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'The Effect of Acquisition of Stadium Naming Rights on  
Shareholder Wealth: Analysis and Optimal Strategy'

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## INTRODUCTION.

The last two decades can be defined as a sponsorship era. Even though the concept of attributing the name to beneficiary's institution in exchange for financial support is known to history from ancient times, never has it experienced such magnitude of dealerships as today. Meenaghan (1983) finds that commercial sponsorship increased sharply since the 1970s and sport sponsorship made 70 per cent of all sponsorship activities. The combination of increase in sport popularity during the 19<sup>th</sup> century with the development of mass media contributed to formation of such special branch in marketing as sport sponsorship. Such strategy arose as attempt to provide signal of high quality of product by being officially associated with the healthy sport activities. In 1980s the explosion of the corporate sponsorships occurred, becoming more of a routine by 2000, but, nevertheless, still showing huge acceleration today.

Stadium naming rights deals are associated with transaction of exclusive right to name a facility in exchange for financial support over the specified period of contract. Being an innovation in 1980s, acquisition of corporate naming rights persuaded high effectiveness as a marketing strategy with respect to increase in brand awareness and sales profitability rather soon. By the end of 20<sup>th</sup> century, such strategy became the widely-applied step towards catching the more mass media spotlight and enhancing the market share of the brand. By 2002, more than 70 per cent of venues in the major league sports had been named after some corporate sponsors (Howard and Crompton, 2003). Today, the stadium without corporate name brings more surprises in the USA and Canada than those without one. Kishner (2011) states that even though stadium naming rights deals are not the newest concept, such vast permutations and applications have never occurred before. Indeed, the length of contract has prolonged, the list of exclusive rights among the parties has enhanced, the prices of dealerships continue to shift the highest paid record. McCarthy(2000) believes that naming rights deals provide the most cost effective marketing communication nowadays.

However, due to partially intangible nature of such contracts, usual accounting principles are not capable of capturing the value effect of the company immediately after the implementation of such strategy. Determination of the value of naming rights implies not only the change in profitability it causes, but also increase in brand awareness, exposure to mass events, perceptions of public and other effects that can impact company's value. Consequently, some researchers suggested using the

event study methodology to capture the effect of implementation of such strategic policy on the firm's value. McWilliams et al. (1997, p.626) define event study as a powerful tool that can help researcher determine the financial impact of changes in corporate policy. It is believed that stock prices are less prone to inside maneuvers than accounting ratios or figures, and, under the assumption of efficient markets, the price reaction to unexpected announcement is immediately and fairly reflected in stock price movement. On this principle, the event study measures whether the market participants find the announcement to be value-enhancing, value-depressing or of neutral effect for the company.

The naming right deals announcements are reviewed in several works. Johson (2009) investigated the impact of 51 sponsorship announcement on companies in Australia and found no overall significant reaction, concluding that such an announcement does not shake up investors beliefs. But why would this still be considered as one of the most effective strategies, if there were no reaction in beliefs? Janney et. al. (2013) performed usual event study and found insignificant overall result, but provided some insights on observable significance if the sample is divided according to some characteristics. The first step towards resolving the paradox of no significant result of the most effective strategy became the work of Clark et al (2003) and Marikova et al. (2007) who used the same sample but received drastically different result. Clark et al included multiple firm-specific factors and examined the effect according to each, while Marikova simply observed the overall effect. The categorizations proved to be important and Clark et al (2003) suggested that further studies might focus on emphasizing more specific factors as well as stated that capturing the effect might help explain the investors psychological changes and account for them in future. Nevertheless, their study used very long event window, in comparison to what literature suggests as high powered (McKinlay,1997 ), and might be prone to numerous other events that happen within the company for that period. Moreover, all of the studies used the assumption of normality of abnormal returns and subsequently implemented the parametric tests, while having rather small sample, around 50 observations. This might lead to problematic hypothesis testing and non-robust results. In general, the performed studies might not be completely reliable analysis of stock market performance after such announcement and left numerous drawbacks to be corrected in future studies.

The validity of this work:

The naming rights deals are considered as one of most effective marketing approach to increase the market share and brand awareness. Nevertheless, it has a surprising deficit of works that accurately provide the research and make reasonable conclusions. Those works either account on unreasonable assumptions, or do not investigate the question deeply enough. This study attempts to provide such work and give broader insight in the concept of naming rights deals.

The aim of this work:

The effect of the announcement of new management strategy can have numerous factors impacting the direction of reaction. This study will provide analysis of seven factors which are expected to have reaction due to physiologically different signal they bring forward. Moreover, the advice for future contracts are set according to the weight company's characteristics tended to impact within this sample. The advise provides the set of characteristics with most promising value impact, as well as the set of characteristics which should eliminate the idea of stadium naming rights acquisition for the company.

The structure of this work:

The work will gradually introduce the concepts needed to determine each step in theoretical as well as methodological framework. The core concept of naming rights will be discussed with brief historical overview. This aims to highlight the evolution of naming rights dealership and rapidly changing patterns of its structure. The event study literature will be included in the way that covers completely all the questions and ideas connected to this study. That means, some theoretical basis for understanding, key issues investigated by event study methodology and potential problems that arose, literature focused more precisely on the similar question and the received answers. The rationale of hypothesis development will be explained in details. The methodology will be provided with explanation of the choice of tests and consequent results will be discussed. In the end, the advice for future naming rights deals will be introduced.

# 1 THE CONCEPT OF NAMING RIGHTS DEALS

The following chapter is devoted to defining the needed benchmark for study of naming rights deals. In the first part I will introduce the definition, motives and main characteristics of this kind of deals. In the second part, a brief history of naming rights deals, focused particularly on sport facilities, will be provided in order to highlight the latest trends and magnitude of such deals. In the third part conclusions will be outlined.

## 1.1 NAMING RIGHTS DEALS: CORE CHARACTERISTICS

'Naming Rights can be broadly defined as a privilege of associating a sponsor's name with a building, project or event by including the sponsor's name in the title of item being named' (Ashley and Ohara: 'Valuing Naming Rights', 2001,p.2).

Naming rights deals imply transactions involving purchase of the exclusive right to name the item or facility by the corporate brand name over the period of signed contract.

Considering the characteristics of naming right deal it can be reasonably referred to as a sponsorship. The well accepted definition of sponsorship is 'an investment in causes or events to support corporate objectives (for example by enhancing corporate image) or marketing objectives (such as increasing brand awareness)' (Gardner and Shuman, 1988, p.44). Acquisition of naming rights can be thus defined as a sponsorship deal with aim to increase the future sales and impact the brand recognition by exploiting larger public exposure, media spotlight and increased opportunities of sale.

