The determinants of demand in football matches during the 2007 Brazilian Championship

Synthia Kariny Silva de Santana[†] and Alexandre Stamford da Silva[††]

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Abstract

In view of the structural changes experienced by Brazilian football as a whole, which is becoming better regulated and more transparently managed, it is necessary to examine the factors that now determine the attendance at football matches. This paper aims to examine the demand for tickets in the 2007 Brazilian Championship games, the main competition in that sport in the country, based on the methodology created by Souza and Angelo (2004), which conducted a study for the championship of 2002. The present study, using the Ordinary Least Squares method, showed that in 2007 the demand for football was price-inelastic, but no inference can be made with respect to income. Moreover, in general, the determinants were found to be steady.

[†]Department of Economics, Federal University of Pernambuco. Member of PET (Program for education teaching). Av. dos Economistas S/N Cidade Universitária , CEP 50740-590, Recife – PE. Brazil. synthiak@gmail.com

[††]Departament of Economics, Federal University of Pernambuco. Av. dos Economistas S/N Cidade Universitária , CEP 50740-590, Recife – PE. Brazil. alexandre@stamford.pro.br

1. INTRODUCTION

Football is a big business. Referred to as the "passion of the crowds," it is deeply rooted in Brazilian culture and has a great potential to generate income by means of championship matches and merchandising. This potential, however, may not be adequately used by the football clubs, which have management processes that are both obsolete and lacking in transparency. The Pelé Law[i] and Statute of the Sports Fans[ii] are pieces of legislation that arise in this context aiming to increase regulation and transparency in the sector and, at the same time, benefit clubs and fans.

Though the sector generates around 250 billion dollars annually worldwide, the Brazilian reality is very different, representing less than 1% of this amount. Furthermore, according Brunoro (1997), while we see the main world championships happening in crowded stadiums, in Brazil there is a much smaller audience, one that is even forced to live with a swollen schedule and a series of tournaments that has not been fully assimilated by the fans. That author also points out that few associations balance spending and revenue. Indeed, most of them participate in tournaments with deficits, are followed by a very limited public and cannot even properly pay their players.

In this context, we want to investigate the following question: What are the factors that determine the presence of the public at a football stadium in Brazil? From the methodology created by Souza and Angelo (2004) in a study about the Brazilian championship in 2002, we will analyze the disputed games in the "A" series of the Brazilian Championship in 2007 which had 380 games[iii] involving 20 football clubs. The goal is to compare the determinants of demand for the games in 2002 with those of 2007 in view of the several events that contributed to the structural change in the Brazilian championship within those 05 years. In that time, the Statute of the Fan and the Pelé Law provided additional regulation to the sport in order to benefit producers and consumers in this market, the former one securing, the right to an organized and transparent competition regarding the regulation and sale of tickets, rights on security services, safe transportation (and adequate organization of the traffic), quality of food and hygiene in the stadiums; and created the Ombudsman of the competition, among other provisions.

The data used was taken from Placar Magazine's Ranking and Information Issue or extracted from the financial bordereau disclosed by the Brazilian Football Federation[iv] for all the matches of the championship.

The remainder of the paper is structured as follows. Section II presents a review of studies on the demand for football matches. Section III sets out the empirical methodology, presents the dataset and discusses the variables. Section IV reports the main empirical results. Section V concludes by summarizing the main findings.

2. DEMAND FOR FOOTBALL MATCHES

The search for the determinants of the demand for football matches in stadiums has received worldwide attention because of the potential income that is no longer being brought in by the clubs. According to Matheson (2003), this topic is in evidence in the UK due the trend of a decrease in the frequency of the public in English and Scottish leagues. Little attention has been given to these same elements in the Brazilian championship though, despite evidence of a drop in attendance dating back to 1971. However, since the second half of the 90s some regulatory instruments were inserted into the championship (even if tentatively), apparently increasing the audience in the stadiums during the games, as one can see in the figure 1.

