present, but are not present in the long run. Becker (1951) suggests that economic discrimination will continue until it becomes too costly for the discriminators, which may be why these effects are shown to wear off.

VI. Conclusion

My study, like previous studies finds mixed evidence of economic discrimination in the MLB. My results are similar to that of Palmer and King (2006) and Scully (1974). Like their studies, my study is also subject to its limitations, but it suggests that average wage penalties are present initially for black and Hispanic players as compared to white players in years 1-3 of their MLB Careers, but that these wage penalties may be off-set for higher performing players from

outside the United States, Canada, and Puerto Rico because they enter the league with free agency status, as shown in model 1. However, these wage premiums due to contract status differ significantly by race as shown in the results of model 2, which could be a result of discrimination. The higher wage premiums for Asian players from outside the United States, Canada, and Puerto Rico may be due to the systematic recruiting effects that Ottenson (2014) described, or they may be a result of discrimination. Additionally, the wage premium for black players from the United States, Canada, and Puerto Rico seen in models 1, 2, and 4 could be due to the additional returns to each year of experience that Scully finds, or they could be a result of the superstar effects of these players described by Lucifer and Simmons (2003).

Bibliography:

Arrow, Kenneth J. "The Theory Of Discrimination." Discrimination in Labor Markets (1973): 1-33. Web.

Becker, Gary Stanley. "The Economics of Discrimination". Chicago: U of Chicago, (1951) ProQuest Ebrary. Aug. 2010. Web.

Bertrand, Marianne & Sendhil Mullainathan. "Are Emily And Greg More Employable Than Lakisha And Jamal? A Field Experiment On Labor Market Discrimination." American Economic Review, 2004, v94(4,Sep), 991-1013.

Blau, Francine D. & Lawrence M. Kahn "The Gender Wage Gap: Extent, Trends, and Explanations." NBER Working Paper No. 21913 (2016). Web.

Chakraborty, Atreyee Sinha. "Economics of Discrimination: A Brief Review of Literature." Social Science Spectrum 2.3 (2016): 203-07. Print.

Christiano, Kevin J. "Salary Discrimination in Major League Baseball: The Effect of Race." Sociology of Sport Journal 3.2 (1986): 144-53. Web.

Depken, Craig A. "Wage Disparity and Team Productivity: Evidence from Major League Baseball." *Economics Letters* 67.1 (2000): 87-92. Web.

Gwartney, J., & Haworth, C. (1974). Employer Costs and Discrimination: The Case of Baseball. Journal of Political Economy, 82(4), 873-881. Web.

Hanssen, Andrew. "The Cost of Discrimination: A Study of Major League Baseball." Southern Economic Journal, vol. 64, no. 3, 1998, pp. 603–627. Web.

Kahn, Lawrence M. "The Sports Business as a Labor Market Laboratory." *Journal of Economic Perspectives* 14.3 (2000): 75-94. Web.

Kahn, Lawrence M. "Free Agency, Long-Term Contracts and Compensation in Major League Baseball: Estimates from Panel Data." The Review of Economics and Statistics 75.1 (1993): 157. Web.

Krautmann, Anthony C., Elizabeth Gustafson, and Lawrence Hadley. "A Note on the Structural Stability of Salary Equations: Major League Baseball Pitchers." Journal Of Sports Economics 4.1 (2003): 56-63. Web.

Lemieux, Thomas. "The Mincer Equation Thirty Years After Schooling, Experience, and Earnings." Jacob Mincer A Pioneer of Modern Labor Economics (2003): 127-45. University of California, Berkeley, Oct. 2003. Web.

Lucifora, Claudio, and Rob Simmons. "Superstar Effects in Sport: Evidence From Italian Soccer." Journal Of Sports Economics 4.1 (2003): 35-55. Web.

Mincer, Jacob. "Investment in Human Capital and Personal Income Distribution." Journal of Political Economy, vol. 66, no. 4, 1958, pp. 281–302., www.jstor.org/stable/1827422.

Ottenson, Emily B. "The Social Cost of Baseball: Addressing the Effects Of Major League Baseball Recruitment in Latin America and the Caribbean." Washington University Global Studies Law Review 13.4 (2014): 767-800. Web.

Palmer, Matthew C., and Randall H. King. "Has Salary Discrimination Really Disappeared from Major League Baseball?" Eastern Economic Journal 32.2 (2006): 285-97. JSTOR. Web.

Phelps, Edmund S. "The Statistical Theory of Racism and Sexism." *The American Economic Review*, vol. 62, no. 4, 1972, pp. 659–661.

Scully, Gerald W." Discrimination: The Case of Baseball." In Noll, R., ed. Government and the Sports Business. Washington, D.C.: The Brookings Institution, 1974, 221-274. Web.

Scully, Gerald W. "Pay and Performance in Major League Baseball." *The American Economic Review*, vol. 64, no. 6, 1974, pp. 915–930. Web.

Sommers, Paul M., and Noel Quinton "Pay and Performance in Major League Baseball: The Case of the First Family of Free Agents." *The Journal of Human Resources* 17.3 (1982): 426-36. *JSTOR*. Web.

Tainsky, Scott, and Jason A. Winfree. "Discrimination and Demand: The Effect of International Players on Attendance in Major League Baseball." Social Science Quarterly 91.1 (2010): 117-28. Web.

Wiseman, Frederick and Sangit Chatterjee, (2003) "Team payroll and team performance in major league baseball: 1985−2002." Economics Bulletin, Vol. 1, No. 2 pp. 1−10. Web.

Wilson, Valerie, and William M. Rogers III. "Black-white wage gaps expand with rising wage inequality." Washington D.C. Economic Policy Institute (2016). Web.

Yilmaz, M. R., and Sangit Chatterjee. "Salaries, Performance, And Owners' Goals In Major League Baseball: A View Through Data." Journal of Managerial Issues 15.2 (2003): 243-55. JSTOR. Web.

Tables and Figures

Table 1a Means Table

Variables	White				Black				Hispanic				Black & Hispanic			
	All Players	1-3 Years	4-6 Years	7+ Years	All Players	1-3 Years	4-6 Years	7+ Years	All Players	1-3 Years	4-6 Years	7+ Years	All Players	1-3 Years	4-6 Years	7+ Years
Wage	$3,998,556.00	$ 479,117.90	$2,386,838.00	$7,621,586.00	$5,296,643.00	$492,599.50	$2,456,915.00	$9,224,675.00	$5,128,904.00	$575,105.20	$2,329,872.00	$8,802,439.00	$ 5,580,071.00	$663,541.70	$2,454,346.00	$8,693,595.00
(sd)	$5,007,387.00	$ 204,419.80	$2,388,245.00	$5,771,259.00	$5,823,969.00	$221,400.90	$2,739,861.00	$5,863,450.00	$6,486,917.00	$480,273.20	$2,369,512.00	$7,384,177.00	$ 5,138,366.00	$737,146.00	$2,067,311.00	$4,731,521.00
wRC	55.78971	49.89383	60.88355	55.95332	60.7978	50.43036	63.10761	64.33241	58.71215	53.87999	60.90607	59.75157	56.7836	44.1324	52.51233	63.263
(sd)	28.49698	49.89383	30.95046	27.9385	26.07291	24.72545	29.77495	23.11577	29.00261	24.22622	28.70948	31.03135	28.1759	26.5037	25.32002	28.70089
Years Exp.	6.246368	2.25974	4.949318	9.949778	6.982639	2.227273	4.914634	10.43571	7.242424	2.21649	5.05042	10.79245	8.333333	2.25	5.230769	11.875
(sd)	3.771223	0.746403	0.8181084	2.823793	4.21004	0.7804428	0.8195334	3.263513	4.39328	0.7531435	1.177823	3.323668	5.086162	0.7537784	1.012739	3.85001

Table 1a contains a means table describing the mean values of wages, wRC, & years of experience by player race & nativity for players from the United States, Canada, & Puerto Rico.