The existing literature shows numerous rationale behind the involvement in sponsorship deals, but the one being most often cited is provided by Cornwell et al. (1998), who define the following motives of sponsorship:

- improving goodwill
- enhancing image
- rising awareness
- increasing profitability
- contributing to community

The resonance of these motives vary with respect to specificity of naming rights deal. The objects of interest in such partnerships are:

- hospitals
- schools
- parks
- shopping malls
- sport facilities
- events
- products
- stations

The change in value such marketing strategy brings is hardly measurable within a specified time, especially in monetary terms. The reason behind it is that significant effect is of intangible nature and, thus, typical accounting procedures are not being enough. 'Traditional methods of accounting do not accurately capture the value of intangible property, even though accountants do acknowledge its existence' (Ashley and Ohara: 'Valuing Naming Rights', 2001,p.3). Nevertheless, marketing professionals refer to naming rights sponsorship as one of the most effective marketing strategies in their effect. 'When it comes to deal-making, stadium naming-rights sponsorships represent the pinnacle of sports marketing, a rare opportunity to elevate a brand's identity by aligning with the nation's most visible and treasured venues, and the teams they host' (P.Brown, Sports Business Journal, 'Effective, creative activation gives naming rights more impact', July 2011, p. 32).

Even though an equivalent effect on brand awareness can be achieved through marketing strategies via-commercials, newspapers and events, none of them implies such exposure to social gatherings as in the case of putting the brand name on the stadium. The sport facility naming right purchase implies the implementation of brand's logo, as well as change of facility's name in all official sources for the period of contract. It also requires news and events associated with the stadium to be accompanied exclusively with the new name and logo. Contracts require logos and commercials of company to be shown on all the displays within the stadium area for a pre-specified amount of time. 'Naming rights relationships, arguably, provide the most cost effective marketing communication in the market place today'(McCarthy et al. (2000): 'An examination of rationale and motives for corporate purchase of stadium and arena naming rights', Cyber Journal of Sport Marketing, iss.1327-6816).

Nevertheless, direct and observable changes can occur immediately in form of increased sales. The contract often secures company to be the sole provider of goods and services within the stadium. The evidence shows that effect is even higher if company and stadium have complementary character and highlight their similar objectives. Consequently, the profitability in the days of games hosted at that stadium can surge due to large sales volumes of products and services as well as huge revenue from parking places. As for stadiums, these type of deals are highly beneficial as well. In some cases, they occur as a consequence of financial contribution by company for reconstruction or improvement of facility purposes. Often, companies go further and contribute to events, teams and innovations within stadium. Such dealerships vary from 5 to 30 years, often being prolonged for another period. The deals are well predetermined and give opportunity to break the contract off in case one of sides engages in reputation reducing activities, scandal and bankruptcy situations.

## 1.2 EVOLUTION OF NAMING RIGHTS DEALS

The concept of naming rights dealership is familiar to history for decades. There were always institutions in financial need, which, in response to generous help, attributed their name to the beneficiaries. Referring to the history of stadiums sponsorships exclusively, the beginning links back to 1920s. The first naming deal with sport facility was made by William Wrigley, the owner of Wrigley Company. Numerous deals, following this start point, were also in the context of personal naming rights acquisition, mainly using family name of companies' owner (for example, Busch Stadium after the owner of Budweiser). This type of dealership was soon replaced by the corporate naming rights deals, when in 1980s The Forum Stadium sold its name to Great Western Savings and Loan. This type of dealership continues to accelerate in demand. By 2002, more than 70 per cent of venues in the major league sports had been named after some corporate sponsors (Howard and Crompton, 2003). The relatively limited supply of the major stadiums combined with the lasting signed contracts contributed to the rise of similar partnerships with minor, university and even college league facilities (BB&T Field, Jones AT&T Stadium, etc). The latest estimates suggest that when the recently planned deals are implemented into practice, there might be only eight NFL stadiums not attached to corporate name (Crabtree, 2013).

The conditions signed within the deals evolved dramatically as well. In the start, contracts did not



go far beyond acquisition of logo place on the roof of the stadium. Now, the deals provide both parties with variety of privileges as well as wide space for corporation. As so, the contracts give opportunity to provide company's goods or services within the stadium, for example, all payments and cash points done by the financial company's cards within the stadium area, beer and food provided by company, if it is from brewing or food industry. The price of naming right deals is surging with time as well. Finkel (2011) noticed that in 1966 the stadium of NFL team, Oakland Raiders, was purchased for \$7.2 millions over the period of 6 years and was considered as absolute boom for that time. By 1987 another NFL stadium, home of Miami Dolphins, sold naming rights to Sun Life Corporation for \$37.5 million over 5-years contract. In 2000 the striking amount for such deal was \$320 million for 32 years by Reliant Energy, while the latest record is \$400 million 25-years contract signed by MetLife in 2010.

There are several non-promising examples of such deals, which were broken off soon due to bankruptcy or other scandal one party was involved in. The most quoted example in papers is the one connected to the Enron Field, which received its name after the huge energy company. The high diapason of scandal affected both parties in contract when the energy company went bankrupt. The stadium had to re-purchase the naming rights in order to bare the least costs in form of reputation burden.

Despite some results reveal possible depressing outcomes, the considerably surging pattern of involvement in naming rights contracts over the last century still continues. The magnitude of the deals increased, the length of contract is prolonged, the maximum price willing to be paid still rises and the search in new spare facilities continues. The vast number of companies also engage in multiple corporate naming contracts (AT&T Park and AT&T Arena, FedEx Field and FedEx Stadium, Scotiabank Saddledome and Scotiabank Place) and numerous contracts are set for infinite number of years (Rogers Centre, Coors Field, Jones AT&T Stadium).

Hence, the pattern is rather promising. International Journal of Sports Marketing and Sponsorship states growth of number of title sponsorship deals is estimated as \$750 million per year for 32 countries, while the USA makes the half of it (IMR Sports Marketing and Sponsorship Intelligence, 'Sponsorship Today', 2050-4888). 'Naming rights and sponsorship deals are, of course, nothing new, but never before have we seen such a proliferation in the number and permutations of such deals as there have been in recent years' (Kishner, 2011, p.1).

### 1.3 CONCLUSIONS

The rate of naming rights deal occurrence is accelerating with time. If few decades ago no one even thought about local facility being named after the corporate brand name, now it becomes surprising if one is not. The companies evidently find it as a reasonable investment and great marketing strategy, as they expect numerous feedbacks in terms of increased awareness, profitability, reputation and public exposure. This field of deals have changed significantly in terms of price, length and magnitude of contracts. Obviously, this became one of the significant part of sponsorship and marketing and lot of hopes is put on such strategy. The history suggests the demand for sport facilities is still moving in the upward trend and will continue so in, at least, nearest future. The professional marketologists beliefs of acquisition of naming rights as one of the most efficient paths towards the success imply this field is worth investigating deeper.