Since 1956, when Rottenberg wrote the first work on economics of sports, studying the labor market for baseball players, the research in the field has expanded considerably. Specific studies about football, however, are more recent. According to Araujo Junior, Shikida and Monasterio (2003), there are three different lines of research: i) use data from sports as inputs of economic theory, ii) the economic peculiarities of demand in sports iii) the application of economic theories and statistical methods to understand, predict and identify various aspects of the economics of sports.

The more common approach in studies of demand regarding football matches, one which is also used in this article, is based on other studies on baseball or football and basically follows the same pattern as the research: the construction of an econometric model seeking to explain the demand for football games as a function of various factors, with most of the demand studies calculating price and income elasticities of demand for games.

In the case of Brazilian football there are two studies that examine the determinants of the demand for games. Souza and Angelo (2004) analyzed football

matches in stadiums for the 2002 Brazilian championship considering: Economic factors, Demographic factors, Competitive imbalance, Expected match quality, Substitutes and the Club's attributes. The limited availability of data (which will be discussed later) does not help the model specification, however, a large part of the results found by the authors are in line with other studies about the demand for football matches.

Villar and Madalozzo (2007), in turn, employ a methodology similar to that of Garcia and Rodriguez (2001), covering the games for the Brazilian Championship between 2003 and 2006 in a total of 1,851 observations on 21 variables grouped in a panel dataset. The variables used were grouped according to Structure, Expected quality, Performance and Uncertainty. The main advantage of the model established by the authors is to do an analysis after the Pelé Law and the Statute of the Fans, following the evolution of the legislation during this period.

3. ECONOMETRIC MODEL AND DATASET

The methodology used in this work is that of Souza and Angelo (2004), devised to examine the determinants of the demand for games of the series "A" of the Brazilian Championship in 2002. In 2007, the championship included 26 different clubs in a total of 334 matches, however, only in 214 games had the teams' revenue publicly disclosed and only in 163 games had the attendance been disclosed. It is emphasized that the *Gama*, *Portuguesa* and *Paraná* declined to disclose attendance and team revenue in any of the matches held at their stadiums. Furthermore, the *Sao Caetano* club released such information for only one game, while the teams of *Vasco da Gama* and *Coritiba* provided the attending and paying public for the two games they hosted.

Since the availability of data affects the specification of the model, it is important to note that we used the same methodology for the championship of 2007, which has the fullness of the data in accordance with the Statute of the Fans. Thus, it is expected that the results are comparable to though more robust than, those found for the championship in 2002. Thus, we also examine if there was any change in the determinants of demand due to new legislation.

3.1. Championship Rules and Variables

The Brazilian championship of 2007, which occurred between the months of May and December with the participation of 20 clubs in a total of 380 games, was held using the current points system, 19 games-way and 19 games-back, the champion being the club with the most points earned throughout the competition.

After each game, the winning team earns three points, the losing team gets none and each team earn one point in case of a tie. The position of each team in the table of classification is then determined by the amount of points that each team has at the end of the competition. The four clubs with the fewest points are demoted to the "B" series the following year, while the four best placed will participate in the Copa Libertadores of America 2008.

The demand for the Brazilian championship games of 2007 (as estimated by the number of people paying) was studied as a function of six groups of variables, namely: Economic factors, Demographic factors, Competitive imbalance, Expected match quality, Substitutes and Club's Attributes.

3.2. Groups of variables and hypotheses

3.2.1. Economic factors

INCOME is the value of the average income of households in the city that hosts the game. It is believed that this variable has a large effect on the demand for games, both because the results of previous work in this regard and due to characteristics of Brazilian culture. The variable was included in logarithmic form so as to obtain the income-elasticity of the demand directly. Thus, if a positive sign for this coefficient is found, one can say that the games in stadiums are normal goods; if the sign is negative, it means that they are inferior goods. It is believed that the football matches in stadiums are inferior goods because of the poor conditions of the infrastructure of the stadiums which, even with the requirements of the Statute of the Fans, do not yet offer appropriate conditions for the entertainment of fans[v]. The security around the stadium is also an important factor in determining the demand for games, however, given the lack of reliable information, this item will not be considered here.