Table 1b Means Table

Variables	FB Asian				FB Hispanic				FB Black & Hispanic				All FB Players			
	All Players	1-3 Years	4-6 Years	7+ Years	All Players	1-3 Years	4-6 Years	7+ Years	All Players	1-3 Years	4-6 Years	7+ Years	All Players	1-3 Years	4-6 Years	7+ Years
Wage	$ 5,276,097.00	$2,557,689.00	$4,506,813.00	$8,160,388.00	$4,234,500.00	$1,120,538.00	$2,229,861.00	$7,219,793.00	$ 6,263,233.00	$1,009,401.00	$1,984,305.00	$10,301,025.00	$4,812,348.00	$1,298,038.00	$2,473,963.00	$8,122,417.00
(sd)	$ 5,361,293.00	$3,511,379.00	$4,816,525.00	$5,738,561.00	$5,272,569.00	$2,108,480.00	$3,002,443.00	$5,977,481.00	$ 6,338,937.00	$1,818,467.00	$2,003,816.00	$ 5,866,386.00	$5,598,194.00	$2,343,601.00	$3,229,898.00	$6,061,617.00
wRC	59.67211	53.4963	58.31578	65.93701	53.59288	47.60737	50.94649	58.59241	61.10145	48.7745	63.82237	66.17853	55.98708	48.69704	53.99217	61.26688
(sd)	27.52927	22.28165	27.91165	30.57466	28.27425	23.9631	26.10019	30.91152	29.71032	27.674	31.02246	28.75686	28.68098	24.57832	27.50235	30.463
Years Exp.	5.943182	2.034483	4.84	10.08824	6.714851	2.152672	4.964789	10.36207	8.190751	2.26087	4.939394	12.23404	6.95953	2.160194	4.945	10.825
(sd)	3.946067	0.8230066	0.8	2.821644	4.051978	0.7693482	0.8025842	2.8372	5.248868	0.743409	0.8268689	3.57538	4.391279	0.7705354	0.8032441	3.151679
N	88	29	25	34	505	131	142	232	173	46	33	94	766	206	200	360

Table 1b contains a means table describing the mean values of wages, wRC, & years of experience by player race & nativity for players from outside the United States, Canada, & Puerto Rico as well as all foreign-born players

Table 2a Means Table of Individual, Team, & Geographic Characteristics of Team

Variables	White All Players	1-3 Years	4-6 Years	7+ Years	Black All Players	1-3 Years	4-6 Years	7+ Years	Hispanic All Players	1-3 Years	4-6 Years	7+ Years	Black & Hispanic All Players	1-3 Years	4-6 Years	7+ Years
Catcher	0.1343826	0.1341991	0.8181084	0.1255539	0.0138889	0.030303	0.0243902	0	0.1235431	0.1443299	0.1176471	0.1179245	0	0	0	0
Outfield	0.3280872	0.3441558	0.3391813	0.3087149	0.6597222	0.6818182	0.695122	0.6285714	0.4009324	0.3608247	0.4453782	0.3962264	0.5964912	0.8333333	0.7692308	0.4375
1B/3B/DH	0.3153753	0.2878788	0.2807018	0.3604136	0.1041667	0.0454545	0.1219512	0.1214286	0.2470862	0.1752577	0.1764706	0.3207547	0.245614	0	0.2307692	0.34375
2B/SS	0.2227603	0.2359307	0.2339181	0.2053176	0.2222222	0.2424242	0.1585366	0.25	0.2284382	0.3195876	0.2605042	0.1650943	0.1578947	0.1666667	0	0.21875
log(Payroll)	18.31783	18.25995	18.26076	18.40057	18.33575	18.24067	18.21131	18.45345	18.37651	18.24953	18.28775	18.48374	18.40974	18.3803	18.41962	18.41707
(sd)	0.40991	0.4090553	0.4184403	0.3899141	0.409673	0.461115	0.3631087	0.3780033	0.4461282	0.4621698	0.3931758	0.4433669	0.4554697	0.3911905	0.6097927	0.4258941
Made Playoffs Previous Year	0.2820823	0.2142857	0.3099415	0.3072378	0.3333333	0.2575758	0.304878	0.3857143	0.3449883	0.2886598	0.3931758	0.4009434	0.2321429	0.25	0.1666667	0.25
Team Win%	0.4960557	0.4859654	0.4994016	0.5004062	0.5032431	0.4917273	0.4986829	0.5113429	0.5052214	0.4941237	0.4976975	0.5146038	0.4945	0.4765	0.4694167	0.5106563
(sd)	0.0646629	0.0664512	0.0639795	0.0632719	0.0668028	0.066981	0.0714585	0.0632396	0.0648605	0.0674931	0.0671262	0.0613394	0.0613923	0.0812533	0.0501823	0.0530311
AL	0.5024213	0.4437229	0.5282651	0.5228951	0.4270833	0.4545455	0.4390244	0.4071429	0.4871795	0.4123711	0.4033613	0.5707547	0.5535714	0.5833333	0.5	0.5625
log(population)	13.66568	13.61833	13.5939	13.75235	13.67625	13.4879	13.53472	13.84794	13.84328	13.63231	13.62352	14.06739	13.92343	13.39404	14.08334	14.06198
(sd)	0.941478	0.9034371	0.9029494	0.988801	0.8694828	0.8205788	0.8361385	0.8833563	1.042557	0.8176753	0.8727258	1.171605	0.9506309	0.4769368	1.157974	0.953216
%population(immigrant)	21.19153	21.23485	20.94444	21.34919	18.66875	18.47273	19.37683	18.34643	22.24755	20.41134	19.27059	24.82925	23.79286	13.25833	18.21667	29.83437
(sd)	13.51737	13.87128	13.35481	13.41214	12.28283	10.66848	13.48468	12.32476	13.75275	14.53534	19.27059	12.92277	16.15007	8.03588	14.83239	16.40436
%population(black)	28.95611	28.12403	27.65049	30.51329	31.01389	28.52727	28.05244	33.92071	29.88928	30.49588	31.99496	28.31604	33.52679	44.00833	41.975	26.42812
(sd)	17.76943	17.58678	17.35099	18.11148	18.93969	16.38813	15.78879	21.28782	19.84777	21.92647	21.2932	17.85661	25.87434	27.22677	22.03394	25.10587
%population(Hispanic)	21.65073	23.12035	22.04678	20.34771	20.77292	20.68182	22.01829	20.08643	21.6102	22.67629	19.20168	22.55189	16.53036	9.983334	14	19.93438
(sd)	16.86958	18.2141	16.90298	15.78312	16.70106	15.99182	18.33043	16.09739	15.92185	18.6332	15.62833	14.61849	15.11992	2.516792	10.54023	18.24558
N	1,652	462	513	677	288	66	82	140	429	97	119	212	57	12	13	32

Table 2a is a means table of the other characteristics that were included in my regressions models for players from the United States, Canada, & Puerto Rico.