## 2. LITERATURE REVIEW

The following chapter will contain four parts. In the first part, I will introduce the framework of event study by outlining the basic works and findings. These are considered as a core findings and a startpoint of the whole methodology. Further, I will provide discussion of several works which used event study for various, not specifically corporate issues. The examples will be from managerial and even surprisingly different aspects, which suggests broaden application of the study. Next, the literature review will be focused on event studies within the sponsorship of stadiums, defining the major outcomes and commentaries. They all together give insights on what whould be done and what drawbacks they did not consider in conclusions. The fourth part will be conclusion of chapter.

### 2.1 FRAMEWORK OF EVENT STUDY

Event study is a technique used to measure the reaction of the capital market to the certain announcement. A.McWilliams et al. (1997, p.626) define event study as a powerful tool that can help researchers assess the financial impact of changes in corporate policy. Unlike other factors reflecting companies' performance, such as sales, the capital market captures immediate magnitude and sign of shareholders' reaction to the announced strategy.

The beginning of the event study methodology development is assigned to the work of Dolley (1993), who assessed the reaction of stock to the split announcement and received evidence of beneficial abnormal returns around the news date. After that work, a significant amount of studies were performed in the same field and, consequently, many new approaches and limitations arose. Binder (1998) suggests, that event study methodology has become widely applicable and is aimed to answer one of the following two questions: 'is the market efficient?' or 'if market is efficient, what impact do announcements bring to value of the firm?'. In order to restrict event study with measuring the reaction to the news arrival and receive reliable and valuable results, the researcher must control for the effect of fluctuations caused by market inefficiencies.

The necessary condition for capturing precisely the reaction to the announcement, the assumption

of market efficiency, at least with respect to the public information, is set. Fama (1991) defines market to be semi-strong form efficient if stock prices fully and fast adjust to all the releases of new public information. More precisely, this means that prices include all available information on not only past values of the stock under consideration, but past values of other assets as well as all other possible influential variables observed by public. This is outlined by all studies as the main condition towards the successful research results on impact of announcement, and will also be one of the initial assumption in this research.

## 2.2 EVENT STUDIES IN VARIOUS FIELDS

Literature has difficulty to count the overall number of event studies performed during last two decades, but certainly outlines the numerous developments of tests on significance of the results as well as extensions to more managerial fields of study. The 'classic' work, serving as a baseline of the whole further practices, is the paper by Fama, Fisher, Jensen and Roll (1969), who contributed their work to determining common stock prices reaction to stock split based on monthly data. The result proved significant shock of returns which adjusted to the new public information fastly. The huge break through was made by Brown and Warner (1985), who examined properties of stock returns based on daily data. The extension of this paper is using daily data rather than monthly in methodology of event study. This is a golden result needed for all further event studies, including this one.

Through decades the impact of surprising news was tested with event study. Big fraction of those can be categorized to the field of structural changes. For instance, the merger and acquisition strategy disclosure was researched infinite number of times and, in general, showed the beneficial impact on shareholders wealth of target firm (Jarell et al., 1988; Ruback et al., 1983) and depressing effect for raiders firms (Jarell et al 1989). Nevertheless, lately, much more attention is devoted to managerial strategies announcement investigations. For example, the expected increase in stock prices were obtained after the announcement of huge celebrity involvement in companies activities (Agrawal, 1995). Another metaphor of unexpected announcement is used in investigating the overall countries' stock market behavior after the natural disaster (N.Luo, 2012). The significant results occurred only in separate industries, while no overall effect was captured. Event study

evaluation of the reaction to managerial practices became repeatedly performed, but, interestingly, yielded often different results based on the sample, test and clusters they use. One evidence is clear, the event study methodology went much further than usual corporate strategies evaluations.

### 2.3 EVENT STUDIES IN SPONSORSHIP

Reactions on company's decision to engage in sponsorship activities have received broaden attention lately. With increasing sponsorship deals, there is also increasing number of attempts to measure its impact on the wealth of shareholders. While sponsorship is a marketing strategy, its specificity is the absence of perfectly obvious slogan suggested to public. Consequently, it provides analysts a spare field for interpretations. The

long-run value of sponsorship should be measured by whole list of factors: starting from accounting ratios changes and finishing with hardly capturable modifications in people's perception of the company's pursuits. It is a prolonged process of analysis, so researchers came up with the alternative method of evaluating the expected profitability - event study.

Vast number of works attempted to investigate the effect of sponsorship announcement on company's value. It is assumed that if the public accepts the announced decision as a favourable one- the prices will show significant positive abnormal return, and vice versa.

Sport or event sponsorship is question of study of many works. Past researches considered different issues, such as impact of hosting mega-events as FIFA World Cup and Olympic Games (X.Li, 2007; Martins et al, 2007; Tsioutsou et. al. 2005), becoming the official major league's sport sponsor (Cornwell et.al. ) and acquisition of titles of arenas (Clark et.al, 2002; Clark et al, 2009; Janney et.al, 2013). These works try to complement each other and make broader conclusions on factors impacting the result.

Concentrating on the stadium sponsorship literature, one can define several works devoted to this issue. The paper by A. Johson (2009) investigated the impact of 51 sponsorship announcement on companies in Australia. Using the usual event study methodology the researcher obtained neutral overall results on the economic wealth of shareholders. The constantly accelerating number of signed contracts for stadium sponsorship are not consistent with the obtained results. In fact, this paradoxal outcome was received by several studies and all of them had one common characteristics: the research was designed without accounting for broad differences in the companies and,

consequently, investors in the study. A. Johnson highlighted the need to pay more attention to variables impacting the change in returns. Janney et. al. (2013) contributes to this idea in the study which used 203 sponsorship announcements and implemented more deep research of naming rights acquisition using as well the usual event study technique. The results they obtained also suggest that there is insignificant overall impact, while by dividing the sample according to the relatively new contract deals, existence of other similar contracts in company's past, level of proficiency of league and effect on college league. Two out of five categories showed significant results reflecting that companies with past experience in such sponsorship show more significant abnormal return than others. Moreover, ANOVA test showed that major leagues stadiums sponsorships tend to be perceived as more beneficial compared to minor ones. Other categories did not show any significant impact. This suggests that sub categorisation approach can lead to more broadened conclusion about the perception of event, as the overall effect can be off-set due to numerous other factors involved.