The PRICE variable is the average value of the ticket in each game, and is calculated by the ratio between the total revenue from ticket sales and the size of the paying public (both according to the financial *Bordereau*). Just as the income, the

PRICE variable was included in logarithmic form in order to extract the price-elasticity, indicating the sensitivity of demand curve to changes in the price of tickets.

Finally, the UNEMPLOYMENT variable represents the unemployment rate in the city at the beginning of the month of occurrence of the game, was eventually excluded from the model by unavailability of data for some of the metropolitan regions[vi].

3.2.2. Demographic factors

The CAPACITY variable indicates the capacity of the stadium where the match is being held. Data was taken from the website of The Rec.Sport.Soccer Statistics Foundation which has a large body of information on football in Brazil, monitoring various championships (municipal, statewide, regional and national). It is expected to positively affect the demand for games.

The distance between two cities (DIST), commonly used in the literature as a proxy for the transportation cost[vii] has been included in the model based on data provided by *Denatran*[viii]. In this case, we used the distance in kilometers between the host city and the visitor city with the goal of capturing the difficulty of locomotion for fans during the championship. The hypothesis here was that a greater distance between the two cities, would result in a lower demand for the match, there being a negative relationship between these variables.

3.2.3. Competitive imbalance

According to Szymanski (2001), the competitive balance refers to the rational expectation of the fans regarding who will win the game. In this case, two variables are indicative of competitive imbalance in terms of the number of points earned, and quality variables such absolute or relative quality. The AMPADV is a measure of relative quality, indicating the difference (in points) between the teams at pre-match. There will also be a non-linear version called AMPADV2. The hypothesis here is that the closer two teams are on the table of classification, the smaller the difference (in quality) between them, causing a greater demand for these games. Thus, we assume that the Brazilian fans prefer watching the games whose outcome is most uncertain.

The third variable of competitive imbalance, AMPLID, seeks to evaluate the importance of the game. It measures the difference in points between the leader of the championship (at pre-match) and the average points between the two clubs that are facing each other. Thus, a low value for AMPLID indicates that the match is important because the two teams are close to the leader of the championship.

3.2.4. Substitutes of the match

The group "Substitutes of the match" includes things that act as direct replacements of football matches in stadiums. Thus, the games televised by open television (TV) as well as by PAY-TV act in this direction. Data for the transmission of the games was obtained from the Brazilian Football Confederation (CBF).

Since only one TV channel can broadcast the games of the Brazilian Championship, a dummy value of 1 was inserted in matches broadcasted by the network and a value of 0 otherwise. The same was done in the case of games broadcasted by PAY-TV (PAYTV). We expect a negative sign for this second variable, indicating that the PAY-TV is a strong substitute to games in stadiums, especially for consumers with a high income.

3.2.5. Expected match quality

The discrete variable ROUND attempts to capture the progress of the Brazilian championship so that each day at least one match is played (i.e., a "round"). We believe that the closer the end of the tournament, the greater will be the demand for games because of the uncertainty about who will be the champion as well as regarding who will be demoted to second division.

CLASS is a variable that refers to classics matches, i.e., games involving clubs from the same city. The games involving the *Santos* and another club within the city of Sao Paulo was considered classics for that reason, and also given the historic rivalry between these clubs (*Corinthians*, *Palmeiras* and *Sao Paulo*).

WEEKDAY, SAT and SUN are three dummy variables indicating, respectively, weekday games and weekend games assuming a value of 1 for the games played at those days and of 0 otherwise. The first refers to games on weekdays (Monday through Friday) while the last two refer to games held on weekends (Saturday and Sunday). One

expects less audience on weekday games because of transport and security problems in the cities around the time people return from a game. Beside this, the day after can also be a workday. For games on weekends, however, one expects an increase in public since, culturally, it is an option for leisure.

Finally, the RIVALS variable represents the number of Rivals clubs that competed in Series "A" of the Brazilian championship in 2007 in the city's host club. Table 1 shows the value for each of the sports associations. Assuming that each fan only watches the games of his or her club, we expect that RIVALS is an important attribute of the Expected match quality, given that fans tend to be as bothered by the outcomes of their club's rivals as they are concerned with their club itself. Thus, given the characteristics of the Brazilian fan, our hypothesis is that the relationship with the dependent variable is a positive one, indicating a wider audience as more clubs are involved in the championship. Souza and Angelo (2004), however, assumed that the RIVALS should be a "substitute" and they expected a negative association because of the division of the market.