Table 2b Means Table of Individual, Team, & Geographic Characteristics of Team

Variables	FB Asian				FB Hispanic				FB Black & Hispanic				All FB Players			
	All Players	1-3 Years	4-6 Years	7+ Years	All Players	1-3 Years	4-6 Years	7+ Years	All Players	1-3 Years	4-6 Years	7+ Years	All Players	1-3 Years	4-6 Years	7+ Years
Catcher	0.03409	0.0689655	0.04	0	0.2138614	0.12977	0.2253521	0.2543103	0.0346821	0.0434783	0.0909091	0.0106383	0.1527415	0.1019417	0.18	0.1666667
Outfield	0.4886364	0.4827586	0.48	0.5	0.2455446	0.2671756	0.2535211	0.2284483	0.283237	0.4782609	0.2424242	0.2021277	0.2819843	0.3446602	0.28	0.2472222
1B/3B/DH	0.2272727	0.2413793	0.16	0.2647059	0.1821782	0.167938	0.1619718	0.2025862	0.265896	0.1304348	0.030303	0.4148936	0.2062663	0.1699029	0.14	0.2638889
2B/SS	0.25	0.2068966	0.32	0.2352941	0.3584158	0.4351145	0.3591549	0.3146552	0.416185	0.3478261	0.6363636	0.3723404	0.3590078	0.3834951	0.4	0.3222222
log(Payroll)	18.44261	18.48378	18.39879	18.4397	18.3711	18.28619	18.33942	18.43843	18.44317	18.39794	18.27133	18.52563	18.39559	18.33896	18.33561	18.46132
(sd)	0.3459929	0.1839273	0.3758961	0.4256565	0.4188517	0.452036	0.4556271	0.3630483	0.4159706	0.4365117	0.4503476	0.3737249	0.4114147	0.4260903	0.4449065	0.372977
Made Playoffs Previous Year	0.2727273	0.2413793	0.44	0.1764706	0.2693069	0.206106	0.2464789	0.3189655	0.2716763	0.2391304	0.3030303	0.2765957	0.270235	0.2184466	0.28	0.2944444
Team Win%	0.491465	0.4782759	0.50228	0.4947647	0.494901	0.4794122	0.4937465	0.5043534	0.500878	0.4866087	0.4963939	0.5094362	0.4958564	0.4808592	0.49525	0.504775
(sd)	0.0639412	0.0694478	0.060941	0.0610966	0.0676666	0.0695049	0.0738599	0.060949	0.0677341	0.0699077	0.0627754	0.067695	0.067243	0.0693163	0.0703913	0.0627369
AL	0.5340909	0.5172414	0.48	0.5882353	0.5306931	0.5267176	0.5	0.5517241	0.5375723	0.3695652	0.5454545	0.6170213	0.5326371	0.4902913	0.505	0.5722222
log(population)	13.68125	13.68444	13.50327	13.80941	13.88557	13.83466	13.91714	13.89499	13.8598	13.61146	13.60577	14.07051	13.85628	13.76367	13.81403	13.93274
(sd)	0.9228315	0.8183161	0.9382819	0.9978951	0.943601	0.9704278	0.9720482	0.9131045	1.002439	0.9400687	1.007597	0.9916012	0.9557633	0.9444331	0.9827663	0.9434365
%population(immigrant)	22.5125	18.90345	17.324	29.40588	22.13327	0.9704278	23.76338	20.94569	23.27168	20.5913	22.07576	25.00319	22.43394	21.54806	22.68	22.80417
(sd)	14.71505	11.71566	11.33495	16.73793	14.00239	13.20189	14.46847	14.09986	14.52055	15.26246	17.27751	12.93958	14.19239	13.49606	14.70793	14.30647
%population(black)	27.04545	25.03448	34.38	23.36765	29.76515	26.6855	27.60704	32.825	27.33064	27.83478	27.40303	27.05851	28.90287	26.70971	28.42	30.42611
(sd)	18.26723	16.95187	18.49437	18.13575	20.75598	13.98785	17.75281	24.89623	15.5144	14.11079	16.52399	15.95811	19.42528	14.41237	17.70788	22.50418
%population(Hispanic)	21.14432	16.00345	16.832	28.7	23.63644	26.69084	26.43873	20.19655	24.82139	22.86957	26.57879	25.15957	23.61775	24.33301	25.261	22.29556
(sd)	18.52966	13.51603	12.49446	23.2491	17.59091	17.66933	18.14109	16.63014	18.80492	19.91305	21.83649	17.17497	17.98481	17.99519	18.40892	17.68997
N	88	29	25	34	505	131	142	232	173	46	33	94	766	206	200	360

Table 2b is a means table of the other characteristics that were included in my regressions models for players from outside of the United States, Canada, & Puerto Rico.

Table 3 Results of Model 1: Differences in Wages by Race & Nativity Separately:

Variable	All Players				Years 1-3				Years 4-6				Years 7+			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary
Foreign Born	-0.00783	0.0999**	0.0982**	0.0944**	0.400***	0.416***	0.425***	0.418***	0.0242	0.126	0.122	0.124	-0.0949	-0.112*	-0.0983	-0.107*
	(0.0702)	(0.0417)	(0.0412)	(0.0413)	(0.0563)	(0.0550)	(0.0550)	(0.0552)	(0.103)	(0.0831)	(0.0825)	(0.0830)	(0.0736)	(0.0621)	(0.0604)	(0.0605)
Black	0.278***	0.0549	0.0513	0.0511	-0.0616	-0.0927*	-0.0954*	-0.0970*	-0.0564	-0.0766	-0.0808	-0.0850	0.349***	0.174***	0.169***	0.167***
	(0.0647)	(0.0393)	(0.0388)	(0.0388)	(0.0535)	(0.0538)	(0.0535)	(0.0537)	(0.0978)	(0.0793)	(0.0788)	(0.0790)	(0.0659)	(0.0570)	(0.0553)	(0.0553)
Hispanic	0.139**	-0.0688*	-0.0772**	-0.0757**	-0.110**	-0.117**	-0.120**	-0.117**	-0.0758	-0.122*	-0.133*	-0.130*	0.0624	-0.0194	-0.0400	-0.0361
	(0.0621)	(0.0369)	(0.0364)	(0.0365)	(0.0507)	(0.0498)	(0.0496)	(0.0498)	(0.0901)	(0.0721)	(0.0717)	(0.0723)	(0.0651)	(0.0547)	(0.0531)	(0.0534)
Season Fixed Effects	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
AE/FA		X	X	X												
Player Characteristics		X	X	X		X	X	X		X	X	X		X	X	X
Team Chacteristics			X	X			X	X			X	X			X	X
Geographic Characteristics				X				X				X				X
N	3170	3170	3170	3170	839	839	839	839	923	923	923	923	1408	1408	1408	1408

Standard Errors in parentheses
="* p<0.1   ** p<0.05   *** p<0.01"

Table 3 Shows the average difference in wages for all players that are not from the US, Canada, or Puerto Rico as compared to players from these countries as well as the average difference in wages for all black & Hispanic players as compared to all white players.

