It’s a party in the MLB: An analysis of shirking between games in Major League Baseball

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Abstract

This paper uses game-level Major League Baseball (MLB) player data to identify whether players with greater job security shirk in their preparation between games. Past work has identified evidence of moral hazard arising in multi-year MLB player contracts, but little work has been done in identifying when shirking takes place. Using a difference-in-differences estimation strategy, this study finds evidence of an inverse relationship between the number of years remaining on player contracts and player performance when the player is playing on short rest, but not on long rest. Using a triple-difference specification, evidence is found that this differential performance by length of rest occurs for games played in “party cities”. Additional evidence is presented which would also suggest that monitoring is an important factor for limiting between-game shirking. Party-city shirking is found to be driven by players on the home team, who end the night at home, rather than visiting players, who end the night at the same hotel as the rest of the team and management.

Introduction

It is common for workers to feel some degree of job security. In certain industries this job security is institutionalized. For example, tenure systems in education award a degree of job security to primary and secondary school teachers as well as college professors. Job security is also a feature of labor laws in the United States and abroad. Employees have a right to unionize, and unions provide members with a sense of job security. Minimum wage laws and other protections may also help employees to feel secure. From the perspective of the employer, this sense of job security may be of concern due to the potential for moral hazard. The field of economics has long been concerned with the proper alignment of incentives in principal-agent relationships (Ross 1973; Holmstrom 1979). In the relationship between employer and employee, the employee (the agent) is assigned tasks to complete to the benefit of the employer (the principal). In this setting, moral hazard may arise if the employee exerts diminished effort and performs at a low level due to this job security, which is referred to as shirking. Professional sports in the United States, and notably Major League Baseball (MLB), present an ideal environment to study this potential for shirking. First, MLB players experience great job security due to membership in a strong union, and many players sign multi-year contracts which award added job security those players. Second, contract data is readily available, and while effort is not directly observable, performance is. This study uses variation in the number of years remaining on a player's contract throughout the duration of such contracts to identify shirking in between game preparation by players.

The collective bargaining agreement between the players and teams, as negotiated between the MLB Players' Association and the 30 MLB teams, outlines certain expectations of players. Specifically, teams may terminate a player contract for various reasons, including failure

of the player to keep himself in "first-class physical condition", failure to "obey the Club's training rules", failure to "exhibit sufficient skills or competitive ability", failure to conform to standards of "good sportsmanship and good citizenship", and failure to "render his services" as outlined in the contract ("2012-2016 Basic Agreement", "2017-2021 Basic Agreement"). While such language exists in the general player's contract, the ability of teams to successfully terminate the contracts of players who violate these terms without paying out the remainder of the contract has been greatly limited by the strength of the Players' Association. Such unsuccessful attempts by teams to terminate player contracts include instances of players being charged with solicitation of a prostitute, smuggling drugs with intent to distribute, assault, and driving while intoxicated, among others. One rare case where a contract was successfully terminated without payout occurred when a player grabbed his team's general manager by the neck and repeatedly slammed him to the ground (Macramalla, 2013). As the voiding of contracts in instances of moral and ethical violations is extremely difficult, voiding contracts due to poor performance is nearly impossible.[1] Player shirking can occur as a result of this high level of job security. A vast literature presents evidence of shirking by MLB players in the early years of multi-year contracts.[2]

Beyond failing to conform to standards of "good sportsmanship and good citizenship", there are a few ways in which players can shirk in their preparation and performance. The most obvious way in which a player can shirk is by failing to exert effort during within-game performance. For example, managers are frequently upset with players over not running hard to first base after hitting a ground ball. Players may also shirk on their contractual responsibilities by exerting low levels of effort in their off-field preparation. There are two times periods where a player can fail to exert high effort in off-field preparation. During the off-season, a player may

choose not to keep up with his normal fitness regimen or diet, and consequently he may arrive to spring training in poor physical shape. Players may also fail to exert high effort in between-game preparation. As teams play 162 games over a 6-month period, time between games is limited. This time can be used to study upcoming opponents, practice, and condition. Players may engage in other activities during this time, such as staying out late, drinking alcohol, using drugs, or eating poorly, that could impair their upcoming performance. Anecdotal evidence, including statements made during interviews of former and current players across professional sports in the United States, suggests that engagement in such behaviors does occur. To this point, while there is a literature identifying shirking by players under multi-year contract, little work has been done to identify in which ways shirking manifests itself.[3]

The focus of this paper will be to identify whether shirking by players with job security occurs in between-game preparation. Specifically, this paper will look to answer the question, "Do MLB players under multi-year contract shirk in between-game preparation?" Variation in the number of years remaining on player contracts is important for identifying shirking behavior. Exerting effort is costly to players. As the use of incentive pay in MLB is minimal,[4] current earnings are not closely tied to current performance. However, as current performance will impact future contract offers, teams discount performance further in the past. Most players want to play beyond their current contracts, providing a strong incentive to exert high effort as the end of their contracts near. To answer this study's research question, the following steps will be taken using a sample of player-game level observations. Following Paulsen (2019), a player fixed-effects strategy is used to identify an inverse relationship between years remaining on a player's contract and performance. While teams play almost every day during the baseball season, variation in the timing of games is used to identify games where players have longer or

shorter time for preparation between games. Using a regression differences-in-differences estimation strategy, this paper finds an inverse relationship between years remaining and performance when players have short rest, but not when they have long rest. A triple-difference estimation strategy is used to find that this differential performance is due to preparation between games played within cities with active "night-life" scenes, or "party" cities. This party-city effect is driven by players under 30, unmarried, and without children. These findings suggest that preparation between games is one avenue through which players under multi-year contract shirk. Further, this party city effect is found only for players on the home team, not the visiting team, suggesting that monitoring may play a role in between-game shirking.

