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The impact of the 2007–2008 crisis on NBA attendance

Consumer behaviour is shaped by a number of parameters. One such parameter is the state of the economy and the level of disposable income, as the demand for goods is shaped according to the circumstances and the type of good. This paper examines whether the economic crisis of 2007–2009 had an impact on the number of spectators of the NBA games. The analysis examines, as well, whether some teams are more recession-proof than others. In order to establish the above, an econometric analysis has been conducted, having as independent variables the GDP, the real disposable income and the ranking position of the teams, and as a dependent variable the number of tickets. Correlation analysis has been conducted, while a multiple regression analysis has been performed. The results show that the number of tickets has a correlation with GDP. The regression analysis shows that the ranking position is an explanatory variable of the number of tickets, while unemployment is not a statistically significant factor. As a conclusion, the analysis shows that recession has a negative impact on the number of tickets, while the ranking position of the team plays a significant role on the number of spectators.

Keywords: recession, economic crisis, disposable income, sports economics, consumer behaviour

JEL classification: G01, R22, Z20

Introduction

The current study examines the impact that one factor, i.e. the income, had on stadium attendance during the period of the economic crisis 2007–2008. The reason for this choice is because the price of the tickets changes not only among periods but also among matches, resulting in the difficulty of obtaining detailed ticket price data, while the presence of superstar players also differs among seasons, in the sense that a player who is considered to be the star in a season might be less attractive in the next season. Since the study examines the impact of the income alone, it should be underlined that other factors may have had an impact on the attendance.

The factors that influence consumer behaviour consist of social, personal, psychological and cultural characteristics [Solomon et al., 2013, p. 362]. Buying behaviour usually depends and is influenced by a wide range of factors [Martins et al., 2012,

p. 37] such as income, demographic, social, as well as cultural factors. In addition to the above internal factors, there are also the external factors of the circumstance surrounding the environment as mentioned in the literature. Nilesh [2013] divides the factors into external, culture and subculture, social class/group, family or interpersonal influences and the others encompassing the geographical, political, religious and economic environment.

One of the most important factors that influence consumers' behaviour and their decision to buy or not to buy a particular good is disposable income [Schiffman et al., 2014, p. 368]. In general, depending on the change in income, the change in demand for goods is also modulated, but having a distinction depending on whether goods are considered as inferior, regular or luxury.

Attending matches in the stadium as spectators at their team's games has multiple functions. It is a way to socialize [Hall et al., 2010, pp. 331–335], and to express their support for the team [Cavdar, Circova, 2018, p. 674], while at the same time it is a means of financial support, by buying the tickets and team's paraphernalia [Bristow, Sebastian, 2001, pp. 264–265] so that the fan can contribute directly to the team's revenues and the team can be competitive. The decision to attend the game is defined by a number of factors. Some factors are economic ones, based on the concept that the consumer is rational and makes a decision according to the expected utility from the game in comparison to the price; a decision well-described in the utility theory [Blunder, 1988, pp. 18–22; Gilboa, Schmeidler, 1997, pp. 740–752]. Other factors are social, including the preferences of the family, the habits of the friends and the habits of the friends [Ramya, Mohamed, 2016, p. 78]. While some factors are general, in the sense that shape a person's purchasing behaviour and decisions, as the ones mentioned above, other factors are more sports-related, such as the uncertainty of the outcome [Coates, Humphreys, 2012, pp. 373–375; Mills, Firt, 2014, pp. 214–216; Pawlowski, Nalbantis, 2015, p. 4128], the other games and events, which act as a "direct" and "indirect" substitute respectively [Addessa, Bond, 2021, p. 4], and the attractiveness of the match [Addessa, Bond, 2021, p. 12], which, in a way, is associated by the presence of superstar players [Humphreys, Johnson, 2020, p. 174].

Having reviewed the factors above, the current study focuses on the disposable income as the key factor having an impact on attendance, having an economic rather than a social perspective. As stated above, although it is a factor having an impact on buying behaviour, it was not possible to examine thoroughly the price of the tickets, due to the lack of available data. While stating that, the researcher took into account that the net change of the average price of tickets from 1999 to 2008 was 1 dollar or 2% [Josza, 2011, p. 142]; thus, since no major differences have been recorded, it can be assumed that the price of tickets would not be a factor having a decisive impact on the decision to attend a game. Also, for the reasons mentioned above, the research does not include a variable regarding

"superstars". Hence, the study includes only one independent variable, namely the disposable income.

The question therefore arises as to whether the economic crisis has brought about a change in the number of spectators attending professional basketball games with a physical presence on the court. In order to examine this question, the paper performs a correlation coefficient analysis to determine whether the number of tickets changes along with the change in the economy and disposable income, and also performs a linear regression to determine whether changes in the number of spectators can be explained by changes in income.