Table 4 Results of Model 2: Differences in Wages by Race & Nativity Separately with the Inclusion of Team Fixed Effects

Variable	All Players				Years 1-3				Years 4-6				Years 7+			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary
Foreign Born	0.00230	0.0885**	0.0821*	0.0817*	0.406***	0.418***	0.417***	0.417***	-0.0411	0.0879	0.0704	0.0704	-0.0856	-0.0912	-0.0897	-0.0900
	(0.0696)	(0.0423)	(0.0420)	(0.0420)	(0.0569)	(0.0556)	(0.0554)	(0.0554)	(0.106)	(0.0854)	(0.0846)	(0.0846)	(0.0739)	(0.0639)	(0.0630)	(0.0631)
Black	0.276***	0.0596	0.0622	0.0624	-0.0769	-0.107*	-0.104*	-0.104*	-0.0854	-0.102	-0.0890	-0.0890	0.369***	0.206***	0.193***	0.193***
	(0.0641)	(0.0399)	(0.0396)	(0.0397)	(0.0543)	(0.0545)	(0.0543)	(0.0543)	(0.0993)	(0.0803)	(0.0796)	(0.0796)	(0.0654)	(0.0579)	(0.0570)	(0.0571)
Hispanic	0.0820	-0.0698*	-0.0654*	-0.0655*	-0.102**	-0.104**	-0.101**	-0.101**	-0.0489	-0.108	-0.100	-0.100	0.00737	-0.0484	-0.0431	-0.0433
	(0.0615)	(0.0373)	(0.0370)	(0.0370)	(0.0511)	(0.0502)	(0.0501)	(0.0501)	(0.0926)	(0.0738)	(0.0731)	(0.0731)	(0.0649)	(0.0557)	(0.0549)	(0.0550)
Season Fixed Effects	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Team Fixed Effects	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
AE/FA		X	X	X												
Player Characteristics		X	X	X		X	X	X		X	X	X		X	X	X
Team Chacteristics			X	X			X	X			X	X			X	X
Geographic Characteristics				X				X				X				X
N	3170	3170	3170	3170	839	839	839	839	923	923	923	923	1408	1408	1408	1408

Standard Errors in parentheses
="* p<0.1   ** p<0.05   *** p<0.01"

Table 4 Shows the robustness check for the average difference in wages for all players that are not from the US, Canada, or Puerto Rico as compared to players from these countries as well as the average difference in wages for all black & Hispanic players as compared to all white players.

Table 5 Results of Model 3: Differences in Wages by Race, Nativity, & their interaction

Variable	All Players				Years 1-3				Years 4-6				Years 7+			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary
Foreign Born	0.407***	0.450***	0.413***	0.416***	0.963***	0.937***	0.945***	0.943***	0.413**	0.522***	0.461***	0.467***	0.141	-0.0508	-0.0450	-0.0780
	(0.147)	(0.0865)	(0.0855)	(0.0856)	(0.102)	(0.0999)	(0.0999)	(0.100)	(0.210)	(0.167)	(0.166)	(0.167)	(0.169)	(0.142)	(0.137)	(0.139)
Black	0.293***	0.0756	0.0745	0.0720	0.0137	-0.0163	-0.0221	-0.0273	-0.0446	-0.0121	-0.0119	-0.0179	0.291***	0.123	0.118	0.119
	(0.0856)	(0.0518)	(0.0512)	(0.0513)	(0.0700)	(0.0702)	(0.0699)	(0.0700)	(0.122)	(0.0990)	(0.0982)	(0.0984)	(0.0894)	(0.0771)	(0.0749)	(0.0751)
Hispanic	0.230***	-0.00344	-0.0157	-0.0149	0.0506	0.0276	0.0208	0.0211	-0.00311	-0.0425	-0.0537	-0.0496	0.104	-0.0148	-0.0418	-0.0428
	(0.0726)	(0.0431)	(0.0425)	(0.0426)	(0.0593)	(0.0584)	(0.0582)	(0.0583)	(0.104)	(0.0836)	(0.0831)	(0.0836)	(0.0757)	(0.0637)	(0.0619)	(0.0622)
Foreign Born Hispanic	-0.549***	-0.441***	-0.398***	-0.405***	-0.757***	-0.695***	-0.690***	-0.697***	-0.494**	-0.481**	-0.420**	-0.429**	-0.351*	-0.110	-0.0894	-0.0528
	(0.171)	(0.101)	(0.100)	(0.100)	(0.124)	(0.122)	(0.122)	(0.122)	(0.246)	(0.197)	(0.195)	(0.197)	(0.192)	(0.162)	(0.157)	(0.158)
Black & Hispanic	-0.0101	0.0945	0.0646	0.0838	0.0918	0.125	0.139	0.167	0.138	0.117	-0.00671	0.0104	-0.00980	0.0460	0.0826	0.0890
	(0.207)	(0.122)	(0.122)	(0.122)	(0.177)	(0.173)	(0.173)	(0.173)	(0.324)	(0.258)	(0.264)	(0.266)	(0.203)	(0.170)	(0.165)	(0.166)
FB & Black & Hispanic	0.0335	-0.0241	-0.0276	-0.0265	-0.128	-0.130	-0.124	-0.113	-0.0309	-0.211	-0.188	-0.184	0.226	0.155	0.139	0.119
	(0.146)	(0.0867)	(0.0855)	(0.0857)	(0.115)	(0.113)	(0.113)	(0.113)	(0.233)	(0.186)	(0.185)	(0.185)	(0.148)	(0.125)	(0.122)	(0.122)
Season fixed effects	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
AE/FA		X	X	X												
Player Characteristics		X	X	X		X	X	X		X	X	X		X	X	X
Team Chacteristics			X	X			X	X			X	X			X	X
Geographic Characteristics				X				X				X				X
N	3170	3170	3170	3170	839	839	839	839	923	923	923	923	1408	1408	1408	1408

Standard Errors in parentheses
="* p<0.1   ** p<0.05   *** p<0.01"

Table 5 Shows the average difference in wages based upon the player's race & nativity as compared to a white player from the United States, Canada, & Puerto Rico.