Since there are a handful of papers in the literature addressing shirking using Major League Baseball data, it is important to call attention to this study's contributions. The primary contribution of this work is in providing evidence of one specific mechanism through which players shirk. While past literature has identified an inverse relationship between the number of years remaining on a player's contract and performance, shirking could take place during the off-season, between games, or during games. Using variation in the amount of time between consecutive games, this study finds evidence of player shirking between games. This work also adds to the literature on the role of monitoring in mitigating shirking behavior. For games taking place in "party cities", shirking is driven by those players on the home team, whose time between games is not monitored as closely as that of players on the road team.

Literature

Contracts and Performance in Major League Baseball

Major League Baseball is a ripe setting for understanding how contract design motivates worker performance. Unlike most work settings, both contract and performance data are readily

available, and contracts vary along multiple dimensions. As a consequence, a number of papers have looked to understand how player effort varies throughout the course of multi-year contracts. Multiple authors have looked to identify whether the job security associated with having multiple years remaining on a contract causes diminished performance. Over time, measures of individual performance in MLB have improved, as have the empirical methodologies employed in this literature. Early works in this area, including Lehn (1982), Krautmann (1990), Scoggins (1993), and Krautmann (1993), found mixed results, primarily due to differences in empirical methodology and approaches that failed to sufficiently control for selection into multi-year contracts. Lehn (1982) measured productivity using player injury, while Krautmann (1990), Scoggins (1993), and Krautmann (1993) used Slugging Average. More recent works, including Hakes and Turner (2008), Krautmann and Donley (2009), Krautmann and Solow (2009), and Paulsen (2019), took improved approaches to addressing selection into multi-year contracts and found evidence of diminished player performance, or shirking, under multi-year contracts. Hakes and Turner (2008), Krautmann and Donley (2009), and Krautmann and Solow (2009) measured productivity using On-Base Plus Slugging Average, while Paulsen (2019) used Wins Above Replacement. While evidence is presented consistent with shirking behavior, little is done to address how shirking manifests in MLB.

A related literature surrounding contracts and performance in the MLB looks at the other side of the shirking question, asking whether players behave opportunistically and perform at an abnormally high level in the final year of a contract. Like the shirking literature, some works within this literature, including Harder (1991) and Maxcy et. al. (2011), found mixed results, while more recent papers using improved identification strategies, including Martin et. al. (2011)

and O' Neill (2013), found evidence consistent with opportunistic behavior by MLB players in the final year of their contract.

Beyond work looking at the effects of contract length and years remaining on performance, a small literature has begun to arise looking at other contract stipulations. Krautmann (2018) looked at contract extensions, which are contracts that are renegotiated prior to the end of a player's current contract with his team. Krautmann (2018) explored when contracts options should be used, and how they are used, finding that these contracts are being used most commonly by teams signing top players before they have reached free agency. Paulsen (2018) looked at contract options, which are contract components that specify an additional year or years of contract negotiated between a player and his team that may become guaranteed at the end of a contract at the discretion of the player, team, or both. Paulsen (2018) found that club options, those options where a contract can be extended at the discretion of the team, lead to diminished player performance.

Shirking Outside of Major League Baseball

Shirking has also been studied in settings beyond the MLB. One such setting has been in other professional sports. Berri and Krautmann (2006) have found evidence of shirking in the National Basketball Association. Frick (2011) has found evidence of opportunistic behavior by German professional soccer players.

Shirking has also been studied outside of professional sports. One such setting where shirking has received attention is in tenure for schoolteachers and college professors. Hansen (2009), Jacob (2013), and Jones (2015) have found tenure to be associated with increases in absenteeism among school teachers. Some evidence of a fall in publishing with age and following tenure has been found for professors (Holley, 1977; Levin and Stephan, 1991; Faria

and McAdam, 2015). Law changes making it more difficult for employers to fire employees have also been found to lead to increases in absenteeism (Ichino and Riphahn, 2005; Scoppa, 2010).

Sleep, Alcohol, and Employee Performance

As discussed previously, there are multiple reasons why time spent between games may be important for MLB player performance. One reason this time may be important is that the player may use it to physically or mentally prepare for the upcoming game or games. Physically, the player may use this time to take batting practice, lift weights, or in other ways prepare for the upcoming game. Mentally, the player may watch film or study the opposing pitchers or hitters in other ways. This time may also be important due to other activities the player can engage in, which may affect ability to perform at the highest level. Anecdotal evidence suggests that there is a party culture surrounding professional athletics.[5] Literature around two factors that may be influenced by this culture, alcohol consumption and sleep, will be discussed.

Studies on the impact of alcohol consumption on work performance generally find either negative impacts or insignificant effects. In a review article of studies looking at the impact of alcohol consumption and subsequent work performance, Thorrisen et. al. (2019) found that a majority of studies found a negative relationship between alcohol consumption and work performance. Two review articles on the effects of alcohol consumption on athletic performance found that small levels of alcohol consumption are associated with little impact on athletic performance in the short term, although this impact varies with the level of alcohol consumption (Shirreffs and Maughan, 2006; Barnes, 2014). An experimental study looking at the impact of alcohol consumption on the subsequent performance of rugby players found that alcohol consumption had a negative impact on countermovement jump performance in the days

following consumption, but no impact on other performance measures (Barnes, Mundel, and Stannard, 2012).

The literature on sleep and athletic performance is much more decisive, suggesting that poor sleep leads to poor athletic performance. Two review articles found that athletes generally do not get enough sleep prior to important games, and that poor sleep is associated with poor performance (Fullagar et. al., 2015; Watson, 2017). Three experimental articles found that poor sleep leads to poor performance across multiple sports settings, including collegiate basketball (Mah et. al., 2011), tennis (Reyner and Horne, 2013), and women's gymnastics (Silva and Paiva, 2016).