The importance of this study is based both on academic reasons and on the contribution that it can make to the management of teams participating in the NBA. In terms of the paper's contribution to academic research, this research examines an important aspect of sports economics and microeconomics, which concerns how the demand for one of the most popular US sporting events is shaped during periods of recession and declining disposable income. So, in this light, this research adds to the literature regarding the income elasticity of NBA games and whether watching games can be considered a normal good. It also strengthens the academic literature regarding the impact of an economic crisis on various sectors and activities of the economy. In addition to contributing to the academic literature, this research also contributes to decisions regarding sports economics, in the sense that, knowing income elasticity may be helpful for NBA managers.

In Vacsi's [2013, p. 146] research, it is found that in 2007–2008 there was a decrease in ticket sales for NBA teams, while Parlow's [2010, p. 196] article states that NBA teams in 2007–2008 recorded losses due to the economic crisis, but there is no mention of the effect of the change in income. In Gao and Kim's [2017, pp. 16–17] research it is found that the decrease in income affected the decrease in demand for entertainment expenditure, which includes "admission fees to sporting events [single admissions and season tickets]", but without a specific measurement for this category and without any reference to the demand for tickets to NBA games.

1. Literature review

First of all, when the economy has a recession, i.e. the GDP is declining, instead of increasing, then both the enterprises and the consumers are decreasing their expenditure due to two main factors: first of all, they have less disposable income, as a result of the recession [De Nardi et al., 2011, pp. 2–3]. Second, the marginal propensity to save is increasing, because the households are afraid that they will have less disposable income in the future, thus they should have a higher amount of savings, in order to address their future needs. In this sense, the house-

holds prefer to cut their current expenditure and increase their savings, in order to be protected from the recession that might continue [Pistaferri, 2016, p. 9]. Thus, the marginal propensity to save increases, and the additional amount of savings acts as insurance for the households, since the market itself cannot have an insurance instrument to protect the disposable income in cases of crises [Mishkin, 2007]. As a result of the increase of the marginal propensity to save, the multiplier of the economy decreases, leading to a decrease in the GDP [Parkin et al., 2008, p. 164].

Except for the fears of the households, the other reason is that they have lower disposable income, thus the decrease in the expenditure is due to the fact that, during the recession, the households do not have the economic means to continue the same rate of consumption as they used to before the crisis. This is because of two reasons. The first reason is because, during the recessions, the unemployment increases and the wages decrease [Kalleberg, Von Wachter, 2017, p. 17], thus there is lower income from employment [Elsby et al., 2010, p. 3]. The other reason is that, during the recession, the value of the property and assets households have decreased as well. For example, the value of stocks decreased in the 2008 recession [Dwyer, 2009], thus there is a decrease in the households' wealth.

The first two years of the recession in the United States witnessed a significant decline in consumption [Lee et al., 2010, pp. 3–6]. Concern about the occupational status of residents and the fear of losing their jobs dramatically reduced their willingness to make purchases, especially when they were for leisure and entertainment [Mansoor, Jalal, 2011, p. 112]. In fact, Stock and Schultz [2011, p. 229] state that consumers' reluctance to shop intensifies during economic downturns because it is affected by the consumer's social ties, both family and friends.

The consumption structure of households during recession deteriorates, resulting in lower consumption and more rational purchase decision making. Consumers, now spending less money on unnecessary expenses, are more careful and do not spend on products that do not meet their fundamental needs [Sobczyk, 2013, p. 345]. Also, household consumption expenditure is decreasing to the extent that their income is decreasing [McKenzie, Schargrodsky, 2011, p. 28].

Based on these, the study examines a key independent variable, i.e. the real disposable income per capita, in order to identify whether this factor has an effect on the stadium attendances of the NBA teams.

2. Methodology

The research uses the Pearson correlation coefficient r . Also, there is a regression analysis in order to determine the degree of the effect of change in disposable income on the number of tickets. In linear regression analysis, the p -value is a con-

tinuous measure of evidence. A low p-value means either that the null hypothesis is true and a highly improbable event has occurred or that the null hypothesis is false. The dependent variable Y is the number of tickets at the stadiums of each team in home matches.

The independent variable used is the level of real disposable income per capita.

However, for the completeness of the paper, a second independent variable was also considered, which is the team's involvement in the league competition. This variable was chosen as it is recorded that fans have an increased interest in attending their team at the stadium when the team has a chance to excel, while on the contrary, when the team cannot claim a competitive position to win the championship, fans' intrinsic interest decreases.

