COVID-19 countermeasures, sporting events, and the financial impacts to the North American leagues

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Abstract
Purpose – The purpose of this paper is to analyze how the coronavirus disease 2019 (COVID-19) countermeasures will affect the financing of the North American leagues. In particular, we focus on the missed revenue from gate receipts for the Big Four leagues.
Design/methodology/approach – The authors forecast the 2020 revenue for each of the four major leagues under two scenarios: (1) expected revenue under the normal conditions of fans in attendance and (2) expected revenues in the absence of fans due to the countermeasures in place. Then, the authors calculate the loss in gate receipts as a difference in the revenue under fans and no-fans scenarios.
Findings – Based on the current estimates, the combined financial loss of the clubs from NFL, MLB, NBA and NHL is expected to be above 6.8bn dollars in gate receipts alone.
Practical implications – The findings are useful to the league management to prepare for the suboptimal financial situation.
Originality/value – To the best of our knowledge, this is the first study that explores the effect of the COVID-19 pandemic across the major league sports leagues in North America.
Keywords Sports finance, North American league, League revenue, Financial impacts of pandemics, COVID-19 and sports
Paper type Research paper

1. Introduction
During the past several months, the global pandemic of coronavirus disease 2019 (COVID-19) has brought unprecedented countermeasures to every sector of the economy, including individuals, groups, institutions and industries. The sports industry is no different. The week of March 9, 2020 brought all sporting events to a halt. The National Basketball Association (NBA) and National Hockey League (NHL) paused their seasons and Major League Baseball (MLB) pushed back opening day. On March 12, the National Collegiate Athletic Association (NCAA) canceled both men’s and women’s college basketball tournaments. The future of the National Football League (NFL) is also uncertain. Right now, every single sports stadium in North America is empty. This is affecting a multi-billion dollar sports industry to an unprecedented level. The NFL, MLB, NBA and NHL make up the “Big Four” leagues in North
America in terms of their annual revenues. Although NBA and NHL have played certain percentages of games for the season, MLB and NFL are yet to begin their season. Leagues that will be unable to play most of their games will have an insurmountable impact.

While the current scenario affects the players and the fans more immediately, it may leave a long-term financial impact to the clubs and the leagues. Estimates show that the pandemic caused by COVID-19 has negatively affected the $160bn sports industry due to missed games, broadcast revenue, gate revenues and salary obligations (Futterman et al., 2020). The MLB can face major losses since it estimates that 40% of its revenues comes from game time experience; therefore, negotiations are being conducted regarding salary cuts for when the games are played without fans (Diamond, 2020). Other sports clubs are going to experience similar financial adversity. While the bigger and more popular leagues may be able to survive, the smaller and less popular sports and leagues are in serious financial trouble. USA Rugby decided to file for Chapter 11 bankruptcy because its financial woes have been exacerbated by the COVID-19 shutdown (ESPN, 2020). The cancellations of many sports events due to the pandemic may cause financial strain for many more leagues and clubs.

In this context, our objective in this paper is to analyze how the COVID-19 countermeasures will affect the financing of the North American leagues. In particular, we focus on the missed revenue from gate receipts for the Big Four leagues. To do so, we forecast the 2020 revenue for each of the four major leagues under two scenarios: (1) expected revenue under the normal conditions of fans in attendance and (2) expected revenues in the absence of fans due to the countermeasures in place. Then, we calculate the loss in gate receipts as a difference in the revenue under fans and no-fans scenarios. To our knowledge, this is the first study that explores the effect of the COVID-19 pandemic across the major sports leagues in North America. This information is useful to the league management to prepare for the suboptimal financial situation. In particular, the estimated financial effects based on projected missed time and previous years’ revenues in this paper will help them formulate an appropriate response that can alleviate the worst-case financial scenario as they accumulate losses from lack of gate revenues, while still facing salary obligations and other expenses.

The remainder of the paper is organized as follows. Section 2 provides a review of the literature pertaining to the effects of adverse shocks to the sports industry in the past. Section 3 presents a description of the data used in the analysis. Section 4 develops an estimation technique and revenue forecasting. Section 5 presents the results. Section 6 discusses results of the empirical test. Section 7 summarizes and concludes.