Data and Empirical Methodology

The aim of this study is to understand whether MLB players shirk in between-game preparation in their early years of multi-year contracts. Game level data for the 2015 to 2017 seasons will be used in answering this question. Game level data comes from DailyBaseballData.com (DailyBaseballData.com, 2015-2017). This data contains player level information related to performance, team and opponent information, and game information including time, location, and weather. Yearly contract data comes from the Cot's Baseball Contracts website (Cot's Baseball Contracts, 2015-2017). This website contains player level data on contract length, salary, and other contract terms. Player demographic data comes from baseballdatabank.org (baseballdatabank.org, n.d.).

Before testing whether players shirk between games, it is important to establish that evidence of shirking is present in the data. Following Paulsen (2019), a player fixed-effects regression will be used to test for shirking by players under multi-year contracts. As it is difficult to directly measure effort, a measure of player performance will be used as the dependent

variable, under the assumption of a direct relationship between effort and performance.[6] Performance will be measured using the Basic Weighted On-Base Average (wOBA) formula (Zimmerman, 2015). A measure of offensive performance, a higher wOBA is interpreted as a stronger performance, and a lower wOBA is interpreted as a weaker performance.[7] The key independent variable is Contract Years Left, which will be given as the number of seasons remaining on a player's contract at the start of the MLB season. Shirking is inferred if a causal relationship between Contract Years Left and wOBA is identified, where the expected relationship between Contract Years Left and wOBA is negative. To test for evidence of shirking, regressions are run of the form

$$PERFORMANCE_{ijt} = \beta_0 + \beta_1 YEARSLEFT_{it} + \beta_{\boldsymbol{X}} \boldsymbol{X}_{ijt} + \alpha_i + \varepsilon_{ijt},$$

where *PERFORMANCE* will be measured using *wOBA* and *YEARSLEFT* is the number of years remaining on the player's contract, $\boldsymbol{X}$ is a vector of control variables which include age, age squared, game temperature in degrees Fahrenheit, and game wind speed in miles per hours, and α_i is the individual fixed effect. The subscript *i* indexes players, *j* indexes games, and *t* indexes seasons.

Variation in the timing of games allows for the identification of an impact of between-game shirking. The MLB regular season consists of 162 games played over a 6-month period. This means that teams will play more than 6 games per week on average. When teams do have days off, these days are frequently used for long-distance travel. Starting position players (non-pitchers) typically play in each game with rest occurring infrequently. While starting position players play almost every day, the amount of time between consecutive games to prepare for the upcoming game will vary based on game start times. Game start times vary between 1 p.m. local time and 8 p.m. local time, with the majority of games starting shortly after 1 p.m. or shortly

after 7 p.m. local time. As games last approximately 3 hours on average, a day game following a night game would allow for less than 16 hours of rest, while a night game following a day game would allow for over 27 hours of rest. If between game preparation matters for in-game performance, spending this time effectively should be especially important for games played on short rest and less important for games played on long rest.

A difference-in-differences estimation strategy is used to test for whether shirking occurs between games. One situation where players have an especially long time to prepare between games is when a night game follows a day game. Night games are defined as those games starting after 6 p.m. local time (primarily games starting around 7), while day games are defined as those starting before 6 p.m. local time (primarily those games starting around 1). If players with more years remaining on their contracts are shirking between games, those players should perform relatively worse when time for preparation between games is short when time is more valuable, and better when time between games is long. To test this hypothesis, the sample is restricted to pairs of games where a day game precedes a night game.[8] Regressions are run of the form

$$PERFORMANCE_{ijt} = \beta_0 + \beta_1 YearsLeft_{it} + \beta_2 LongRest_{ij} + \beta_3 YearsLeft_{it} * LongRest_{ij} + \beta_{\boldsymbol{X}} \boldsymbol{X}_{ijt} + \alpha_i + \varepsilon_{ijt},$$

where *LongRest* takes on a value of 1 if the game is a night game following a day game, and 0 if the game is a day game preceding a night game. While β_1 is predicted to be negative, β_3 is predicted to be positive as those players with more time remaining on their contracts are predicted to perform better with long rest, or worse with shorter rest. As player fixed-effects are included in all regressions, the player is serving as his own control in the difference-in-

differences framework. The coefficient, β_3, captures within player variation in the impact of the number of years remaining on a contract on performance under short or long rest.

Descriptive statistics are presented in Table 1, first for the full sample, then for the restricted sample. The full sample includes all game observations for non-pitchers who participated as hitters in games from 2015 to 2017 and have contract information available.[9] The full sample includes 117,427 player-game observations for 1,009 unique players, so the average player in the sample appears in about 116 games across the three-year period. The average number of years remaining on player contracts at the start of these season is 1.87, and average wOBA is 310.93. The restricted sample includes only those observations for games in which a player is playing in both games of a day game preceding a night game. These games account for about 25 percent of all games in the sample. Note that the average wOBA and contract years remaining is higher for this restricted sample. This likely occurs because those players who are not a part of the team's regular starting lineup play in back-to-back games infrequently, and these players are typically of lower ability and are given shorter contracts than those players who play in the majority of the team's games. However, average age for the two samples is similar, as are average game conditions, which include temperature and wind speed.

Results

To first identify how contract years remaining impacts performance, regressions are run with wOBA as the dependent variable. Specification (1) includes only contract years left as an independent variable, without player fixed-effects. Without the inclusion of player fixed-effects, the coefficient on contract years left is positive and significant. This is likely attributable to positive selection into multi-year contracts, as only the best players are given contracts that are many years in length. In specification (2), following the inclusion of player-fixed effects, the

coefficient on contract years left becomes negative and significant, as predicted. This coefficient increases in magnitude and remains significant with the inclusion of control variables in specification (3). The magnitude of the coefficient on contract years left is relatively large.[10] These findings are consistent with Paulsen (2019) and much of the literature. Among the control variables, the relationship between age and performance follows a quadratic relationship, as would be expected. Hitters perform better when the weather is warmer and wind speeds are higher, which is consistent with what physics would predict. Players also perform better at home, which is consistent with prediction.