Table 6 Results of Model 4

Variable	All Players				Years 1-3				Years 4-6				Years 7+			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary
Foreign Born	0.357**	0.436***	0.396***	0.396***	0.960***	0.939***	0.923***	0.923***	0.398*	0.552***	0.493***	0.493***	0.179	-0.0100	-0.0341	-0.0342
	(0.144)	(0.0868)	(0.0864)	(0.0864)	(0.103)	(0.101)	(0.101)	(0.101)	(0.216)	(0.171)	(0.170)	(0.170)	(0.166)	(0.142)	(0.140)	(0.140)
Black	0.316***	0.0880*	0.0872*	0.0873*	-0.00754	-0.0347	-0.0367	-0.0367	-0.0585	-0.0201	-0.0229	-0.0229	0.337***	0.176**	0.166**	0.166**
	(0.0846)	(0.0524)	(0.0521)	(0.0521)	(0.0702)	(0.0703)	(0.0701)	(0.0701)	(0.123)	(0.0997)	(0.0988)	(0.0988)	(0.0897)	(0.0791)	(0.0779)	(0.0779)
Hispanic	0.176**	-0.00240	-0.00872	-0.00875	0.0539	0.0398	0.0343	0.0343	0.0477	0.000765	-0.0114	-0.0114	0.0505	-0.0466	-0.0493	-0.0494
	(0.0715)	(0.0433)	(0.0430)	(0.0430)	(0.0597)	(0.0586)	(0.0585)	(0.0585)	(0.106)	(0.0850)	(0.0843)	(0.0843)	(0.0755)	(0.0649)	(0.0640)	(0.0640)
Foreign Born Hispanic	-0.481***	-0.437***	-0.386***	-0.387***	-0.747***	-0.699***	-0.672***	-0.672***	-0.571**	-0.584***	-0.516***	-0.516***	-0.356*	-0.104	-0.0621	-0.0625
	(0.168)	(0.101)	(0.101)	(0.101)	(0.126)	(0.124)	(0.124)	(0.124)	(0.251)	(0.200)	(0.199)	(0.199)	(0.189)	(0.162)	(0.160)	(0.160)
Black & Hispanic	-0.151	0.0785	0.106	0.106	0.145	0.159	0.178	0.178	0.00981	-0.00721	0.112	0.112	0.0373	0.0988	0.122	0.122
	(0.205)	(0.123)	(0.123)	(0.123)	(0.178)	(0.174)	(0.173)	(0.173)	(0.337)	(0.267)	(0.266)	(0.266)	(0.201)	(0.171)	(0.169)	(0.169)
FB & Black & Hispanic	-0.00849	-0.0458	-0.0537	-0.0530	-0.108	-0.113	-0.113	-0.113	-0.0418	-0.222	-0.222	-0.222	0.123	0.0646	0.0427	0.0432
	(0.143)	(0.0871)	(0.0865)	(0.0865)	(0.115)	(0.113)	(0.112)	(0.112)	(0.232)	(0.185)	(0.183)	(0.183)	(0.149)	(0.129)	(0.127)	(0.127)
Season Fixed Effects	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Team Fixed Effects	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
AE/FA		X	X	X												
Player Characteristics		X	X	X		X	X	X		X	X	X		X	X	X
Team Characteristics			X	X			X	X			X	X			X	X
Geographic Characteristics				X				X				X				X
N	3170	3170	3170	3170	839	839	839	839	923	923	923	923	1408	1408	1408	1408

Standard Errors in parentheses
="* p<0.1   ** p<0.05   *** p<0.01"

Table 6 Shows the robustness check for the average difference in wages based upon the player's race & nativity as compared to a white player from the United States, Canada, & Puerto Rico.

Table 7 Results of Model 5

	All Players				Years 1-3				Years 4-6				Years 7+			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary
Foreign Born	-0.169	0.0965	0.0835	0.0774	0.1000	0.129	0.144	0.152	0.105	0.299	0.283	0.278	-0.157	-0.184	-0.168	-0.167
	(0.149)	(0.0937)	(0.0925)	(0.0925)	(0.129)	(0.129)	(0.129)	(0.130)	(0.224)	(0.191)	(0.189)	(0.189)	(0.143)	(0.139)	(0.135)	(0.135)
Black	0.154	0.216**	0.188**	0.188**	0.0809	0.0595	0.0385	0.0286	-0.0801	-0.101	-0.115	-0.121	0.680***	0.605***	0.580***	0.591***
	(0.145)	(0.0922)	(0.0910)	(0.0910)	(0.113)	(0.114)	(0.114)	(0.114)	(0.214)	(0.182)	(0.181)	(0.181)	(0.149)	(0.146)	(0.142)	(0.142)
Hispanic	-0.0317	-0.209**	-0.196**	-0.198**	-0.256**	-0.280**	-0.286**	-0.298**	-0.149	-0.314*	-0.328*	-0.337**	-0.0343	-0.0187	-0.0278	-0.0233
	(0.133)	(0.0838)	(0.0827)	(0.0827)	(0.118)	(0.118)	(0.118)	(0.118)	(0.199)	(0.169)	(0.167)	(0.168)	(0.126)	(0.123)	(0.119)	(0.119)
wRC	0.0142***	0.0118***	0.0114***	0.0114***	0.00241**	0.00225**	0.00195**	0.00188*	0.0114***	0.0112***	0.0110***	0.0109***	0.0174***	0.0176***	0.0164***	0.0166***
	(0.00104)	(0.000671)	(0.000668)	(0.000669)	(0.000955)	(0.000989)	(0.000993)	(0.000997)	(0.00134)	(0.00115)	(0.00115)	(0.00115)	(0.00109)	(0.00106)	(0.00105)	(0.00105)
ForeignBorn*wRC	0.00339	0.000158	0.000346	0.000387	0.00634***	0.00596***	0.00585**	0.00555**	-0.0000793	-0.00291	-0.00269	-0.00257	0.000637	0.00118	0.00114	0.000984
	(0.00232)	(0.00146)	(0.00144)	(0.00144)	(0.00227)	(0.00227)	(0.00227)	(0.00228)	(0.00352)	(0.00298)	(0.00295)	(0.00296)	(0.00209)	(0.00202)	(0.00196)	(0.00196)
Black*wRC	0.000796	-0.00270*	-0.00230*	-0.00230*	-0.00280	-0.00316	-0.00279	-0.00260	-0.000382	0.000437	0.000578	0.000603	-0.00706***	-0.00674***	-0.00642***	-0.00664***
	(0.00221)	(0.00140)	(0.00138)	(0.00138)	(0.00204)	(0.00205)	(0.00204)	(0.00205)	(0.00313)	(0.00265)	(0.00264)	(0.00264)	(0.00217)	(0.00211)	(0.00204)	(0.00205)
Hispanic*wRC	0.00274	0.00241*	0.00204	0.00210*	0.00288	0.00332	0.00337*	0.00365*	0.00144	0.00318	0.00325	0.00344	0.00110	-0.0000454	-0.000240	-0.000256
	(0.00205)	(0.00129)	(0.00127)	(0.00127)	(0.00204)	(0.00204)	(0.00204)	(0.00205)	(0.00299)	(0.00254)	(0.00251)	(0.00252)	(0.00188)	(0.00183)	(0.00177)	(0.00177)
Season Fixed Effects	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
AE/FA		X	X	X												
Player Characteristics		X	X	X		X	X	X		X	X	X		X	X	X
Team Chacteristics			X	X			X	X			X	X			X	X
Geographic Characteristics				X				X				X				X
N	3170	3170	3170	3170	839	839	839	839	923	923	923	923	1408	1408	1408	1408

Standard Errors in parentheses
="* p<0.1   ** p<0.05   *** p<0.01"

Table 7 shows the average additional effects on wages of output for players from outside the US, Canada, & Puerto Rico as compared to players from these countries & the average additional effect of output on wages for being black or Hispanic as compared to being white.