2. Literature review
In this section, we provide a description of past literature that analyzes the impact of external shocks to the sporting industry. Although no shock in recent history parallels the current suspension of all sporting events; a strategy implemented to halt the transmission of COVID-19, we look at the literature of past lockdowns and strikes for clues about the size of revenue losses incurred when games are canceled. Studies have found that interruptions such as strikes and lockouts affect various aspects of sports including attendance, hotel occupancy rates, workers productivity, salary, consumer demand and revenue (Iqbal, 2019; Bauman, 2018; Ge and Lopez, 2016; Birren, 2014; Baade et al., 2006; Lavoie and Rodriguez, 2005; Staudohar, 2013; Schmidt and Berri, 2004).

One example of a long-term suspension of games is the NHL lockout of 1994. Owners of the NHL wanted to implement a new collective agreement with a payroll tax that acted like a salary cap. The players did not accept the payroll tax, which led to a lockout lasting for 103 days. The lockout ended on January 12, 1995 with owners winning minor concessions. The NHL lost 442 games and billions of dollars in revenue (Miller and Schoepfer, 2017;
A decade later, NHL owners announced a lockout for the 2004–2005 season on September 15, 2004. This lockout occurred due to another salary cap dispute. The lockout remained for 310 days with the NHL missing 1,230 games. The league lost around $2bn in revenue and $1bn in players' salaries (Allen and Brehm, 2005; Staudohar, 2006; Treber et al., 2018). The NHL endured another lockout in 2012–2013. This lockout occurred because the owner and players could not reach a consensus on how the hockey-related revenue is distributed between them. With this lockout, 625 games were canceled, and the league lost a billion dollars in revenue (Strang, 2013; Mirtle, 2010). After both these recent lockouts, attendance was negatively affected, primarily for stronger franchises (Horowitz, 2011).

Strikes in the MLB also occurred for similar reasons. In 1994, team owners wanted a new collective bargaining agreement, introducing certain clauses including salary cap, elimination of salary arbitration, etc. Players rejected the new proposal and went on strike on August 12, 1994. This led to the cancelation of the remainder of the season, including the 1994 World Series. The strike continued for 232 days and canceled 948 games and $1bn in revenue. For years after the strike, the MLB lost attendance for both weak and strong franchises (Blair, 2019; Snyder, 2007; Agha, 2013; Winfree and Fort, 2008; Fuhr, 1999).

These types of negative financial shocks are not limited to baseball and hockey leagues. The NBA also experienced lockouts such as the one beginning on July 1, 1998 because owners and players could not reach a collective bargaining agreement. The lockout continued for 204 days, resulting in more than $1bn loss in revenue to the league and an estimated loss of $500m in player salaries (Golianopoulos, 2019; Carpenter, 2013). In addition to that, the average attendance, TV ratings and league popularity decreased following the end of strike (Horowitz, 2011). The NFL has also experienced lockouts and strikes over the years, dating back to 1968. The most recent lockout in the NFL began on March 12, 2011 and it primarily occurred because of the dysfunctional relationship between the owners and the players. This lockout continued for 136 days and avoided loss of 2011 games (Staudohar, 2012; Lewis and Proffitt, 2013).

Besides league lockouts and strikes, past recessions have also affected the major leagues financially. Parlow (2010) analyzes the effect of the Great Recession on the NBA. The NBA expected to lose $400m in revenue in 2009–2010 season and many teams experienced reduction in gate revenue, attendance and lost corporate support. While various sports leagues have faced severe financial consequences in the past due to different shocks such as strikes, lockouts and recessions, the financial effects of these shocks do not compare to the current turmoil affecting each club and league in North America and across the globe.