3.2.6. Club's Attributes

The variable FANS was included based on research done in June 2001 by the University of Sao Paulo[ix], which had 17.000 people from the 100 largest cities of Brazil were interviewed by e-mail, post mail and face-to-face on the streets. Official websites of clubs, websites of organized fan-clubs, newspapers, and sports magazines were also consulted. This variable is measured as the percentage of fans from each club in the country, assuming zero value for clubs not mentioned in the sources used. We assumed that the greater the number of fans, the greater the demand for the game. Table 2 summarizes this information.

The second club variable is the attribute "SEL", which indicates the games played for the *Brazilian National Football Team* by the athletes from each club, and thus SEL-HOME[x] and SEL-VTR[xi]. Variable GOL (GOL-HOME and GOL-VTR) refers to goals scored by the athletes from each of the clubs for the Brazilian National Football Team. Thus, these four variables seek to capture the presence of "stars players".

TURNOVER tries to investigate the change in the composition of teams as an important factor in the demand for games. Thus, it is the percentage of athletes who were not playing for the host club at the previous year. Shmanske and Kahane (2000)

analyzed the impact that a change in the framework for players has on the demand for the games for a specific team in Major League Baseball under the assumption that the fans are averse to changes in the composition of teams because of the lack of identity that will cause in the spectators.

In order to assess whether access to the first division by a team that played in the second division in the previous year causes an increase in demand for the games of this club, we included a binary variable, called SECOND, with value of 1 for such clubs (*Atletico-MG*, *Sport*, *Nautico* and *America-RN*) and of 0 for any other case. This hypothesis is strengthened by the observation that the average public that these clubs had was , respectively, of 23,199, 26,070 (3rd highest average), 12,912 and 9,370, while the average audience in the championship was of 17,461 people.

Variables FIRST and LAST try to check the influence of the club's position in the national ranking on the demand for their games. Thus, we operate under the assumption that both the teams with real chances of winning the championship title and those at risk of falling to the second division attract fans ("fans solidarity[xii]"). The FIRST takes the value of 1 if the host team is placed among the top eight in the ranking and 0 otherwise. Similarly, the variable LAST takes the value of 1 if the host club is placed among the last four (i.e., those that would be demoted to second division if the championship ended that way) and 0 otherwise.

Finally, given the large number of fans of teams located in Rio de Janeiro and Sao Paulo residing in the north, northeast and center-west regions of Brazil, a phenomenon that became more evident after the international prizes won by these clubs during the 90s, the BIG variable was included to capture the effect that the "large teams" cause on visitors when the games take place in those areas mentioned. Thus, the authors consider as "big": *Santos*, *Corinthians*, *Sao Paulo*, *Palmeiras*, *Fluminense*, *Vasco*, *Botafogo* and *Flamengo*. Because the arbitrary selection of big clubs, we used the top eight clubs according to the CBF's ranking[xiii] (updated on 03/12/2007), which are, namely, *Corinthians*, *Vasco*, *Flamengo*, *Sao Paulo*, *Atlético MG*, *Internacional* and *Palmeiras*. In other words, we believe that not only the clubs from the SP/RJ cause influence on the demand for games, but whatever club has a high ranking at CBF.

Table 3 summarizes the variables and the theoretically expected signs.

4. RESULTS

The results of the regression, which used the variables mentioned in the methodology, is described in Table 4. Out of the 27 variables initially included in the model, only 9 are present in the final model, which was reached after the completion of various interactions between variables in order to find a robust model. All continuous variables passed the Komogorov-Smirnov normality test and presented, as variables of the model, a statistical significance of 5%. White's test didn't detect heteroscedasticity in the model.

In terms of magnitude, the most important variable was whether the club has moved to the first division championship or not (SECOND). Second in importance was the PRICE of tickets (measured by revenue/public). The results also indicate that major teams carry some power to influence the decision to watch the games, that being the variable with the third largest coefficient.