Table 8 Results of Model 6

	All Players				Years 1-3				Years 4-6				Years 7+			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary	lsalary
Foreign Born	0.737**	1.052***	0.976***	0.968***	0.732***	0.775***	0.844***	0.864***	2.154***	2.258***	2.188***	2.189***	0.254	0.0234	-0.00713	-0.0710
	(0.329)	(0.206)	(0.204)	(0.204)	(0.258)	(0.258)	(0.261)	(0.263)	(0.462)	(0.389)	(0.386)	(0.387)	(0.349)	(0.339)	(0.329)	(0.331)
Black non-FB	0.0383	0.163	0.153	0.155	-0.0222	-0.0291	-0.0604	-0.0603	-0.200	-0.0559	-0.0203	-0.0201	0.604***	0.534**	0.486**	0.505**
	(0.200)	(0.126)	(0.124)	(0.124)	(0.155)	(0.155)	(0.155)	(0.155)	(0.265)	(0.225)	(0.223)	(0.224)	(0.220)	(0.213)	(0.207)	(0.207)
Hispanic Non-FB	0.0967	-0.0709	-0.0644	-0.0668	-0.0794	-0.0911	-0.102	-0.108	0.179	0.0843	0.0761	0.0658	-0.0408	-0.0454	-0.0622	-0.0593
	(0.153)	(0.0963)	(0.0952)	(0.0952)	(0.138)	(0.138)	(0.138)	(0.138)	(0.226)	(0.193)	(0.191)	(0.192)	(0.143)	(0.139)	(0.135)	(0.135)
FB Hispanic	-1.152***	-1.180***	-1.100***	-1.096***	-0.935***	-0.957***	-1.014***	-1.033***	-2.645***	-2.562***	-2.486***	-2.483***	-0.410	-0.179	-0.131	-0.0628
	(0.376)	(0.236)	(0.233)	(0.233)	(0.305)	(0.305)	(0.306)	(0.309)	(0.533)	(0.452)	(0.448)	(0.449)	(0.388)	(0.378)	(0.367)	(0.370)
B+H Non-FB	0.404	0.425	0.370	0.367	-0.0644	-0.0807	-0.0139	-0.0261	0.988	0.258	0.137	0.154	0.660	0.562	0.566	0.490
	(0.449)	(0.281)	(0.278)	(0.278)	(0.358)	(0.357)	(0.356)	(0.358)	(0.715)	(0.603)	(0.598)	(0.604)	(0.440)	(0.427)	(0.415)	(0.417)
FB B+H	0.285	0.123	0.0892	0.0784	0.332	0.313	0.334	0.318	0.371	0.0537	-0.0639	-0.101	0.0336	0.0189	0.0694	0.0628
	(0.321)	(0.201)	(0.198)	(0.198)	(0.242)	(0.242)	(0.241)	(0.242)	(0.500)	(0.423)	(0.420)	(0.421)	(0.328)	(0.319)	(0.309)	(0.309)
FB*wRC	-0.00651	-0.0101***	-0.00938***	-0.00921***	0.00413	0.00322	0.00210	0.00174	-0.0291***	-0.0296***	-0.0295***	-0.0295***	-0.00443	-0.00120	-0.000650	-0.000221
	(0.00502)	(0.00315)	(0.00311)	(0.00311)	(0.00446)	(0.00448)	(0.00451)	(0.00453)	(0.00714)	(0.00602)	(0.00596)	(0.00598)	(0.00484)	(0.00470)	(0.00456)	(0.00458)
Non-FB Black*wRc	0.00304	-0.00139	-0.00125	-0.00132	0.000762	0.000208	0.000713	0.000626	0.00195	0.000707	0.000141	0.0000257	-0.00720**	-0.00644**	-0.00577*	-0.00604**
	(0.00305)	(0.00191)	(0.00189)	(0.00189)	(0.00277)	(0.00277)	(0.00277)	(0.00277)	(0.00382)	(0.00322)	(0.00319)	(0.00320)	(0.00325)	(0.00315)	(0.00306)	(0.00306)
Non-FB Hispanic*wRc	0.00151	0.00118	0.000856	0.000914	0.00227	0.00241	0.00248	0.00260	-0.00315	-0.00207	-0.00213	-0.00194	0.00127	0.000469	0.000295	0.000210
	(0.00237)	(0.00148)	(0.00146)	(0.00147)	(0.00236)	(0.00236)	(0.00235)	(0.00235)	(0.00336)	(0.00284)	(0.00282)	(0.00282)	(0.00217)	(0.00211)	(0.00204)	(0.00204)
FB Hispanic*wRC	0.0130**	0.0127***	0.0120***	0.0118***	0.00497	0.00570	0.00683	0.00698	0.0389***	0.0361***	0.0358***	0.0358***	0.00385	0.00110	0.000705	0.000280
	(0.00579)	(0.00363)	(0.00358)	(0.00359)	(0.00531)	(0.00531)	(0.00533)	(0.00537)	(0.00834)	(0.00705)	(0.00698)	(0.00701)	(0.00548)	(0.00532)	(0.00516)	(0.00519)
Non-FB B+H*wRc	-0.00513	-0.00590	-0.00545	-0.00507	0.00455	0.00458	0.00354	0.00449	-0.0136	-0.00287	-0.00313	-0.00320	-0.00936	-0.00820	-0.00769	-0.00647
	(0.00702)	(0.00440)	(0.00434)	(0.00435)	(0.00679)	(0.00679)	(0.00676)	(0.00683)	(0.0119)	(0.0101)	(0.0100)	(0.0101)	(0.00640)	(0.00622)	(0.00604)	(0.00609)
FB B+H*wRc	-0.00571	-0.00284	-0.00230	-0.00211	-0.00985**	-0.00926**	-0.00955**	-0.00901**	-0.00978	-0.00509	-0.00282	-0.00221	0.00335	0.00221	0.00118	0.000958
	(0.00487)	(0.00305)	(0.00302)	(0.00302)	(0.00437)	(0.00437)	(0.00435)	(0.00438)	(0.00734)	(0.00619)	(0.00616)	(0.00618)	(0.00475)	(0.00461)	(0.00448)	(0.00449)
wrc	0.0143***	0.0120***	0.0116***	0.0116***	0.00192*	0.00182*	0.00149	0.00140	0.0121***	0.0121***	0.0120***	0.0119***	0.0177***	0.0178***	0.0164***	0.0167***
	(0.00110)	(0.000702)	(0.000699)	(0.000699)	(0.000978)	(0.00101)	(0.00101)	(0.00102)	(0.00137)	(0.00118)	(0.00117)	(0.00117)	(0.00116)	(0.00113)	(0.00112)	(0.00112)
Season Fixed Effects	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
AE/FA		X	X	X												
Player Characteristics		X	X	X		X	X	X		X	X	X		X	X	X
Team Characteristics			X	X			X	X			X	X			X	X
Geographic Characteristics				X				X				X				X
N	3170	3170	3170	3170	839	839	839	839	923	923	923	923	1408	1408	1408	1408

Standard Errors in parentheses
="* p<0.1   ** p<0.05   *** p<0.01"

Table 8 Shows the average additional effects of race & nativity on wages for offensive output as compared to white players from the US, Canada, & Puerto Rico.