The linear regression analysis has the following limitations:

Parameter instability: this indicates the tendency for the relationships between variables to change over time due to changes in the economy or markets. For example, if a variable is highly dependent on a particular factor, then the regression analysis model will need to be adjusted for that factor in order to produce reliable results. In the case of the present analysis, no events have occurred which would determine the number of spectators in the stadium, so that the model would have to be adjusted.

Sensitivity to outliers: the linear regression model is sensitive to outliers. This means that a majority of the data occurs close to the x-axis, but if there are two points very far from the x-axis, then the regression results will be affected. In the case of this regression, no outliers have occurred in either the dependent or the independent variable, as determined by the descriptive statistics.

Over-fitting: when there are many independent variables, the linear regression model may over-fit the assumptions so that, in addition to the relationships between the variables, it will also shape the random error. In the case of the present regression, there is no multivariate model.

Linear correlation: if a relationship is non-linear, the model does not take it into account. In the case of the present regression, no non-linear correlation has occurred.

3. Data

The survey data are as follows.

Net disposable income per capita is in US dollars and is posted on the Federal Bank of St. Louis website.

Number of tickets refers to the number of tickets purchased for the teams' home games, as the total number of home and away is not recorded. However, the

statistics on the NBA Federation's website record the average number of home and away tickets, which is considered as an alternative.

The following teams have been excluded from the sample of total teams:

- The Hornets has been excluded from the sample, because the team did not participate in the 2001 to 2004 championship,
- Wizards has been excluded from the sample, because the team did not participate in the 2005 championship,
- Warriors and Trail Blaze have been excluded from the sample, because the teams did not participate in the 2009 championship.

4. Findings

First, descriptive statistics are recorded in terms of the total number of tickets. As recorded in Table 1, the annual average number of tickets for the teams' home games is 18,381,079 tickets (SD 433.87).

Table 1. Descriptive statistics, number of home tickets, 2001–2009

Descriptive statistics	Value
mean	18,381,078.56
median	18,449,282.00
standard deviation	433.87
kyrtosis	–1.28
range	1,221,536.00
minimum	17,816,096
maximum	19,037,632

Source: Own elaboration.

As presented in Figure 1, while until 2003 less than 18 million tickets had been sold per season, in 2004 this figure increased to 18.3 million and in 2007, i.e. the year before the recession, tickets reached 19.04 million, and in 2008 dropped to 18.4 million tickets.

As shown in Table 2, while the total number of tickets increased by 3.44% in the period 2001–2009, during the period of the economic crisis, i.e. the period 2007–2009, the number of tickets decreased by 2.77%, while in the period before the crisis, from 2001 to 2006, the number of tickets increased by 5.36%.

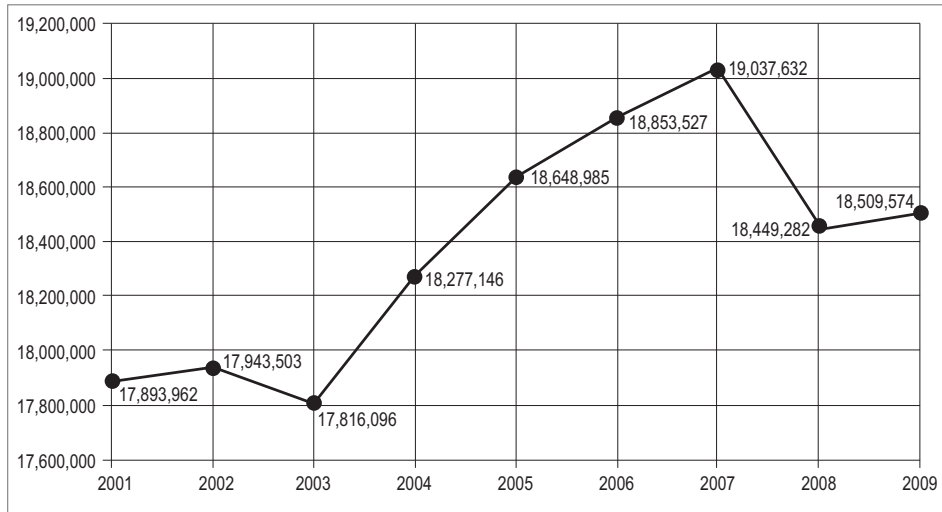


Figure 1. Number of tickets in NBA games, 2001–2009

Source: Own elaboration.

Table 2. Number of tickets and percentage differences per period

Period	Number of tickets
2001	17,893,962
2002	17,943,503
2003	17,816,096
2004	18,277,146
2005	18,648,985
2006	18,853,527
2007	19,037,632
2008	18,449,282
2009	18,509,574
$\Delta\%$ 2001–2009	3.44%
$\Delta\%$ 2001–2006	5.36%
$\Delta\%$ 2007–2009	–2.77%

Source: Own elaboration.