To test for shirking between games, a difference-in-differences regression strategy is used. The results are presented in Table 3. Specification (1) in Table 3 presents results similar to those of the specification (3) of Table 2, but with the restricted sample. When restricting the sample, the coefficient on contract years left remains largely unchanged. Specification (2) presents the results of the difference-in-differences regression. Consistent with what was predicted, increases in contract length lead to decreases in performance. The positive and significant coefficient on the interaction term is consistent with what was predicted as well. Specifically, on short rest increases in contract years remaining are associated with decreases in performance. However, when players have long rest, increases in contract years remaining are not significantly associated with decreases in performance. This variation in performance with contract length would be consistent with player shirking between games.

Additional Results and Evidence

The results presented thus far have been consistent with player shirking between games. However, these results would also be consistent with another type of shirking, shirking during the off-season. If players shirk in their off-season preparation, it is possible that this would lead

to worse performance on short rest and better performance on long rest if rest between games is important for the body's recovery. In this section, evidence will be presented that would suggest that poor off-season preparation is not driving the presented results, and rather that these results are being driven by shirking between games.

If player shirking in preparation during the off-season is driving the difference in performance on short and long rest for players with more years remaining on their contracts, this difference should vary across the season. Specifically, as players who enter the season underprepared move along through the long MLB season, rest between games should become increasingly more important. To test this hypothesis, differences in performance between games will be examined in the first half and second half of the season. First, the sample from specification (2) of Table 3 will be split into games played in the first half of the season and games played in the second half. Second, a triple-differences estimation technique will be used. The triple-differences regression equation will be:

$$PERFORMANCE_{ijt} = \beta_0 + \beta_1 YearsLeft_{it} + \beta_2 LongRest_{ij} + \beta_3 FirstHalf_{ij} + \beta_4 YearsLeft_{it} * LongRest_{ij} + \beta_5 YearsLeft_{it} * FirstHalf_{ij} + \beta_6 LongRest_{ij} * FirstHalf_{ij} + \beta_7 YearsLeft_{it} * LongRest_{ij} * FirstHalf_{ij} + \beta_X \boldsymbol{X}_{ijt} + \alpha_i + \varepsilon_{ijt},$$

where *FirstHalf* is a binary variable which takes on a value of 1 if the game takes place during the first half of the MLB season. The coefficient of interest in the regression is β_7, on the triple difference interaction term. If rest between games matters more for players under longer contract as the seasons wears on, this coefficient should be negative and significant. Additionally, β_5 would likely be negative if shirking takes place during the off-season as the player's physical conditioning improves throughout the course of the season.

Regression results testing for whether differential performance between games is driven by off-season preparation are presented in Table 4. Specifications (1) and (2) split the sample into the first and second half of seasons. In each case the coefficients on the interaction term is positive and significant. While the coefficient is slightly larger in the second half, the difference in the coefficients is not significantly different. Specification (3) presents results of the triple difference specification. The coefficient on the triple difference interaction term is not statistically significant. These results taken collectively do not provide support for the differential performance between short and long rest of players under longer contract being driven by off-season preparation. Additionally, the coefficient on the contract years left and first half interaction in the triple difference specification is not statistically significant as would likely be the case if players shirk in off-season preparation.

To provide further evidence that players shirk in between game preparation, additional evidence will be presented consistent with shirking between games. One reason rest between games may be important is that players may engage in undesirable behaviors during this time. Anecdotal evidence from player interviews across sports would suggest that players may party between games. Partying behavior could be detrimental to player performance for multiple reasons. Partying may involve consuming alcohol or other substances that can impair performance (Shirreffs and Maughan, 2006; Barnes, Mundel, and Stannard, 2012; Barnes, 2014). A second reason is that partying may consume time that could be used to sleep or prepare in other ways, and sleep is important for performance (Mah et. al., 2011; Reyner and Horne, 2013; Silva and Paiva, 2016). How likely a player is to engage in partying behavior is likely to vary across cities. The quality of the nightlife of the home city varies across MLB games. Some teams play in cities with active nightlives and partying reputations, like Los Angeles (Dodgers and

Angels) and New York City (Yankees and Mets). Others play in cities less known for their nightlives, like Milwaukee (Brewers) and Minneapolis (Twins).

If partying behavior is driving shirking between games, having sufficient rest between games should be more important when a player is playing in a city more conductive to partying. To test this hypothesis, differences in performance between games will be examined in party cities and non-party cities. Party cities will be defined as those listed in the Skyscanner list of the 10-best nightlife cities in the United States.[11] In order from 1 to 10, the list is Miami, New Orleans, Las Vegas, Houston, New York, San Diego, Los Angeles, Austin, Philadelphia, and Chicago. As such, any home game played by the Marlins, Astros, Yankees, Mets, Padres, Angels, Dodgers, Phillies, Cubs, or White Sox are classified as games played in party cities. First, the sample will be split into those games played in party cities and those games played in non-party cities. Second, a triple-differences estimation technique will be used. The triple-differences regression equation will be:

$$PERFORMANCE_{ijt} = \beta_0 + \beta_1 YearsLeft_{it} + \beta_2 LongRest_{ij} + \beta_3 PartyCity_{ij} + \beta_4 YearsLeft_{it} * LongRest_{ij} + \beta_5 YearsLeft_{it} * PartyCity_{ij} + \beta_6 LongRest_{ij} * PartyCity_{ij} + \beta_7 YearsLeft_{it} * LongRest_{ij} * PartyCity_{ij} + \beta_X \boldsymbol{X}_{ijt} + \alpha_i + \varepsilon_{ijt},$$

where *PartyCity* is a binary variable which takes on a value of 1 if the game takes place in a party city. The coefficient of interest in the regression is β_7, on the triple difference interaction term. If rest between games matters more for games played in party cities, this coefficient should be positive and significant.