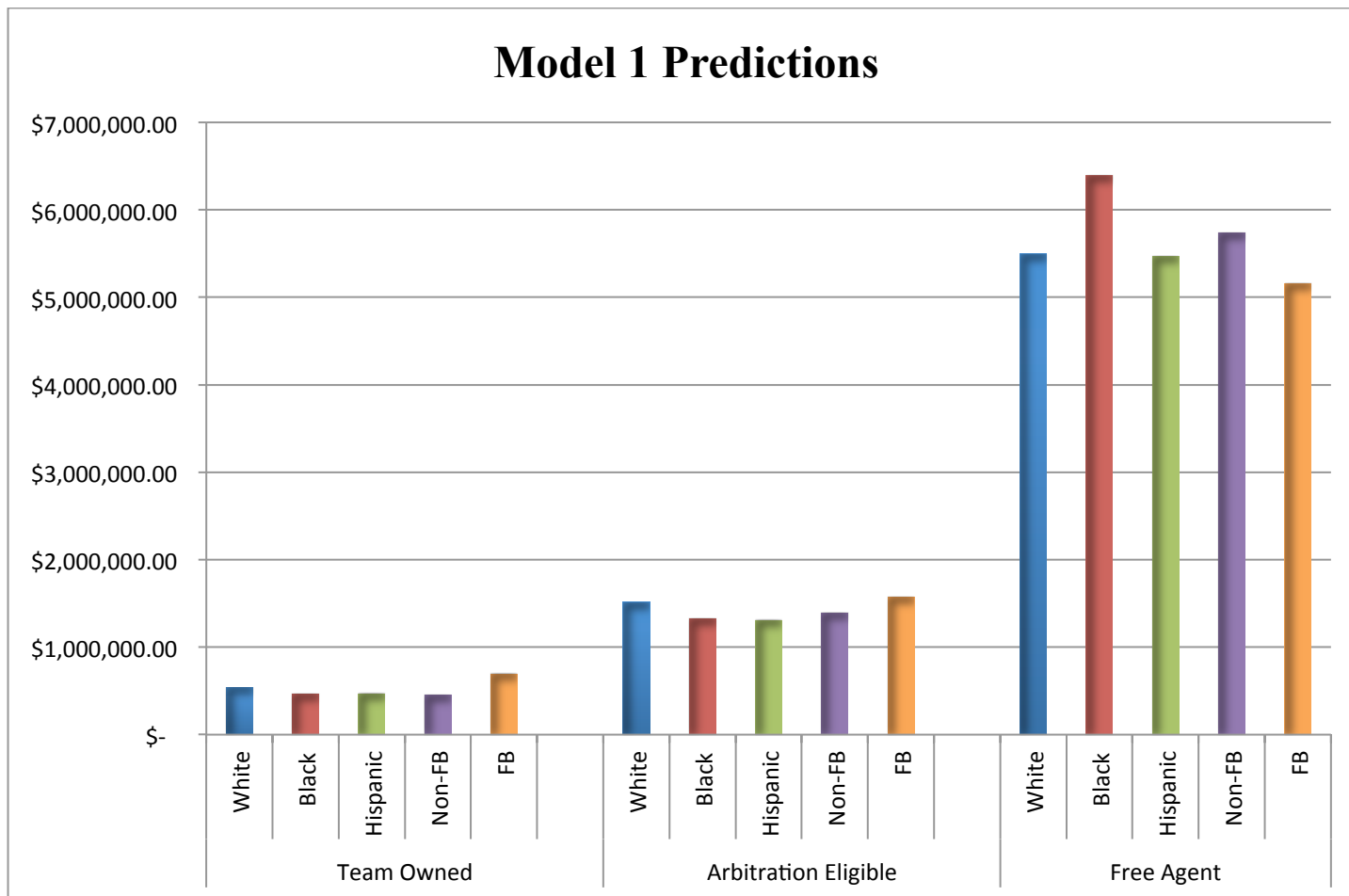**Figure 1:** Model 1 Predicted Salaries

Figure 1 contains the average predicted salaries for players of the categories described in Model 1.

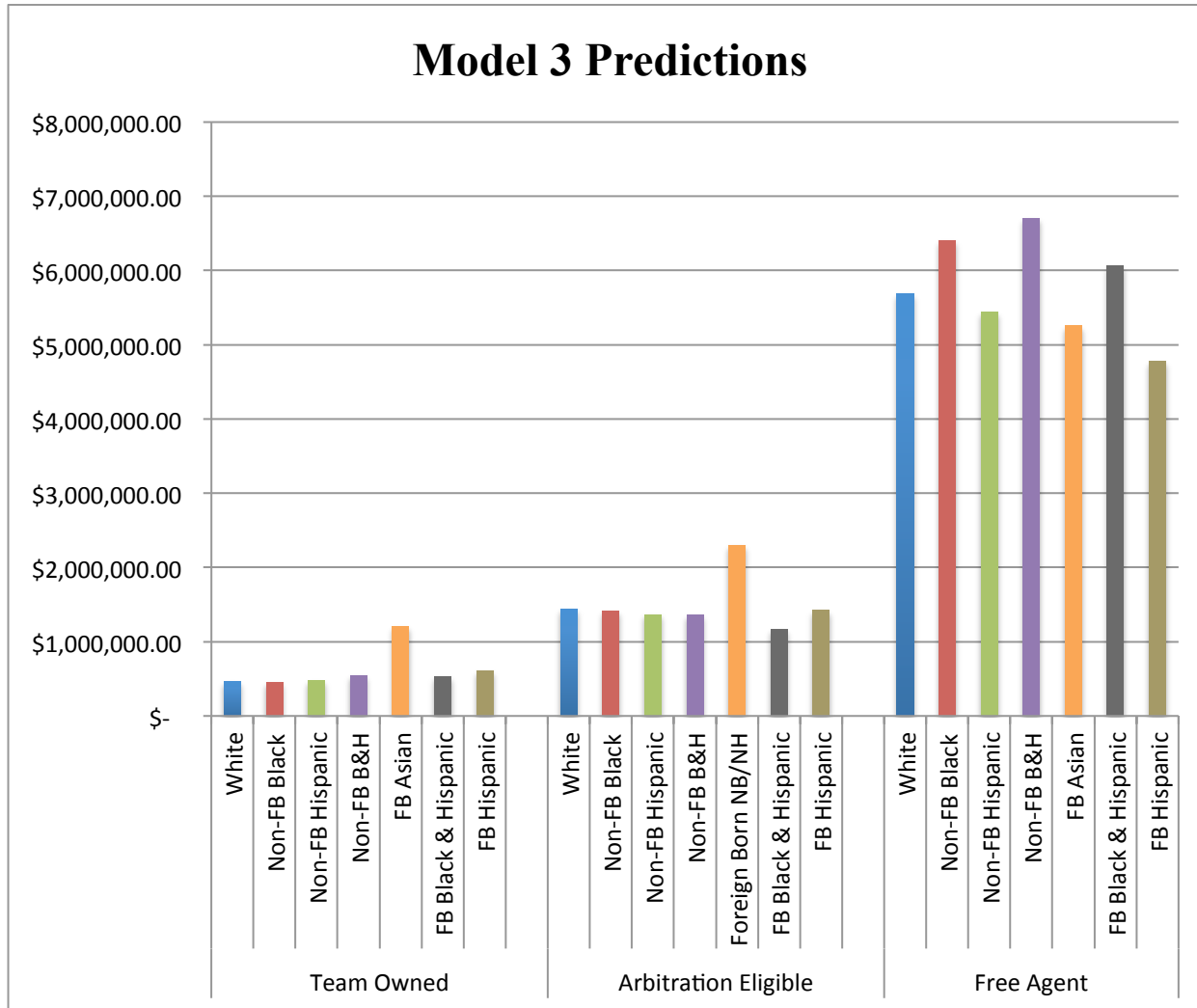**Figure 2:** Model 3 Predicted Salaries

Figure 2 contains the predicted salaries for players of the categories described in Model 3.