Clark et al. (2003) state that "it is impossible to effectively ascertain the actual strength (or even the direction) of the correlation between stadium sponsorship announcements and share prices. This is because no efforts were undertaken to analyze the impact of stadium- and arena-naming-rights announcements in isolation" (Clark et al, 2003). 49 observations were examined, including only sports with NFL, NBA, NHL MLB teams connected to it. Using usual technique of finding abnormal returns via OLS market model and event window [-25; +50]. They received positive significant effect in the day of announcement using the categorisation principle as well as captured significant result depending on characteristics. Marikova et.al. (2007) proved the importance of examining factors separately by taking the same sample as the one by Clark et.al (2003) and analysing only overall companies' performance. The result suggested insignificant cumulative effect. The main trigger of such disparity lies in the fact that the earlier approach accounted for ten firm-specific factors, while the latter did not acknowledge the importance of using categorization of sample data.

Clark et al (2003) suggest in their analysis that this reasonably proves not only the value changing effect of such deals, but also that investors' perception depend on much peculiar factors and by investigating them the managers could account for such psychological effects in their future decisions.

The existing literature on naming rights acquisition makes some clear insights in solving the

phenomenon of initial results implying neutral reaction of shareholders by delving deeper in possible individual firms' characteristics as well as explanations of psychological patterns followed by investors. Consequently, eventhough this field had some investigations, it is still widely opened for next research which will keep in mind all the suggestions of the previous researchers.

## 2.4 CONCLUSIONS

The event study methodology is on the one hand rather new methodology, but, on the other hand, highly applied during these decades to various investigations. The main works are centered around corporate strategy announcement, but, especially lately, the increased use of event study is observed in management. During the last decades numerous modifications happened in event study methodology, implying the extension of tests and loosening assumptions. The studies evaluate in a positive manner, implying that more drawbacks are controlled for. Still, the methodology is often non-accurately used and miss-specified conclusions are made. For example, studies on similar samples tend to show different effects. Researchers give advise on separating data under analysis according to particular characteristics, as, they say, result heavily depends on that. Consequently, event study is fast method of observing the strategy effect, but still needs deeper insights on how to increase the reliability of the observed results.

This chapter will be devoted to the research methodology. In the first part I will provide information on the way the data is collected, data sample is determined and windows for the further study are outlined. Then, I will go by introducing the steps connected to abnormal returns calculation. The third part of chapter is devoted to discussion of the method which is more likely to give reliable results in this case. The fourth part is description of Wilcoxon-Mann-Whitney test for determination of significance of abnormal returns. Next, the chapter will continue with outlining K-means clusterization and the final part describes the Quetelet index.

### 3.1            DATA COLLECTION

One of the main requirements that event study methodology sets in order to receive valuable results is the accuracy of the collected data. As McWilliams et. al. (1997) state, the only information needed for the event study are names of traded firms, event dates and stock prices. As much as it may seem as easy to implement, it crucially depends on the precision of the data.

The initial step was to find the list of all stadiums which signed official naming rights dealership. It was done through web-resources and was carefully checked on each official stadium's site in the section which describes its history. (Sports Business: Professional Sports, List of Sports Venues with Sole Naming Rights, Financial History of the New York Giants). In attempt to minimize bias that can arise due to extreme difference in preferences, characteristics of sport, size and number of venues and possible culturological traditions with respect to such events, I limited my research with stadiums in United States of America and Canada.

Next, the venues in the list showed too many variations in their applications, meaning, most of them were used for football, basketball and other sports and concerts, while others could be auto racing speedways, venues for exhibitions and so on. Again, for accuracy reasons the facilities for multi-purpose and those focused on football, basketball, ice-hockey and baseball were left, others being excluded from the study. Moreover, only the facilities in the capacity range of 18 000 to 85 000 seats were under consideration due to visible distinction of venues with lower capacity with respect to frequency, importance of events, location, purposes, etc.



Further, the accurate announcement date was collected. The announcement date is the official date that the press releases the information to the public. Several official internet news providers were used, among them were Sportsbusinessdaily.com, The Wall Street Journal, NBC News and others. Announcement dates that were impossible to be determined precisely were excluded from the research.

Due to the fact that precise daily stock market prices were needed for the research, companies that are not traded on stock exchange were also eliminated from the study. Moreover, one of the crucial factor needed to be accounted for is the absence of compounded effect (McWilliams and Siegel (1997), meaning that the event is isolated from other events effects. Those companies who were evidently incorporated in some other significant activities, such as, for example, merger and acquisition, during the period around naming rights deal were also excluded from the study.

Consequently, the list of objects with corporate names in this study all satisfied the following criteria:

- located in the United States of America or Canada
- used either mainly in football, basketball, baseball, hockey or in multi-purpose (ability to host multiple types of sports and concerts)
- ranged [18 000; 85 000] in the number of seats
- connected to the accurate date of announcement in the official press
- isolated from other event effect within the company
- traded publicly on stock exchange

The sample that occurred by the end of sorting, comprised 39 objects with details provided in Table 1 in the Appendix.

### 3.2 ABNORMAL RETURNS CALCULATION

After the sample of facilities and corresponding companies were identified, the daily stock market prices were obtained from Datastream.

The analysis of price behaviour is based on two period: event window and estimations window.

Considering that 'event' is the day of the announcement (also described as  $t=0$ ), the event window can consist of that day only or several days around the event might be included. Brown and Warner (1985) found that the power of the test decreases in the event window of (-5;+5) compared to just day 0. In order to control more the significance of event, literature suggests using smaller event windows in case of certain announcement dates (MacKinlay, 1997 ; Brown et al, 1985; McWilliams et al, 1997). For the same reason and implying the assumption that no leakage of information prior to the announcement occurred, this study uses announcement date [0] as event window. It consists only from the announcement day as the precise dates of announcement were found and stock prices should capture the effect immediately if market efficiency is assumed.

The estimation period is the period used to measure the expected returns for the event period. MacKinlay (1997) states that most often the period prior to the event window is used, excluding the event window itself. The estimation period length varies through studies, but if using market model for expected return, 120-day period is considered to be enough. In this study 150-days estimation period will be used. Estimation window is, thus, [-151;-2]. The gap of [-1] is included for observational purposes.