Table 5 presents results testing for whether long rest for players under longer contracts matters more for games played in party cities. Specifications (1) and (2) split the sample into

games played in party cities and games played in non-party cities. The coefficient on the interaction of years left and long rest is positive and significant for games played in party cities, but insignificant for games played in non-party cities. The third specification then tests this difference using a triple-differences estimation. As predicted, the coefficient on the triple-difference interaction term is positive and significant, indicating that having long rest between games matters more in party cities for those players under longer contracts. The impact of long rest for those under longer contracts is not statistically different from zero for those games not played in party cities. This finding suggests that one avenue through which players under longer contract shirk is in their preparation between games.

To provide further support for this party city effect, the sample is split by age, marital status, and whether a player has children. MLB players vary in age from early 20s to early 40s, with most players falling between 25 and 35. If partying behavior is driving player shirking between games, one would expect that it is the relatively young players in the sample that are driving this finding. Similarly, one would expect the party city effect to be driven by players who are unmarried and don't have children. While this data is not readily available, internet searches were performed to collect this data. To test these hypotheses, the sample is split into players under 30 and 30 and above,[12] married and unmarried, and with and without children. Table 6 presents these results. For the sample of players under 30, the triple difference coefficient is positive and significant. For the sample of players 30 and above, this coefficient is insignificant. The triple difference coefficient is also positive and significant for unmarried players, but insignificant for married players. Similarly, the triple difference coefficient is positive and significant for players without children, while insignificant for those with children. These results would suggest that the party city effect found in Table 5 is driven by those players under 30,

those unmarried, and those without children, the samples of players more likely to be partying between games.

Monitoring and Player Performance

One way through which management can try to mitigate employee shirking is through monitoring. In the context of Major League Baseball, a few recent works look at performance and monitoring of MLB umpires. Works by Mills (2017) and Bradbury (2019) find that improvements in strike-zone monitoring technology lead to improvements in umpire performance and reductions in umpire shirking in MLB. Paulsen (2019) finds no evidence of shirking by MLB pitchers, whose performances are closely monitored, but evidence of shirking by MLB non-pitchers, whose performances are less closely monitored.

When looking at between game preparation across party and non-party cities, monitoring is likely to discourage undesirable behavior like going out, staying up late, drinking alcohol, or eating poorly. The level of player monitoring for games played in party cities will differ greatly between those players playing for the home team and those playing for the visiting, or road, team. Players on the home time spend nights between games at home, returning to a house or apartment following a game. Visiting teams stay together in a hotel when traveling for road games. As a result, it should be relatively easy for a visiting team to monitor its player's behaviors between games. The team can learn if any given player stays out late. Because the home team's players head home for the night between home games, monitoring how that time is spent is much more difficult. As a result, players on the home team should have a much easier time engaging in undesirable behavior than players on the visiting team.

The hypothesis that shirking between games in party cities is driven by players on the home team is tested in Table 7. Specification (1) includes only players playing games at home.

Specification (2) includes only players playing games on the road. The coefficient on the triple-difference term is the first specification is large, positive and statistically significant. In the second specification, this coefficient is insignificant. These results would suggest that it is those players on the home team, whose time between games in not closely monitored, that are driving the party city effect found in Table 5. This result would support the notion that monitoring of players is an important factor for limiting potential shirking by those players with job security.

While the triple-difference interaction term is not significant for visiting players, the coefficient on the interaction of years left and long rest is positive and significant. This would suggest that there is still between-game shirking by visiting players, but that it takes a different form than shirking by home team players. While monitoring may deter visiting players from going out to party while on the road, it is still possible that those players engage in undesirable behaviors in their rooms between games. These players may stay up late watching television rather than getting sufficient sleep or spending sufficient time preparing for tomorrow's starting pitcher.

Conclusions

Despite a literature having arisen on the impact of contract length and performance in MLB, teams continue to sign the league's best players to increasingly long contracts with total nominal values in the hundreds of millions of dollars. In the months leading up to the 2019 season, Mike Trout, Manny Machado, and Bryce Harper signed new contracts that combined to total 35 years in length and more than one billion dollars in nominal value.[13] To best understand how to mitigate the disincentive effect of having high levels of job security, teams must understand not just that shirking occurs, but also how the shirking occurs. Shirking may occur through diminished on-field effort during games, in maintenance of physical fitness and baseball

skills during the off-season, or in preparation and focus between games throughout the course of the season. Understanding when and where shirking occurs can help teams in targeting resources for monitoring in the most effect ways possible.

The focus of this paper is on identifying whether players with greater job security shirk in their preparation between games. Using game level data, this study finds evidence of a causal connection between increases in years remaining on player contracts and player performance when the player is playing on short rest, but not on long rest. Using a triple-difference specification, evidence is found that this differential performance by length of rest occurs for games played in party cities. This would suggest that one mechanism through which increased job security may lead to poor player performance is through increased partying behavior between games. The sample is split between players under 30 and 30 and older, married and unmarried, and with and without children, and this party game effect is found to be driven by those players under 30, unmarried, and without children. Further evidence is presented which would also suggest that monitoring is an important factor for limiting shirking between games. Party city shirking is found to be driven by players on the home team who end the night at home, rather than visiting players who end the night at the same hotel as the rest of the team and management. Evidence of shirking by visiting players is still found, but this shirking is consistent whether or not the game takes place in a party city.