As to the Demographic factors, only CAPACITY emerged in the final results, and presented a positive impact, as expected, indicating that larger arenas tend to attract more public.

In terms of competitive imbalance, the range of points between the leader of the championship and the average difference in points between two clubs facing each other (AMPLID) showed a negative sign, indicating that the smaller the difference, the greater the importance of match, leading to a larger audience.

From the fourth group of variables (Expected match quality) only Round and Classics emerge in the final model and presented the expected positive signs. Thus, the demand for games seem to increase because of the advance of the championship and the occurrence of games involving teams from the same city.

The amount of clubs in the same city that are competing in the Brazilian Championship, that is, RIVALS (belonging to Expected match quality Group) showed the expected positive sign and a statistical significance of 1%. Thus, it is concluded that the existence of other clubs are not Substitutes as proposed by Souza and Angelo (2004), with each fan attending only the games from the club that he or she really likes. Quite to the contrary, the demand for games increases because of the rivalry between clubs in the same city.

Finally, the group of variables that is the most important in determining the demand for games is the one referring to the club's attributes, particularly BIG, teams that came from the second division and the top 8 in the ranking.

LOG (PRICE) showed a negative coefficient, as expected, and lower than 1 suggesting that the demand for soccer in Brazil is price-inelastic. This indicates that a 1% increase in the price of admission reduces attendance by 0.27%. Thus, a club may raise the price of the ticket without causing a relevant reduction of revenue from ticket sales, on average. It should be noted that although the variable was statistically significant and is an important one, as it was one of the specific objectives of this work, its value tells us that changes in price have very little influence on the demand for games. The income-elasticity of demand, however, could not be calculated because Income was removed from the model due to not being statistically significant in previous tests.

Table 5 compares the signs of the variables encountered as a result of this study with the assumptions for them in the present study and those resulting from the study by Souza and Angelo (2004)[xiv]. As can be seen, most of the variables that appear in our model are also in the model from Souza and Angelo (2004) with a good degree of adjustment. Only RIVALS and LOG (PRICE) are absent in the latter. Furthermore, although the DIST and PAYTV[xv] are present in the SEG-Model by Souza and Angelo, they are absent in the results presented here.

5. CONCLUSION

The present study aimed to apply a methodology previously used on the Brazilian championship in 2002 on data from the Brazilian championship of 2007, drawing up on the new legislation requiring the clubs to publish information about attendance and revenues after each game.

Through out this article, we can see that the results presented here were similar to those found by Souza and Angelo (2004), leading us to conclude that, despite the lack of data on public and income with respect to some clubs, their results are still valid.

Thus, we conclude that the factors that most influence the demand for football matches in the Brazilian championship are: difference (in points) between the leader of the championship and the average difference in points between the clubs that face each other (the real importance of the game: AMPLID); capacity of the stadium (CAPAC); Classic matches (CLASS); Team of great national impact as a visitor in the north, northeast, and central-west regions of Brazil (BIG); price of the ticket (showing that the games are inelastic with respect to the price - LOG-PRICE); the top eight clubs in the

ranking (indicating that they have reasonable chances to get to the leadership - FIRST); number of clubs that are competing in the same league in the city host (RIVALS); and the round (ROUND)

Finally, the results found by Souza and Angelo (2004) remain valid in view of the fact that the same variables they found were statistically significant in the model presented here, with high and significant coefficients. Approximately 40.08% of the variance in the presence of the public in stadiums in the Brazilian Championship games can be explained by the variables above, showing a good degree of adjustment of the data.