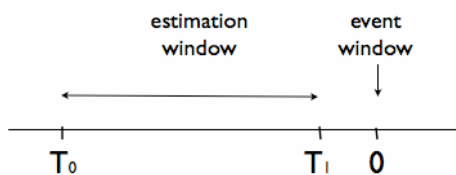


Figure 1. Time line for the event study

So, the estimation window is used to find excess returns during around the announcement and consequently determine whether they significantly reacted to the announcement. The event study approach assumes market to be efficient and thus expects stock market to reflect the reaction to the news fully and accurately. P. Drake et.al.(2010) state that empirical evidence prove US stock market to be at least semi-strong form efficient (*The Basics of Finance:An Introduction to Financial Markets, Business Finance and Portfolio Management, 2010, p.32*), while Bank of Canada's research (2004) found the same evidence for Canadian stock exchange (*Scott Henry, Michael R. King, 'The Efficiency of Canadian Capital Market: Some Bank of Canada Research', 2004*). So, we may rely on the fulfilment of this assumption within the following study.

Hence, the analysis of the magnitude and sign of the reaction comes to the analysis of excess returns significance and direction.

Brown and Warner (1985) propose the following estimation of excess returns:

- Mean Adjusted Return

$$A_{i,t} = R_{i,t} - \bar{R}_i$$

$$\text{where } \bar{R}_i = \frac{1}{150} \sum_{t=-151}^{-2} R_{i,t}$$

- Market adjusted returns

$$A_{i,t} = R_{i,t} - R_{m,t}$$

where  $R_m$  is the market index

- OLS market model

$$A_{i,t} = R_{i,t} - \hat{\alpha} - \hat{\beta}R_{m,t}$$

While Brown and Warner (1985) state that if there exist abnormal returns than there is no difference in obtained results depending on the model chosen, the other existing literature on event studies suggests that the most accurate and oftenly used is the OLS market model. MacKinlay (1997) states that it shows increased ability to capture event effects.

In this analysis the market model is implemented into practise, using for  $R_{m,t}$  S&P500 Composite weighted index for the returns measured for companies from the United States of America and other countries, while S&P/TSX Composite weighted index is used for Canadian stocks. The data is obtained from Datastream. The index was used throughout the estimation window with respect to the date, to estimate coefficients and, thus, apply them for abnormal returns for the event window. The coefficients were estimated using Eviews 5. Binder (1998) states that coefficients can be assumed to be constant during the event window. Further, for each company the obtained coefficients were used to find the expected return based on the market model. Finally, the excess returns were calculated along the [-1; 0] window as a difference between the observed return and the calculated expected one.

The obtained abnormal returns for each company can be observed for the period [-1;0] where period  $t=-1$  is included for comparison purposes, in Table 2 in Appendix.

### 3.3 DETERMINATION OF TEST ON SIGNIFICANCE

There are numerous methods to test significance of results, which also imply different underlying assumptions. Generally, tests in event study on significance of abnormal returns can be divided into two categories:

- Parametric tests

These tests are based on the assumption that the abnormal returns are jointly normal and identically independently distributed through time for all securities. Researcher should calculate cumulative abnormal returns and define their significance by implementing the t-statistics. There are several extensions which use standardization technique, for example test introduced by Patell (1976), which standardizes abnormal returns by their deviations from the estimation period. Standardization is used in order to satisfy the equal variance conditions. One of the characteristics of parametric tests is that they are also effected by existence of outliers, while those outliers should not be eliminated from the study due to their possible importance.

- Non-parametric tests

These tests are robust to data from non-normal distributions. The characteristics of non-parametric tests is absence of dependence on normal distribution requirement, so they are also called 'distribution-free test'. They are not affected by the existence of outliers due to their nature. Generally, non-parametric tests are either sign or rank tests. Cowan et al. (1992) propose generalised sign test which hypothesizes that proportion of positive abnormal returns is equal between estimation period and event period and is immune to asymmetry of AR distribution. Corrado (1989) proposed rank test, which assigns every abnormal return its rank and hypothesizes that it is equal to the expected rank equal to  $(T+1)/2$ , where T is the maximum rank. There is evidence that rank test loses power for the prolonged periods for CAR (for example 20-days event window), but if the period is short it has proved to be robust with respect to volatility and clusterings.

Though parametric method is widely used in big samples, the assumption of normality of abnormal

returns is too restrictive. Binder (1998) states that the hypothesis testing becomes problematic, because often the abnormal return estimators are not independent or do not have identical variance. McWilliams et al. (1997) analyze the main flows in managerial application to event study and define the necessary steps the researcher needs to follow in order to get the reasonable result. They highlight importance of using non parametric test at least at the end of each research, to identify outliers in cases when normality assumption is applied to abnormal returns, due to evidence that event studies are effected by outliers, especially in the small samples. Fama (1976) states that abnormal returns show fatter tails and skewness to the rights comparing to the normal distribution.

There exist many extensions and complementations to the methods outlined above, but the conclusion that can be derived from analysing the listed works is that the test on significance of abnormal returns should be non-parametric, especially in sample size, like in this study. Moreover, literature suggests that non-parametric tests outperform parametric ones due to their immunity to volatility and clusterings, while parametric tests are strictly dependant on distribution assumption, effected by variance behaviour of abnormal returns and impacted by outliers. Due to the evidence that abnormal returns tend not to be identically independently normally distributed in reality (Fama 1976) I expect higher precision of my results by using non-parametric test, which satisfies the outlined requirements for robustness of outcomes.

### 3.4 MWW TEST FOR SIGNIFICANCE OF ABNORMAL RETURNS

The MWW test, or Wilcoxon-Mann-Whitney test, also known as Wilcoxon rank-sum test, is a non-parametric test of difference of two populations against alternative that one stochastically exceeds the other. Using additional assumption of identical shape of distributions, Wilcoxon-Mann-Whitney one-sided test checks whether two populations significantly differ and, if yes, which one exceeds. The test is a non-parametric alternative to independent means t-test. The difference in populations in Wilcoxon-Mann-Whitney test is called a location shift.

The proper computation of Wilcoxon-Mann-Whitney is based on the following procedure.

Assumptions required are:

- $F_1$  and  $F_2$  are from the identical continuous distribution

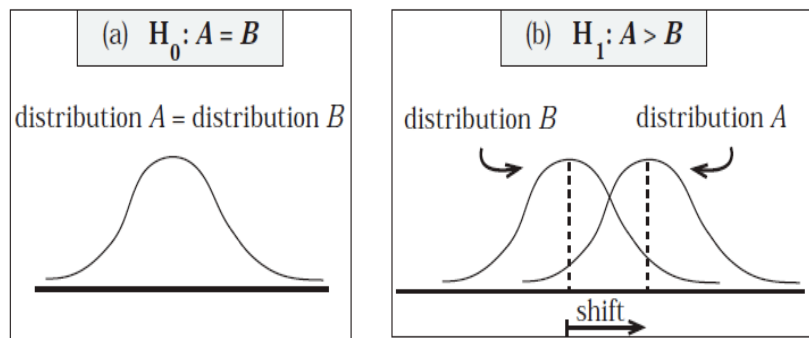
- $F_1(x) = F_2(x - \Theta)$ , i.e. two populations differ only in their location
- $F_1$  and  $F_2$  are mutually independent

Hypothesis can be written as:

$$H_0: \Theta = 0$$

$$H_a: \Theta > 0$$

The test is based on investigating the existence of what is called a location shift ( $\Theta$ ). In other words, if the distributions of two samples are the same, one can determine the centres of location, for example if  $\Theta$  is significantly greater than zero, then  $F_2$  is shifted to the left from  $F_1$  as in the figure 2.