While the awarding of long, costly contracts to the league's best players may be necessary for teams to attract and maintain the league's best players, the findings of this paper can help to inform management on how to mitigate shirking behavior. Shirking between games by players with job security should be of greater concern to teams that play home games in party cities. One suggestion for how to mitigate such shirking behavior is to use incentive pay to

motivate performance during home games. Fans of a team are more likely to attend home games than road games, so motivating strong performance at home may be an optimal strategy whether or not a player has job security. Teams may also consider devising ways to more closely monitor how players spend their time between games when playing at home. Team dinners, meetings, or practices may be relatively unobtrusive ways to keep players from engaging in undesirable behaviors.

Notes

1. I am unaware of any instances of contracts being voided due to poor performance. Poor performing players are commonly designated for assignment (DFA). If a player is DFA, other teams first have an opportunity to claim the player's contract. If no opposing team's claim the player, the player is sent to the minor leagues, but still paid out the remainder of the MLB contract.
2. Papers finding an inverse relationship between contract length and performance (typically individual measures of offensive performance) in MLB include Lehn (1982), Scoggins (1993), Hakes and Turner (2008), Krautmann and Solow (2009), Krautmann and Donley (2009), and Paulsen (2019).
3. Paulsen (2019) is a notable exception. Shirking is identified as occurring for non-pitchers but not pitchers. It is suggested that this may be due to either a shorter off-season for pitchers or due to less in-game opportunity to exert low effort. Within performance by non-pitchers, shirking is identified as occurring only in offensive performance, not defensive. It is suggested that this could be due to either low in-game effort or poor preparation between games.
4. The majority of player contracts do not have any performance incentives. Performance incentives occur more frequently in multi-year contracts than in one-year contracts, but these incentives are small relative to the guaranteed salary. As an example, Giancarlo Stanton's 13-year, $325 million contract has performance incentives which could add up to $1 million to his salary yearly.
5. As an example, in a March 2019 episode of "Jalen and Jacoby", Jalen Rose discusses his opinion that Rob Gronkowski, a National Football League player known also for his partying

behavior, partied at a level that was 'tame' relative to other great athletes. This discussion can be seen at https://www.youtube.com/watch?v=ey_7tdJK3Fs.

6. The finding of a "contract year" effect in baseball would suggest that effort does have a positive impact on performance. See Martin et. al. (2011) and O'Neill (2013).
7. The basic wOBA formula is discussed in detail at https://blogs.fangraphs.com/instagraphs/basic-woba-equation/.
8. As an example, suppose a plays the following 7 games in a week: night, night, day, night, night, day, night. The restricted sample would include both day games and the night games directly following the day games. As night games make up over 65% of the sample, the majority of days games are preceded by night games. A small percentage of day games are preceded by a day off, which is usually used for travel between cities. While most travel occurs on days off, travel sometimes occurs on a day where a day game is preceding a night game. This possibility works against finding significant results in the difference-in-differences regression.
9. Games that were either the first or second game of a double header were excluded from the analysis. Double headers are not a part of a team's normal schedule. They only occur to make up games that are cancelled due to rain.
10. According to fangraphs.com, wOBA around or below 290 if awful, around 300 is poor, are 310 is below average, around 320 is average, around 340 is above average, around 370 is great, and around or above 400 is excellent. A three year increase in contract years left would decrease wOBA by about 10 points, which is the difference between poor and below average, or below average and average performance.

11. This list can be found at https://www.skyscanner.com/tips-and-inspiration/10-best-nightlife-cities-united-states. Table A1 in the appendix presents comparable results to those presented in Table 5 using alternative definitions of party city.
12. The results presented in Table 6 are similar if the sample is split into those 30 and below and those above 30. While average age for the restricted sample is 28.4, the average age for those players in multi-year contracts in this sample is 30.4. As a result, splitting the sample at 30 more evenly splits the sample of multi-year contracts.
13. Mike Trout signed a contract extension which extended his current contract by 12 years and added approximately$430 million in nominal value. Bryce Harper signed a new contract at $330 million in nominal value over 13 years. Manny Machado signed a new contract at $300 million in nominal value over 10 years.

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Tables

TABLE 1
Summary Statistics

Variable	All Games	Restricted Sample
wOBA	310.93	332.11
	(0.77)	(1.59)
Contract Years Left	1.87	2.01
	(0.00)	(0.01)
Age	28.50	28.42
	(0.01)	(0.02)
Temperature (degrees F)	73.65	73.49
	(0.03)	(0.06)
Wind Speed (miles per hour)	7.48	7.51
	(0.01)	(0.03)
N	117,427	27,169
Unique Players	1,009	589

Note: Standard errors are in parenthesis. The restricted sample includes only those players playing in games where a day game is followed by a night game.

TABLE 2
Full Sample Regression Results

Variable	wOBA	wOBA	wOBA
	(1)	(2)	(3)
Contract Years Left	6.18***	-2.93***	-3.54***
	(1.20)	(0.96)	(0.99)
Age			38.46***
			(10.57)
Age Squared			-0.62***
			(0.18)
Temperature (degrees F)			0.69***
			(0.08)
Wind Speed (miles per hour)			0.50***
			(0.17)
Home			13.94***
			(1.64)
Right Handed Pitcher			-0.02
			(2.00)
Player Fixed Effects	No	Yes	Yes
Opponent Fixed Effects	No	No	Yes
R-squared within	0.002	0.000	0.005
N	117,427	117,427	117,427

Note: Standard errors are in parenthesis. Heteroskedasticity robust standard errors, clustered on the player, are used. * indicated $p < 0.1$, ** indicates $p < 0.05$, *** indicates $p < 0.01$.