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Figure 1: Average attendance for Brazilian championship since 1971.
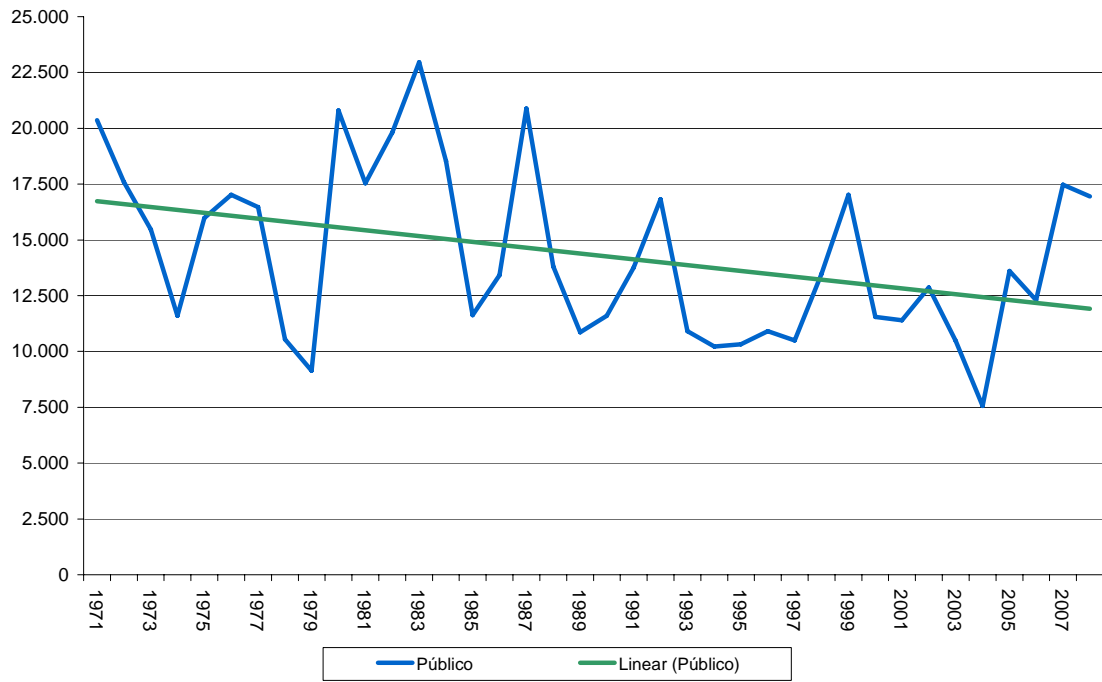
Table 1: Rivals

City	Club	Rivals
Sao Paulo	*Corinthians* *Palmeiras* *Sao Paulo*	03
Rio de Janeiro	*Botafogo* *Flamengo* *Fluminense* *Vasco*	04
Porto Alegre	*Grêmio* *Internacional*	02
Curitiba	*Atlético-PR* *Paraná*	02
Belo Horizonte	*Atlético-MG* *Cruzeiro*	02
Recife	*Náutico* *Sport*	02
Goiânia	*Goiás*	01

Florianópolis	*Figueirense*	01
Caxias do Sul	*Juventude*	01
Santos	*Santos*	01
Natal	*América-RN*	01

Table 2: Fans

1º	*Flamengo (RJ)*	16,4 %
2º	*Corinthians (SP)*	12,3 %
3º	*Vasco (RJ)*	11,0 %
4º	*Sao Paulo (SP)*	9,5 %
5º	*Palmeiras (SP)*	8,6 %
6º	*Grêmio (RS)*	3,2 %
7º	*Atlético (MG)*	3,1 %
8º	*Santos (SP)*	3,0 %
9º	*Fluminense (RJ)*	2,9 %
10º	*Cruzeiro (MG)*	2,6 %
11º	*Botafogo (RJ)*	2,5 %
12º	*Internacional (RS)*	2,0 %
13º	*Bahia (BA)*	1,3 %
14º	*Sport (PE)*	1,0 %
15º	*Vitória (BA)*	0,9 %
16º	*Coritiba (PR)*	0,7 %
17º	*Santa Cruz (PE)*	0,6 %
18º	*Paraná (PR)*	0,5 %
19º	*Ceará (CE)*	0,4 %
20º	*Paysandu (PA)*	0,3 %

Table 3: Summary of variables

Variable	Group	Expected Sign
INCOME	Economic factors	-
LOG (PRICE)		-
POP	Demographic factors	+
CAPACITY		+
DIST		-

AMPADV	Competitive imbalance	-
AMPADV_2		-
AMPLID		-
ROUND	Expected match quality	+
CLASS		+
WEEKDAY		-
SAT		+
SUN		+
RIVALS		+
TV	Substitutes	*
PAYTV		-
FANS	Club's Attributes	+
SEL-HOME		+
SEL-VTR		+
GOL_SEL_HOME		+
GOL_SEL_VTR		+
TURNOVER		-
SECOND		+
FIRST		+
LAST		+
BIG		+

Table 4: Results. Y=LOG(PUBLICO).