**Figure 2 :** Illustration of  $H_0 : A = B$  versus  $H_1 : A > B$ .

Wilcoxon-Mann-Whitney test is based on the following idea. Having two samples, call one sample A and the second sample B. Wilcoxon-Mann-Whitney combines sample A and sample B into one combined sample and assigns each observation corresponding rank. Then, ranks attributed to each sample are summed. The larger summed rank between samples is used to test for critical value table:

$$WMW = \sum_{j=1}^n R(Y_j)$$

where Y is sample which makes higher sum of ranks from the combined sample.

The aim of event study technique is to determine the significance of departure of observed abnormal returns from zero during the event period. Friedman (1937) stated, normal distribution is

rather an exception than a rule with social and economic data. This test is highly powerful for non-normal data and shows efficiency of 0.95 comparing to t-test, which is considered as rather high.

Applying the methodology to this study, the actual returns will be compared to expected returns, in other words, observed abnormal returns will be compared with zero abnormal returns. Assuming that both samples come from the identical distribution, the significant departure between them is understood as a location shift of actual abnormal returns from zero. If the sample of abnormal returns exceeds sample of zero abnormal returns than abnormal returns are significantly positive. The nature of this study implies clustering the data by different characteristics, so, the sample of 39 observations is divided into smaller clusters and in small sample case WMM test rarely spuriously indicates significance relative to other tests.

First, I would analyze the significance of abnormal returns comparing the shift of observed abnormal returns sample and zero abnormal returns. This will be repeated for each cluster, so the effect of announcement will be examined for companies with respect to their characteristics (for example, impact of the announcement first for S&P500 components, then for S&P500 non-components and so on for each cluster). The sign of the departure will be analysed, so I chose one-sided alternative hypothesis. This allows to determine whether the significant location shift exists and in which direction.

Further, I will apply the same technique between some clusters, verifying whether abnormal returns of one cluster are observably different from the other (for example, difference in abnormal returns between components of S&P500 and non-components of S&P500 and, if yes, which is higher). Wilcoxon-Mann-Whitney test is immune to differences in sample sizes and outliers, so it can be relied on. Thus, I aim to capture the significant location shifts and their sign, if they exist, and verify whether the magnitude of stocks reaction to the announcement of naming rights acquisition may be attributed to difference in characteristics of clusters.

### 3.5 K-MEANS CLUSTERING

The key idea of clustering analysis is to find how data can be accurately divided into groups in order to apply different algorithms with respect to group's main properties. Vast number of theories are developed about what should be the basics of division into clusters, but k-means clustering is

one of the most sound ones.

K-mean clustering, the centre of works of McQueen (1967), Lloyd (1982), Ball and Hall (1965), is a method of clustering which portions  $n$  observations into  $k$  clusters in a way that minimizes the squared errors between the observation and its nearest centroid. The k-means algorithm (McQueen,1967) attributes each cluster its centroid and then places every observation in the cluster to the closest one. Then the new centroid within the cluster is found and the procedure of placing the observation to its closest centroid is repeated until centroids are fixed and no changes occur. So, it minimizes the within cluster sum of squares, over all clusters:

$$\arg \min_S \sum_{i=1}^k \sum_{x_j \in S_i} \|x_j - \mu_i\|^2$$

This clustering method allows to find clusters with the smallest squared errors between observation and the centroid. Consequently, it is a method which groups most similar observations into  $k$  clusters.

In this study, MATLAB R2012B is used. I decided to impose  $k=3$  as it will give the broader insights of properties of observations. The k-mean clustering assigned each company to one of the three centroids. It will minimize the distance between the observation and its nearest centroid, so abnormal returns of all companies in the study will be portioned within 3 groups. Now, eliminating the specificities defined by type of contract and psychological perception of investor, but analysing on the basis of shared closest centroid, we do the same Wilcoxon-Mann-Whitney technique in evaluating the significance and sign of the location shift from normal returns in case of each k-mean cluster. We, then, compare clusters in pairs to find whether and how are k-mean clusters different from each other, again by the same technique.

The expected effect of implementation of three clusters division is proving significant impact on clusters' stock prices. This could lead to evidence that there exist groups of companies which experience statistically significant negative or positive effect depending on centroid they are assigned to.



### 3.6 THE QUETELET INDEX

After the results are obtained, and we do expect them to show significant evidence, this study continues with Mirkin (2011) refers to as capturing relationships with Quetlet index.

Mirkin (2011) defines the baseline of Quetlet index as strategy for visualisation of correlation patterns in contingency tables without removal of 'non-fitting entities'.

He describes the calculation on the following example: assume the probability of getting tuberculosis is 0.1%. Investigate the bad housing conditions impact on probability of getting tuberculosis by finding the rate of tuberculosis decrease among bad housing conditions, say, you receive 0.5%. The index by Quetlet can be found as  $q(1/k) = (0.5-0.1)/0.1=4$ , meaning that the change of rate of getting tuberculosis increases 400% if the bad housing condition is present.

The Quetlet index in my study will enable me define the correlation pattern by the same logic. The question of interest is how being in particular characteristics cluster affects the rate of occurring in the k-mean cluster with significant positive or negative abnormal returns. In other words, I will attempt to find which characteristics of the deal and in which magnitude impact probability of occurring in the shareholders' wealth-enhancing or wealth-depressing group of companies. This will provide me with deeper understanding of investors multi-criterial approach in evaluating such announcements.

#### 4 HYPOTHESES DEVELOPMENT

This study will examine company's stock market performance at the news date according to numerous characteristics which can impact investors expectations. Clark et al (2003) suggest further event studies to divide the data according to multiple characteristics in order to increase probability of capturing the effect of the announcement. Considering this, I introduce extended number of factors that should be analyzed for broader insight of the study. The sample will be clustered with respect to each factor performance, whose characteristics, I believe, may impact the investors beliefs. The factors and further division is shown in Table 3.