Sports play an important role in the economy by creating employment and economic activity, particularly in cities with multiple major teams, and therefore the pandemic's effect on the suspension of sporting events is important to estimate. The literature examining professional sports' impact on the economy is divided into ex ante and post ante. Ex ante economic analysis generally concludes that a new sports team or building a new stadium will yield economic benefits to the city. These studies mostly are predictive in nature (Crompton, 1995; Rosentraub and Swindell, 1998). However, post ante analyses, using cross-sectional and time series data collected from different areas, alongside cost benefit analysis in order to examine the impact of sport events on economies, find mixed results (Rosentraub et al., 1994). It is worth noting that the scale of the pandemic’s effect on all sports activities is unlike the effect of a new stadium or a single sporting event, therefore, the financial and economic consequences will be significant.

3. Data and methodology

To analyze the financial impact of the COVID-19 pandemic at the league level, we use the financial data for the individual teams represented in the NBA, MLB, NHL and NFL obtained
from Forbes (2020). The dataset provides financial statistics such as the team value, debt, revenue, operating income, player expenses, gate receipts, etc. To serve the purpose of this paper, we use the information for two key variables: revenue and the gate receipts. This dataset provides complete information for only the 2007–2018 periods. Therefore, we join this data with another dataset from Statista (MLB Revenue by Team/Franchise, 2019, 2020; NBA Teams Revenue Ranking, 2018/19, 2020; NFL Revenue by Team, 2019; NHL Teams Revenue, 2018/19, 2020), which provides revenue information for 2019. Below are summary statistics of the data for the 2007–2019 seasons.

The data shows that the average revenue for the teams represented in the NFL, MLB, NBA and NHL for the period 2007–2019 was about $317, $245, $167 and $122m, respectively. The total revenue for the NFL is the largest, followed by MLB, NBA and NFL. These leagues are the largest not only in North America but also across the globe in terms of the total revenue. That is why their financial adversity is a major concern.

4. Estimation
The main objective of this paper is to estimate the expected revenue for each league – and each team – under the COVID-19 circumstances. To estimate the revenue situation for the individual leagues, our approach is to estimate the 2020 revenue based on the past revenue data available up to 2019, as shown in Table 1. To do so, first we calculate the annual growth rate of revenue for each team based on the past revenue data. We take the difference of the natural log for each season’s revenue and the previous season’s revenue, which gives us the growth rate of revenue.

\[
\text{Revenue Growth}_{i,t} = \ln(\text{Revenue}_{i,t}) - \ln(\text{Revenue}_{i,t-1})
\]

where, \(i\) represents each team from NFL, MLB, NBA and NHL; and \(t = 2007–2019\). As such, we get the growth rates of revenue for each team for the period 2008–2019. Using the growth rates calculated above and the team revenues, we estimate the growth rate of revenue for each year using the following linear regression.

\[
\text{Revenue Growth}_{i,t} = \alpha_i + \alpha_1\text{Revenue}_{i,t-1} + \alpha_2\text{League}_i + \alpha_3\text{Team}_i + \alpha_4\text{Season}_t + 
\]

\[
+ \alpha_5\text{League*Season}_{i,t} + \alpha_6\text{Team*Season}_{i,t} + \epsilon_{it}
\]

where, Revenue.Growth\(_{i,t}\) is the growth rate of revenue for team \(i\), that belongs to league \(j\), in season \(t\). This growth rate of revenue is modeled as a function of the team’s current and previous season revenue. We also control for the league, team and season fixed effects as well as the appropriate interaction terms that are likely to affect the growth rates of revenue.

This estimation gives us the predicted value of the growth rate for each team, which is then used to estimate the expected revenue for the 2020 period as:

\[
\text{Revenue}_{i,2020} = \text{Revenue}_{i,2019} \times (1 + \text{Revenue}_{i,2019})
\]

<table>
<thead>
<tr>
<th>League</th>
<th>Mean</th>
<th>Std.</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MLB</td>
<td>$244.51</td>
<td>$85.97</td>
<td>$124</td>
<td>$683</td>
</tr>
<tr>
<td>NBA</td>
<td>$165.82</td>
<td>$68.41</td>
<td>$78</td>
<td>$472</td>
</tr>
<tr>
<td>NFL</td>
<td>$316.77</td>
<td>$103.32</td>
<td>$185</td>
<td>$950</td>
</tr>
<tr>
<td>NHL</td>
<td>$122.22</td>
<td>$41.76</td>
<td>$61</td>
<td>$270</td>
</tr>
</tbody>
</table>