Dependent Variable: LOG(PUBLICO)
Method: Least Squares
Included observations: 377

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.910419	0.185926	47.92455	0.0000*
AMPLID	-0.031768	0.006870	-4.624182	0.0000*
CAPACITY	8.69E-06	1.30E-06	6.677630	0.0000*
CLASS	0.177494	0.048404	3.666943	0.0003*
BIG	0.196190	0.062973	3.115481	0.0020*
LOG(PRICE)	-0.274498	0.063473	-4.324678	0.0000*
FIRST	0.160997	0.072407	2.223502	0.0268**
RIVALS	0.125351	0.032630	3.841559	0.0001*
ROUND	0.016998	0.002457	6.918732	0.0000*
SECOND	0.311555	0.083385	3.736356	0.0002*
R-squared	0.415176	Mean dependent var		9.532220
Adjusted R-squared	0.400834	S.D. dependent var		0.749964
S.E. of regression	0.580516	Akaike info criterion		1.776367
Sum squared resid	123.6784	Schwarz criterion		1.880670
Log likelihood	-324.8451	F-statistic		28.94878
Durbin-Watson stat	1.973593	Prob(F-statistic)		0.000000

* (**) means that the coefficient is significant at the 5% (1%) level.

Table 5: Comparison of the coefficients signs. SA = Souza and Angelo SEG-Model.

Variable	hypothesis	Result	Result_SA
AMPLID	-	-	-
CAPACITY	+	+	+
CLASS	+	+	+
BIG	+	+	+
LOG(PRICE)	-	-	*Absent*
FIRST	+	+	+
RIVALS	+	+	*Absent*
ROUND	+	+	+
SECOND	+	+	+
SEL-HOME	+	Absent	+
PAYTV	-	Absent	-
TV	-	Absent	Absent

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[i] Law Nº 9.615 - March 24, 1998 - establishing general rules on sport and other provisions.

[ii] Law N° 10.671, May 15, 2003 - which provides for the Defense of Sports Fans Statute and other provisions.

[iii] Some teams were punished by Athletic Justice and had to play the match without any attendance. So, three games were excluded from the dataset. We will treat this matter in more detail in the exposure of the methodology.

[iv] http://www.cbf.com.br/seriea

[v] According to Carlos de La Corte, Master in architecture from the University of Sao Paulo (USP), the Brazilian stadiums obey, on average, only 50% of the rules of international law that regulates football stadium. Source: http://www.onorte.com.br/noticias/?75279

[vi] The unavailability of monthly data for each city with clubs disputing the Brazilian championship forced Souza and Angelo (2004) to divide the model into two parts: "SEG model" and "DESEMP model".

[vii] More specifically, the cost of travel for the games in football stadiums can be measured by the cost of transportation + cost of ticket + food expenditure. However, we believe that the cost of transportation by itself is already a good proxy.

[viii] National Department of Transit (Brazilian)

[ix] The search is signed by "46 students of Statistics from University of Sao Paulo", without any information on the statistical method used but it is the only information available and compatible with our observations. Available at: http://www.rsssfbrasil.com/miscellaneous/othersurv.htm

[x] SEL-HOME: for the home team

[xi] SEL-VTR: for the visiting team

[xii] Giovanetti et al (2006) conducted an interesting study about the Brazilian professional football's fans fidelity

[xiii] We ignored here if the club was from RJ-SP or not.

[xiv] Results only for the SEG-Model by Souza and Angelo (2004) because it has 216 observations while the Unemployment-Model presents only 97.

[xv] TV wasn't statistically significant either. So, there is some evidence that these "Substitutes" don't affect the demand for football matches in the Brazilian Championship.