Appendices:

Appendix A: Major League Baseball Statistics

1. **Weighted Runs Created**

   The Weighted Runs Created Statistic was designed by Tom Tango, a Sabermetrician in an attempt to quantify a player's offensive output by crediting the player with a value for each outcome. The Weighted Runs Created Statistic ranges from a low of 40 for poor performing players to a high of 105 for excellent players. It is a scale that is based off of a popular baseball statistic Weighted On Base Average (wOBA) and compares an individual player's wOBA to that of the league with a scale factor that varies by year. The formula for wRC, from Fangraphs.com, also my data source of player performance is:

   wRC = (((wOBA-League wOBA)/wOBA Scale)+(League R/PA))*PA

   Table ## reports the average League wOBA, the wOBA scale & the League R/PA by season:

Season	League Average wOBA	wOBA Scale	League R/PA
2007	.331	1.192	.124
2008	.328	1.211	.120
2009	.329	1.210	.120
2010	.321	1.251	.115
2011	.316	1.264	.112
2012	.315	1.245	.114
2013	.314	1.277	.110
2014	.310	1.304	.108
2015	.313	1.251	.113
2016	.318	1.212	.118

Table ##: Summary of constants of determinants of individual wRC.

2. **At Bats**

   The at bat statistic records the number of plate appearances that a player has minus situations where the player: "hits a sacrifice bunt or sacrifice fly; is awarded first base on four called balls; is hit by a pitched ball; or is awarded first base because of interference or obstruction" (Official Baseball Rules 2010).

Appendix B: Fully Described Models

Differences in Wages by Race & Nativity Separately:

Formally Model 1 is:

LLog(wage)= β_0+ β_1ForeignBorn$_i$ + β_2 Black$_i$ + β_3Hispanic$_i$+ β_4wRC +β_5MLBexp + β_6MLBexp^2+ $\beta_7$catcher+ β_8Outfield+ $\beta_9$1B/3B/DH + β_{10}log(teampayroll)+ β_{11}playyoffpreviousyear+ $\beta12$teamwin%+ $\beta13$Al+ $\beta14$ + β_{15}log(population size) $_i$+

β_{16}%population Hispanic$_i$ + β_{17}%population black$_i$ + β_{18} %population immigrant$_i$ + β_{19} season fixed effects$_t$ +μ_i

Where i indexes individuals, t indexes time based on MLB seasons and μ_i denotes the individual unobserved error.

Differences in Wages by Race & Nativity Separately with the Inclusion of Team Fixed Effects:

Formally Model 2 is:

Log(wage)= β_0+ β_1ForeignBorn$_i$ + β_2 Black$_i$ + β_3Hispanic$_i$+ β_4wRC+β_5MLBexp+ β_6MLBexp^2+ $\beta_7$catcher+ β_8Outfield+ $\beta_9$1B/3B/DH + β_{10}log(teampayroll)+ β_{11}playyoffpreviousyear+ β_{12}teamwin%+ β_{13}Al+ β_{14} + β_{15}log(population size) $_i$+ β_{16}%population Hispanic$_i$ + β_{17}%population black$_i$ + β_{18} %population immigrant$_i$ + β_{19} season fixed effects$_t$+ β_{20} Team fixed Effects$_i$ +μ_i

Where i indexes individuals, t indexes time based on MLB seasons and μ_i denotes the individual unobserved error.

Differences in Wages by Race, Nativity, & their interaction:

Formally Model 3 is:

Log(wage)= β_0+ β_1Foreignborn$_i$ + β_2 Black$_i$ + β_3Hispanic$_i$+ β_4ForeignBorn*Hispanic$_i$+ β_5ForeignBorn*Black*Hispanic$_i$+ β_6wRC+ β_7MLBexp+ β_8MLBexp^2+ $\beta_9$catcher+ β_{10}Outfield+ β_{11}1B/3B/DH + β_{12}log(teampayroll)+ β_{13}playyoffpreviousyear+ β_{14}teamwin%+ β_{15}Al+ β_{16}log(population size) $_i$+ β_{17}%population Hispanic$_i$ + β_{18}%population black$_i$ + β_{19} %population immigrant$_i$ + β_{20} season fixed effects$_t$+ +μ_i

Where i indexes individuals, t indexes time based on MLB seasons and μ_i denotes the individual unobserved error.

Differences in Wages by Race, Nativity, & their interaction with the Inclusion of Team Fixed Effects:

Formally Model 4 is:

Log(wage)= β_0+ β_1Foreignborn$_i$ + β_2 Black$_i$ + β_3Hispanic$_i$+ β_4ForeignBorn*Hispanic$_i$+ β_5ForeignBorn*Black*Hispanic$_i$+ β_6wRC+ β_7MLBexp+ β_8MLBexp^2+ $\beta_9$catcher+ β_{10}Outfield+ β_{11}1B/3B/DH + β_{12}log(teampayroll)+ β_{13}playyoffpreviousyear+ β_{14}teamwin%+ β_{15}Al+ β_{16}log(population size) $_i$+ β_{17}%population Hispanic$_i$ + β_{18}%population black$_i$ + β_{19} %population immigrant$_i$ + β_{20} season fixed effects$_t$+ β_{21} Team fixed Effects$_i$ +μ_i

Where i indexes individuals, t indexes time based on MLB seasons and μ_i denotes the individual unobserved error.

Differences in Productivity on Wages by Race & Nativity separately

Formally Model 5 is:

$Log(wage) = \beta_0 + \beta_1 Foreignborn_i + \beta_2 Black_i + \beta_3 Hispanic_i \; \beta_4 Foreignborn*wRC_{it} + \beta_5 Black*wRC_{it} + \beta_6 Hispanic*wRC_{it} + \beta_7 MLBexp + \beta_8 MLBexp^2 + \beta_9 catcher + \beta_{10} Outfield + \beta_{11} 1B/3B/DH + \beta_{12} log(teampayroll) + \beta_{13} playyoffpreviousyear + \beta_{14} teamwin\% + \beta_{15} Al + \beta_{16} log(population\ size)_i + \beta_{17}\%population\ Hispanic_i + \beta_{18}\%population\ black_i + \beta_{19}\ \%population\ immigrant_i + \beta_{20}\ season\ fixed\ effects_t + \mu_i$

Where i indexes individuals, t indexes time based on MLB seasons and μ_i denotes the individual unobserved error.

Model 6: Differences in Productivity on Wages by Race, Nativity, & their interaction

Formally Model 6 is:

$Log(wage) = \beta_0 + \beta_1 Foreignborn_i + \beta_2 Black_i + \beta_3 Hispanic_i + \beta_4 ForeignBorn*Hispanic_i + \beta_5 ForeignBorn*Black*Hispanic_i + \beta_6 Foreignborn*wRC_{it} + \beta_7 Black*wRC_{it} + \beta_8 Hispanic*wRC_{it} + \beta_9 ForeignBorn*Black*wRC_{it} + \beta_{10} ForeignBorn*Hispanic*wRC_{it} + \beta_{11} ForeignBorn*Black*Hispanic*wRC_{it} + \beta_{12} MLBexp + \beta_{13} MLBexp^2 + \beta_{14} catcher + \beta_{15} Outfield + \beta_{16} 1B/3B/DH + \beta_{17} log(teampayroll) + \beta_{18} playyoffpreviousyear + \beta_{19} teamwin\% + \beta_{20} Al + \beta_{21} log(population\ size)_i + \beta_{22}\%population\ Hispanic_i + \beta_{23}\%population\ black_i + \beta_{24}\%population\ immigrant_i + \beta_{25} season\ fixed\ effects_t + \mu_i$

Where i indexes individuals, t indexes time based on MLB seasons and μ_i denotes the individual unobserved error.