Table 1. Revenue for the 2007–2019 period, by league

Note(s): \(N = 123\) teams represented in the Big Four leagues. Revenue in 2020 US$ millions
The revenue estimated in this way gives us the expected value of revenue for each team under the normal circumstances, i.e. without the COVID-19 implications. Each team’s total revenue will be affected by factors such as missed time, broadcast revenues, gate revenues, etc. As discussed earlier, we consider the gate receipts to be a major part of what the teams will lose in the new circumstances. To incorporate this, we calculate the average proportion of gate receipts to the total revenue for the sample for the 2016–2018 season as follows [1].

\[
\text{Gate Receipts Proportion (GRP}_i = \frac{\sum_{t=2016}^{2018} \text{Gate Receipts}_{it}}{\sum_{t=2016}^{2018} \text{Revenue}_{it}}
\]

Then, we adjust the 2020 expected revenue by removing the average proportion of the gate receipts. This gives us the expected revenue for each team in the absence of fans.

\[
\text{Expected Revenue Without Fans}_i,2020 = (1 - \text{GRP}_i)\text{Revenue}_i,2020
\]

The 2020 season has not yet started for either the MLB or the NFL. To calculate the 2020 season completed for both the NHL and NBA, we divide the games played by the number of games in a season + average playoff games per team. This meant each NBA team has 82 regular season games + 160/30 playoff games. Each NHL team has 82 regular season games + 174/31 playoff games. However, playoff games are worth more in revenue to a team than a regular season game. Gate receipts for postseason games are about 1.666 times that of regular season games for the NBA (Helin, 2020). We could not locate the difference between NHL post season gate receipts and regular season gate receipts, so we used the NBA estimated ratio. Therefore, our predicted 2020 revenue, without fans, is based upon the following equation:

\[
\text{Expected Net Revenue}_i,2020 = \text{Revenue}_i,2020 \times \text{Season Completed}_i,2020 + \text{Expected Revenue Without Fans}_i,2020 \times \left(1 - \text{Season Completed}_i,2020\right)
\]

From here, we calculate the expected revenue loss for each team as:

\[
\text{Expected Revenue Loss}_i,2020 = \text{Revenue}_i,2020 - \text{Expected Net Revenue}_i,2020
\]

5. Results
This section provides a summary of the results for the Big Four leagues estimated for the 2020 season. We focus on the two estimates: (1) expected revenue at the league level under the normal circumstances (i.e. no COVID-19, with fans) and (2) expected revenue at the league level under the COVID-19 circumstances (i.e. without the fans). We present these results in Table 2.

<table>
<thead>
<tr>
<th>League</th>
<th>League revenue with fans</th>
<th>League revenue without fans</th>
<th>League revenue loss</th>
<th>League revenue percent loss</th>
<th>Average team loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>MLB</td>
<td>$10,796.58</td>
<td>$7,578.54</td>
<td>$3,218.04</td>
<td>29.81%</td>
<td>$107.27</td>
</tr>
<tr>
<td>NBA</td>
<td>$9,525.17</td>
<td>$8,862.41</td>
<td>$662.77</td>
<td>6.96%</td>
<td>$22.09</td>
</tr>
<tr>
<td>NFL</td>
<td>$15,185.26</td>
<td>$12,720.68</td>
<td>$2,464.58</td>
<td>16.23%</td>
<td>$77.02</td>
</tr>
<tr>
<td>NHL</td>
<td>$5,284.47</td>
<td>$4,824.38</td>
<td>$460.09</td>
<td>8.71%</td>
<td>$14.84</td>
</tr>
<tr>
<td>Average</td>
<td>$10,197.87</td>
<td>$8,496.50</td>
<td>$1,701.37</td>
<td>15.43%</td>
<td>$55.33</td>
</tr>
<tr>
<td>Total</td>
<td>$40,791.48</td>
<td>$33,986.00</td>
<td>$6,805.48</td>
<td></td>
<td>$6,805.48</td>
</tr>
</tbody>
</table>