<b>Factor</b>	<b>Clusters</b>
S&P 500	<ul style="list-style-type: none"> <li>• Non-component</li> <li>• Component</li> </ul>
<u>Price of rights</u> Capacity of stadium	<ul style="list-style-type: none"> <li>• Low</li> <li>• Medium</li> <li>• High</li> </ul>
Industry	<ul style="list-style-type: none"> <li>• Beer and food</li> <li>• Financial</li> <li>• Others</li> </ul>
Capacity of stadium	<ul style="list-style-type: none"> <li>• Small</li> <li>• Big</li> </ul>
Type of sport	<ul style="list-style-type: none"> <li>• Basketball</li> <li>• Football</li> <li>• Hockey</li> <li>• Baseball and athletics</li> </ul>
Level of team league	<ul style="list-style-type: none"> <li>• Professional</li> <li>• University</li> </ul>

Table 5. Factors and corresponding clusters applied in the announcement reaction study

Following the factors characteristics, I assigned each observation the number corresponding to the certain characteristics. For example, if company is S&P500 component it was assigned '1', while non-component was followed by '0'. In the case of ratios, the information on ranges defined to clusters within factors can be found in the Table 2 in appendix.

## 4.1 S&P 500

Separation of effects between companies which are included in the index from those who are not is derived from the fact that the beliefs of investors might be impacted by whether the company is listed in the index of 500 most demonstrative companies in their field or not. It might be perceived by investors as a signal of stability and quality and, consequently, might lead to less shaking beliefs about reasonability of their actions. The fact, that the company is listed in the index, which is used in most studies as a market proxy, can make investor believe, that the company is quality-checked, that it had numerous actions in past and proved to be reasonable and stable eventually, that it is concerned about manager's actions and all the consequences which can arise.

Not being in the list might raise doubtfulness of reasoning of such action, as so, they might be more sceptical of company's decisions. This situation might reflect what was mentioned in agency cost theory developed by Jensen and Meckling (1976). Rather than enhancing future returns, executives might engage in actions aimed to increase their own well-being at the cost of company.

'Enterprenour or manager in a firm with mixed financial structure will choose a set of activities for the firm such that the total value of the firm is less than it would be if he were the sole owner' (Jensen, Michael C.; Meckling, William H. (1976). "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure". *Journal of Financial Economics* 3 (4): 305–360). Every contract signed in the naming right partnership also provides with the set of v.i.p. seats, free tickets to all the events within venue and possibility to meet famous people. This set of luxurious opportunities might be more attractive to managers than well-being of company after the investment. At the same time, the announcement of acquisition of naming rights for S&P500 components is not expected to rise such doubts due to confidence in awareness of company's actions.

Moreover, the companies listed in the index tend to have larger spector of marketing activities in the past, with already known peculiarities of outcome, either by their own experience, or by the experience of similar companies. The idea of investors' uncertainty about the creation of new environment might as well impact. The non-listed companies seem to lack previous experience in such specific marketing strategies, particulary, the acquisition of naming rights. Investors might face adoption of new strategy as an additional threat to company if they find future results to be

ambiguous. Behavioural sociology suggests that the uncertainty is absorbed with increase in amount of similar experience around. The individuals and institutions tend to derive their attitude through experience of others, so, innovations are absorbed into collective 'awareness' with time. This idea is the baseline of so called 'bandwagon' effect, which was addressed in famous work of Abrahamson and Rosenkopf (1993). They found that any technological, organizational or strategic innovation with ambiguous returns can diffuse in a bandwagon manner. Referring to this study, the uncertainty of result of acquisition of naming rights may be consequence of absence of such practise in the *similar* surrounding environment and might be eliminated through time by increasing number of its adoption into practise.

Components of S&P500 included in this study show considerable amount of previous naming right deals. As so, almost 40 per cent of the companies in the cluster named 'S&P500 component' experienced at least one such acquisition in past, moreover, some of them performed up to three naming rights deals. The multiple reiteration of the same kind of deal might affect impression about subsequent effect on companies' brand. This may be assumed to be a signal to the rest of the similar companies and decrease in the amount of uncertainty due to increased awareness of the following impact. Consequently, companies with quite similar characteristics develop less frightening attitude to such action and become more enthusiastic on implementing the same action and achieve beneficial results. As such, companies from S&P500 might have increased awareness of the good brand signal stadium naming might provide and, moreover, might find it as opportunity to provide business partners with more casual environment for making future deals. At the same time, only 8 per cent of non-listed companies experienced such acquisition and no multiple-naming contracts are observed. This might suggest that the strategy is rather new for these companies and the effect is still ambiguous for them. Consequently, the following effects will be examined:

#### HYPOTHESES:

H<sub>01, 02</sub>: The announcement of acquisition of stadium naming rights has no impact on returns of S&P500 component (S&P500 non-component)

H<sub>A1</sub>: The announcement of acquisition of stadium naming rights has positive impact on returns of S&P500 component

H<sub>A2</sub>: The announcement of acquisition of stadium naming rights has negative impact on returns of

S&P500 non-component

H<sub>A3</sub>: The announcement of acquisition of stadium naming rights by S&P500 components has higher impact than by S&P500 non-component

## 4.2 PRICE-TO-CAPACITY RATIO

The three categories depending on the ratio of price of contract to capacity of stadium in the contract were included in order to examine the way investors look at the price invested per seat. The factor which affected the choice of three categories, rather than one, in this case study, is, first of all, very observable clusterization of data into three ratio levels, which might show the existence of some pattern. As the price of naming rights-to-capacity can be viewed as a degree the company is willing to invest in such contract, this might be perceived as the phenomenon 'stuck-in-the-middle strategy'. The concept was firstly introduced by Michael Porter (1980), who defined business strategies in three main types. He suggests that if one aims to fix his competitive marketplace he should implement certain pathway. By dividing companies in three types according to their market share, he observed the following results. The highest market share companies received profits due to their strategy, implying increase in the size, scale and scope. The lowest market share also received profits due to specializing on certain category of the market and implementing direct strategies on it. However, companies with the middle market share performed lowest profitability due to lack of generic strategy. The absence of generic strategy implies that company is confused about the path it should use, so it implements the strategy in between. That might also be the line of reasoning of investor's behaviour in this study.