This is the first indication that there has indeed been a reduction in the number of tickets.

It should then be examined whether there is a correlation between the number of tickets and the level of disposable income.

The correlation coefficient between the independent and dependent variable is 0.163.

Under the null hypothesis of no correlation: $t[214] = 2.40923$, with a two-tailed p-value of 0.0168.

Therefore, with this coefficient value, it is found that there is no correlation between the variables, so the number of tickets is independent of the level of disposable income.

If the dependent variable is the average number of total tickets, i.e. the tickets of home and away games of the teams, there is a relative increase in the value of the correlation coefficient $r = 0.256$, but even this value shows that there is no correlation.

The next correlation to consider is between the team's league position in each year and the number of tickets. For this, the correlation coefficient is -0.955 . The negative sign is due to the fact that in the rankings there is a contrast of numbers, in the sense that the higher number in the ranking order represents a lower position; for example, the number 22 in the rankings is higher than the number 15, but represents a lower position. Therefore, the correlation coefficient of -0.0955 shows a significant correlation between the team's position in the annual league and the number of tickets, as the higher the position, the higher the number of tickets increases, while on the contrary, when the team becomes non-competitive, the number of spectators decreases.

Of course, one could argue that this correlation is so strong and statistically significant because it is based on tickets for home games, so the correlation is valid because only the number of fans of each local team is taken into account. However, the correlation coefficient is also very strong when considering the average number of tickets, i.e. home and away tickets, having the value of $p = -0.913$. Although the value of the correlation coefficient is relatively lower than the previous indicator, it still demonstrates a very strong correlation (the reason for the negative sign of the correlation coefficient is explained above).

Based on the above, a linear regression was performed to determine whether the level of disposable income is a factor that can explain the change in tickets in a statistically significant way.

The regression statistics are presented in Table 3. The multiple R shows the deviation of the dependent variable, which can be explained by the regression. The multiple R is 0.16, so there is no correlation.

Table 3. Model summary

Model	R	R square	Adjusted R square	Standard error of the estimate
1	0.163*	0.026	0.022	95448.36552

* Predictors: [Constant], Average_income

Source: Own elaboration.

The analysis examines the null hypothesis, in the ANOVA analysis. As presented in Table 4, the value of F is 5.804 while the significant F is $0.017 < 0.05$, thus the null hypothesis cannot be accepted.

Table 4. ANOVA

Model		Sum of squares	df	Mean square	F	Sig.
1	regression	5.29E+10	1	5.29E+10	5.804	0.017*
	residual	1.95E+12	214	9.110E+9		
	total	2.00E+12	215			

* Predictors: [Constant], Average_income.

Source: Own elaboration.

The regression in Table 5 shows that the real disposable income has a p-value = $0.02 < 0.05$, hence the independent variable is an explanatory factor of the number of tickets.

Table 5. Regression, real disposable income and home tickets

Coefficients*						
Model		unstandardized coefficients		standardized coefficients	t	sig.
		B	standard error	beta		
1	[Constant]	295907.661	172416.710		1.716	0.088
	Average_income	11.352	4.712	0.163	2.409	0.017

* Dependent variable: Home_tickets.

Source: Own elaboration.

Conclusions

The linear regression showed what is noted in the literature, that the change in the amount of disposable income is a factor that affects consumer choices. Fans clearly love their team and want to support it, both emotionally inside the stadium and financially. However as has been found, the decline in the number of tickets is explained to a statistically significant extent by the decline in income.

Compared to the results of previous studies that had shown that tickets decreased during the economic crisis, the present study has managed to make concrete and measurable the effect of the change in real disposable income on the

number of tickets for NBA games, and also gives a clear answer to the question whether the number of tickets is correlated with the position of the team in the championship. In fact, the analysis shows that the position of the team has a strong correlation with the number of tickets, which may substantiate the view that the more competitive teams are more resilient to recessionary conditions in terms of their ability to keep their fans in the stadium.

The findings of the research not only fill the literature gap regarding the effect of declining income on the demand for NBA game tickets, thus contributing to the strengthening and expansion of the academic literature, but can be used in practice by the teams participating in the NBA: based on the findings of the research, an NBA team has the possibility to plan how to deal with a new economic crisis that may occur in the economy: the team can know about the crisis' effect on tickets demand, to calculate this impact in terms of ticket revenues and to take the proper measures in their pricing policy and their cost management. Of course, it should be noted that a future study analysing the effect of the change in disposable income on the home tickets of a selected team and its fans will provide even more targeted results, taking into account the different changes in disposable income according to the demographic characteristics of local fans.

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