Note(s): N = 123 teams. Revenue in 2020 US$ millions

Table 2. Predicted revenue loss for the 2020 season
The results show that the expected gate receipts without the COVID-19 pandemic would have been above $40.79bn across the four leagues, but the new estimates without the fans is going to be only about $33.98bn. That is a loss of $6.8bn across the four leagues: $3.22bn for MLB, $0.66bn for NBA, $2.46bn for NFL and $0.46bn for NHL. In terms of percent change, MLB is predicted to incur the most losses (29.81%), followed by NFL (16.23%), NHL (8.71%) and NBA (6.96%). On average, each team in the MLB, NBA, NFL and NHL is predicted to lose $107.27, $22.09, $77.02 and $14.84m, respectively. Figure 1 shows the visualization of the predicted revenue for each league with fans (top panel) and without fans (bottom panel).

6. Discussion

Based on the current estimates, the combined financial loss of the clubs from NFL, MLB, NBA and NHL is expected to be above 6.8bn dollars in gate receipts alone. The weaker league financing is going to disrupt the athletes, coaches and clubs. The near-future plans for the leagues are not yet certain. No one knows how the whole season is going to be affected, but these clubs and the leagues will suffer a financial fallout due to the changes brought on by the COVID-19 pandemic. Although NBA and NHL have played certain numbers of games, MLB and NFL are yet to begin their season. Those leagues that will be unable to play most of their games or play with no fans, will experience major losses. In particular, the estimates show the MLB to fare worse than the NFL because the MLB gate receipt revenue percentage is far greater than the NFL. While our estimates include only gate receipts, the teams also need to consider other sources of stadium revenue that is being lost, such as parking, food and drinks, merchandise sales, etc. With the reduced revenue, the teams need to have a management plan not only for the directly affected athletes, coaches and officials but also for stadium staff members and vendors. This pandemic is going to cost much more than what we have predicted here based on the gate receipts alone. The leagues should take immediate actions to mitigate the worst-case financial scenario for the individual teams by making specific plans regarding issues such as missed time, broadcast revenues, gate revenues and salary obligations.
It would be ideal to include all sources of revenue to forecast the 2020 losses. However, in the absence of complete data, we can include only the gate receipts to estimate the reduction in revenue. While using total stadium revenue, which includes concessions, parking and merchandise, leads to a better estimator of reduced revenue, the data for total stadium revenue is unavailable. However, unlike gate receipts, any loss of revenue from concessions and merchandise can be mitigated by reducing inventory during the fan-less season. Another source of financing for the leagues is the TV revenue, but it is hard to estimate the impact on this source because many MLB owners have partial ownership in regional sports networks (RSNs) and the owners can funnel dividends to the team without having to report it to the league. However, it is likely that the TV viewership will increase as people will watch sports during any imposed stay-at-home orders or because they are fearful of leaving home. So, we do not anticipate a reduction in TV revenues. Even if there are no games, subscriber fees make up around 90% of RSNs, which gets packaged with the rest of cable bundles.

7. Conclusions
As the World Health Organization declared the COVID-19 outbreak a pandemic in March of 2020, the NBA and the NHL suspended their seasons, the NCAA canceled its championships, and many other leagues and sporting events, including all MLB play, are postponed for months. The NFL plans are not yet certain. In that context, we estimate the potential revenue fallout for the Big Four leagues in North America. One of the major sources of revenues that the leagues will certainly lose as the virus continues to spread is the gate receipts. Therefore, we estimate the industry level loss under such circumstances to be over 6.8bn dollars, assuming that the leagues will not collect any gate receipts for the remainder of the season. Future research should include all sources of revenue that can be lost due to restrictions set in place to curb infections in order to estimate the exact amount of loss.

Note
1. We do so because we do not have the 2019 gate receipts information for each team. These data are available only for the MLB. But, the average proportion for each team for the 2016–2018 period gives us a pretty good picture of what would happen to their gate receipts in 2019.

References


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Further reading


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