TABLE 3
Short versus Long Rest Regression Results

Variable	wOBA (1)	wOBA (2)
Contract Years Left	-3.64*	-6.03***
	(2.07)	(2.33)
Long Rest		-17.90***
		(4.82)
Contract Years Left * Long Rest		4.78**
		(1.87)
Age	61.83***	61.81***
	(18.27)	(18.27)
Age Squared	-1.00***	-1.00***
	(0.32)	(0.32)
Temperature (degrees F)	0.54***	0.53***
	(0.17)	(0.17)
Wind Speed (miles per hour)	0.88**	0.87**
	(0.35)	(0.35)
Home	10.71***	10.37***
	(3.31)	(3.32)
Right Handed Pitcher	-0.61	-0.80
	(3.86)	(3.87)
Player Fixed Effects	Yes	Yes
Opponent Fixed Effects	Yes	Yes
P-value on test of $\beta_1 + \beta_3$		0.576
R-squared within	0.006	0.006
N	27,169	27,169

Note: Standard errors are in parenthesis. Heteroskedasticity robust standard errors, clustered on the player, are used. * indicated p < 0.1, ** indicates p < 0.05, *** indicates p < 0.01.

TABLE 4
Early versus Late Season Regression Results

Variable	First Half wOBA (1)	Second Half wOBA (2)	Triple Diff wOBA (3)
Contract Years Left	-4.15	-7.72***	-7.03***
	(3.20)	(2.91)	(2.42)
Long Rest	-12.80**	-22.77***	-23.61***
	(6.33)	(7.03)	(7.05)
First Half			-5.72
			(7.20)
Contract Years Left * Long Rest	4.11*	5.45**	5.55**
	(2.27)	(2.67)	(2.65)
Contract Years Left * First Half			1.85
			(2.71)

Long Rest * First Half			10.75
			(9.22)
Contract Years Left *			-1.43
Long Rest * First Half			(3.19)
Age	49.09*	82.06***	61.82***
	(28.35)	(25.19)	(18.29)
Age Squared	-0.74	-1.38***	-1.00***
	(0.32)	(0.44)	(0.32)
Temperature (degrees F)	0.45*	0.91***	0.56***
	(0.23)	(0.32)	(0.18)
Wind Speed (miles per	0.87*	1.06*	0.86**
hour)	(0.45)	(0.57)	(0.35)
Home	5.81	17.38***	10.33***
	(4.40)	(4.67)	(3.32)
Right Handed Pitcher	-4.52	2.60	-0.87
	(5.15)	(5.85)	(3.88)
Player Fixed Effects	Yes	Yes	Yes
Opponent Fixed Effects	Yes	Yes	Yes
R-squared within	0.008	0.008	0.006
N	14,489	12,680	27,169

Note: Standard errors are in parenthesis. Heteroskedasticity robust standard errors, clustered on the player, are used. * indicated $p < 0.1$, ** indicates $p < 0.05$, *** indicates $p < 0.01$.

TABLE 5
Party City Regression Results

Variable	Party City wOBA (1)	Non-Party City wOBA (2)	Triple Diff wOBA (3)
Contract Years Left	-8.16**	-4.74	-5.36**
	(4.00)	(2.97)	(2.63)
Long Rest	-18.02**	-15.87***	-15.94***
	(8.29)	(5.49)	(5.51)
Party City			-8.65
			(8.02)
Contract Years Left *	8.34***	2.51	2.54
Long Rest	(2.74)	(1.82)	(1.85)
Contract Years Left *			-1.70
Party City			(2.46)
Long Rest * Party City			-4.72
			(9.77)
Contract Years Left *			6.27**
Long Rest * Party City			(3.10)
Age	66.91*	56.29**	61.73***
	(37.17)	(22.06)	(18.27)
Age Squared	-1.08*	-0.89**	-0.99***
	(0.65)	(0.38)	(0.32)

Temperature (degrees F)	0.93***	0.37*	0.54***
	(0.32)	(0.21)	(0.17)
Wind Speed (miles per hour)	1.10	0.72*	0.87**
	(0.69)	(0.42)	(0.35)
Home	-7.07	12.99***	10.21***
	(9.88)	(4.69)	(3.31)
Right Handed Pitcher	-4.64	1.68	-0.92
	(7.10)	(4.88)	(3.87)
Player Fixed Effects	Yes	Yes	Yes
Opponent Fixed Effects	Yes	Yes	Yes
R-squared within	0.010	0.007	0.006
N	8,772	18,397	27,169

Note: Standard errors are in parenthesis. Heteroskedasticity robust standard errors, clustered on the player, are used. * indicated $p < 0.1$, ** indicates $p < 0.05$, *** indicates $p < 0.01$.

TABLE 6
Party City Over Supporting Evidence Regression Results

Variable	Under 30 wOBA	30 and Over wOBA	Unmarried wOBA	Married wOBA	No Children wOBA	Children wOBA
	(1)	(2)	(3)	(4)	(5)	(6)
Contract Years	-5.96	-6.64*	-1.81	-7.99**	-9.08**	-3.93
Left	(3.91)	(3.75)	(5.02)	(3.13)	(4.29)	(3.00)
Long Rest	-17.68**	-12.42	-13.73*	-17.61**	-17.68**	-14.91*
	(6.90)	(9.49)	(7.92)	(7.59)	(7.33)	(8.17)
Party City	-9.62	-10.70	0.91	-15.70	-8.96	-10.83
	(9.28)	(15.06)	(11.55)	(11.84)	(9.63)	(14.20)
Contract Years	3.50	1.16	3.82	1.66	5.68**	0.67
Left * Long	(2.80)	(2.65)	(2.45)	(2.52)	(2.80)	(2.22)
Rest						
Contract Years	-1.58	-0.77	-2.28	-1.15	-1.54	-0.87
Left * Party City	(2.99)	(4.35)	(3.16)	(3.96)	(2.82)	(4.07)
Long Rest *	-10.09	11.85	-12.65	8.28	8.83	7.26
Party City	(11.74)	(17.66)	(13.78)	(14.04)	(12.29)	(16.04)
Contract Years	7.52**	1.43	8.71**	0.85	6.29*	2.69
Left * Long	(3.72)	(5.16)	(3.54)	(4.81)	(3.42)	(5.19)
Rest * Party						
City						
Age	-11.76	42.82	51.68	75.20***	54.35*	74.15**
	(41.80)	(70.32)	(34.80)	(26.02)	(31.20)	(33.43)
Age Squared	0.45	-0.75	-0.83	-1.24***	-0.81	-1.22**
	(0.81)	(1.07)	(0.65)	(0.44)	(0.58)	(0.54)
Temperature	0.50**	0.60**	0.39	0.67***	0.62**	0.42*
(degrees F)	(0.22)	(0.28)	(0.27)	(0.23)	(0.25)	(0.24)
Wind Speed	0.77*	1.09*	0.89*	0.88*	0.60	1.25**
(miles per hour)	(0.43)	(0.64)	(0.52)	(0.47)	(0.47)	(0.53)

Home	12.61***	5.72	13.12**	7.30*	14.73***	4.26
	(4.20)	(5.49)	(5.26)	(4.18)	(4.59)	(4.72)
Right Handed Pitcher	-2.37	0.78	1.76	-3.15	3.24	-4.95
	(5.08)	(5.71)	(6.00)	(5.09)	(5.38)	(5.62)
Player Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Opponent Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
R-squared within	0.008	0.008	0.008	0.009	0.009	0.006
N	17,243	9,926	11,719	15,450	14,569	12,600

Note: Standard errors are in parenthesis. Heteroskedasticity robust standard errors, clustered on the player, are used. * indicated $p < 0.1$, ** indicates $p < 0.05$, *** indicates $p < 0.01$.

TABLE 7
Party City Home versus Visiting Regression Results

Variable	Home wOBA (1)	Visiting wOBA (2)
Contract Years Left	-4.98	-4.91*
	(3.51)	(3.76)
Long Rest	-15.13*	-17.17**
	(7.94)	(8.18)
Party City	0.36	23.34
	(17.79)	(18.53)
Contract Years Left * Long Rest	-0.18	5.49**
	(2.34)	(2.77)
Contract Years Left * Party City	-6.32	0.35
	(5.72)	(3.35)
Long Rest * Party City	-5.63	-3.16
	(13.92)	(14.20)
Contract Years Left * Long Rest * Party City	11.79***	-0.28
	(4.37)	(4.39)
Age	69.66**	49.51**
	(28.09)	(23.22)
Age Squared	-1.20**	-0.72*
	(0.49)	(0.41)
Temperature (degrees F)	1.05***	0.15
	(0.25)	(0.24)
Wind Speed (miles per hour)	1.19**	0.26
	(0.55)	(0.54)
Right Handed Pitcher	-2.08	-0.46
	(5.89)	(5.26)
Player Fixed Effects	Yes	Yes
Opponent Fixed Effects	Yes	Yes
R-squared within	0.009	0.008

N	13,431	13,738

Note: Standard errors are in parenthesis. Heteroskedasticity robust standard errors, clustered on the player, are used. * indicated $p < 0.1$, ** indicates $p < 0.05$, *** indicates $p < 0.01$.

Appendix

A. Additional Table

TABLE A1
Robustness Party City Regression Results

Variable	PC 2 wOBA	NPC 2 wOBA	PC 3 wOBA	NPC 3 wOBA	PC 4 wOBA	NPC 4 wOBA
Contract Years	-5.27	-6.02**	-8.89*	-4.98*	-5.13	-5.82**
Left	(4.54)	(2.88)	(4.98)	(2.88)	(3.78)	(2.97)
Long Rest	-18.13**	-15.07***	-13.97	-16.38***	-21.08***	-14.34***
	(9.12)	(5.14)	(9.76)	(5.07)	(7.90)	(5.58)
Contract Years	8.29***	2.52	7.52**	2.90*	8.78***	2.08
Left * Long Rest	(3.18)	(1.75)	(3.41)	(1.68)	(2.58)	(1.90)
Age	70.35*	57.04***	95.66**	49.06**	48.33	65.72***
	(39.01)	(21.82)	(44.66)	(20.80)	(33.44)	(23.24)
Age Squared	-1.17*	-0.91**	-1.57**	-0.78**	-0.79	-1.04***
	(0.68)	(0.38)	(0.78)	(0.36)	(0.58)	(0.40)
Temperature	0.89***	0.49**	0.93***	0.46**	0.89***	0.40*
(degrees F)	(0.30)	(0.22)	(0.33)	(0.20)	(0.29)	(0.22)
Wind Speed	0.67	0.82**	0.82	0.91***	1.04	0.61
(miles per hour)	(0.77)	(0.41)	(0.85)	(0.43)	(0.65)	(0.44)
Home	-16.22	12.13***	-22.86*	11.88***	-4.26	13.46***
	(11.27)	(4.40)	(11.91)	(4.26)	(9.07)	(4.85)
Right Handed	-8.28	2.61	-7.44	2.50	-5.63	1.77
Pitcher	(7.22)	(4.88)	(7.84)	(4.55)	(6.64)	(5.16)
Player Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Opponent Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
R-squared within	0.008	0.007	0.010	0.006	0.009	0.007
N	7,880	19,289	6,985	20,184	9,667	17,502

Note: Teams included in PC2 are those team playing in cities listed on the U.S. News list of the 10 cities with the best nightlife found here: https://travel.usnews.com/rankings/best-bar-club-scenes-in-the-usa/. Where this list differs from the Skyscanner list is that it includes Boston and San Francisco but does not include Philadelphia or Houston. PC3 includes only those cities on both lists. PC4 includes cities appearing on either list. Standard errors are in parenthesis. Heteroskedasticity robust standard errors, clustered on the player, are used. * indicated $p < 0.1$, ** indicates $p < 0.05$, *** indicates $p < 0.01$.