The middle category might be perceived by investors as the one stuck-in-between with no generic strategy. This might highlight to investors the inability to focus on concrete aims of companies' future and thus is perceived as the most value reducing. Paying relatively a lot for seat might be due to soundness and magnitude of dealership, paying relatively cheap is a opportunity to increase brand awareness without huge costs. As for middle, investors might find it as mimicing other institutions' actions while being limited in concrete idea of company's goals. DiMaggio and Powell (1983) suggest that uncertainty is often a startline of mimicing pattern: when organizational technologies are poorly understood (March and Olsen, 1976), when goals are ambiguous, or when the environment creates symbolic uncertainty, organization might model themselves on other organizations (DiMaggio et al, 1983)).

As a result, investors may think that companies engage in naming rights deals not because they evaluate them as efficiency-increasing, but due to unambiguity of their situation and attempt to solve it by repeating this action after other corporations.

The high price deals might be perceived as aim to acquire sound branding strategy which means highly demanded stadiums and more spotlight on the deal. That might suggest that company is more aware of the effect of the dealership, so the negative reaction is less likely expected, but profitability of such strategy depends on how well will the cash flows be paid back.

The low price of rights-to-capacity level might be perceived as aim to achieve certain marketing goals while not putting all the weight of brand on it. This might also be viewed by investors as strategy of

#### HYPOTHESES:

H<sub>01, 02, 03</sub>: The announcement of acquisition of stadium naming rights has no impact on returns of companies with low/middle/high level of costs paid per seat

H<sub>A2</sub>: The announcement of acquisition of stadium naming rights has negative impact on returns of companies with middle level of costs paid per seat

#### 4.3 SECTOR

This factor was included because the opportunity to exploit the stadium is not the same for all sectors.

First of all stock market participants are expected to evaluate cost-benefit side of this strategy. The difference between sector's opportunities to increase profitability within the stadium arises from the fact that, even though all of them have their logos, advertisements and brand names all over the facility, only few can increase rapidly sales directly within the stadium.

The disbelief in the project of naming right dealership might arise if the reason of this strategy to lead to progressive profitability is unclear. The science of marketing defines the concept of strategic

compatibility of sponsorship as the extent to which partner has complementary goals (Amis et al., 2005).

The stadium title contracts with brewing and food industry always include the exclusive right of being the sole provider of drinks and snacks within the stadium area. This means that during each game only company's menu is provided and purchased. It might reflect the opportunity for surging sales during games and championships. The brewing company and sport fans is rather harmonic combination and investors might additionally perceive this as a sign of high awareness of clientele and opportunity to increase sales by providing the product within the stadium.

For financial institutions such opportunity is limited by the nature of their activity. The maximum they can exploit specific to their field is cash points and ability to pay with their credit cards. There is no obvious way to increase the volume of sales of financial service directly, rather than with time. Such strategy might be not obvious in its success for investors and thus might be viewed as an investment not worth its costs.

The sector 'others' comprises industries that occur less frequently in naming right deals, such as cable providers, telecommunications, airlines, etc. This category seems to be in between, as, for example, telecommunication companies have opportunity to increase sales by equipping the stadium with its brand's technology and services, while still not expecting to do that on the constant basis.

Thus, financial sector being the only one which indirectly increases sales with such dealership might confuse investors with the future benefits of the deal. The brewing and food company is expected to face positive reaction. The sectors others is also expected to react positively rather than negatively.

#### HYPOTHESES:

H<sub>01, 02, 03</sub>: The announcement of acquisition of stadium naming rights has no impact on returns of companies within Brewing and Food / Financial / 'Other' sector

H<sub>A1</sub>: The announcement of acquisition of stadium naming rights has positive impact on returns of companies within Brewing sector

H<sub>A2</sub>: The announcement of acquisition of stadium naming rights has negative impact on returns of companies within Financial sector

H<sub>A3</sub>: The announcement of acquisition of stadium naming rights has positive impact on returns of companies within 'Others' sector

H<sub>A4</sub>: The announcement of acquisition of stadium naming rights has larger positive impact on returns of companies within Brewing Sector than Financial Sector

H<sub>A5</sub>: The announcement of acquisition of stadium naming rights has larger positive impact on returns of companies within Brewing Sector than 'Others' Sector

#### 4.4 CAPACITY

The stadiums which sell naming rights vary considerably in the number of seats provided. Some consist of 20 000 seats, while others-more than 80 000. The soundness of those deals is not equivalent, implying the difference in attendancy rate as well as opportunities to host various events. It is expected that reactions to those announcements may differ. As high-capacity stadiums are more often under the media spotlight and are usually applied to multiple-events, there is possibility that investors react differently. Small capacities might not be expected to cover all the costs of contract. The cut-off came to 40 000 seats as it is the line which most observably differentiates stadiums by their opportunities of hosting the events and media attention.

The inclusion of such cathegorising come from probability that investors may perceive big stadiums as an investment with higher probability to cover the expenses due to higher exposure to public.

While the majority of stadiums can be used in multiple purposes for both sizes, the expandable capacity for occuring events is obviously much more limited for small stadiums. Usually, the football stadium is also applicable for basketball, athletics and concerts, while ice hockey stadiums is usually limited by skating activities.

Moreover, almost all of the events occuring in large and small stadiums differ drastically. For example, in the sample used in this study, stadiums in the upper group are more often the hosts to large events, such as annual Belk Bowl Championship in Bank of America Stadium, run up for 2006 FIFA World Cup in First Energy Stadium, Justin Timberlakes' stop in his tour in M&T Bank



Stadium in 2013. Some of these facilities are expandable up to 82 000 seats, for cases such as Manchester United versus F.C.Barcelona game in FedEx Field in 2011, when the stadium did not have one spare seat.

As for category of small capacity, they also provide opportunity to be transformed from mainly football facility to a concert arena, but the amount of attracted public for one event is limited and thus are limited opportunities of hosting the most sound events happening in area. Due to the fact that acquisition of naming rights of stadiums is pretty direct marketing strategy aiming to increase brand soundness and attract market share in more rapid way than usual marketing schemes offer, investors might disapprove acquisition of small-capacity stadiums' name. The investment even in small stadium is rather costly, sometimes the same price is attributed to 20 000 and 65 000 seats deals, as in case of Air Canada Arena and Ford Field, for the very different impact they later perform. So, there might be sceptical attitude of investors to such announcement as to costly marketing strategy not to be beneficial enough.

H<sub>01, 02</sub>: The announcement of acquisition of stadium naming rights has no impact on returns of companies acquiring big / small capacity stadiums

H<sub>A1</sub>: The announcement of acquisition of stadium naming rights has positive impact on returns of companies acquiring big capacity stadium

H<sub>A2</sub>: The announcement of acquisition of stadium naming rights has negative impact on returns of companies acquiring small capacity stadium

#### 4.5 TYPE OF SPORT

The stadiums, even the multiple-use ones, are always focused mainly on one sport events. Thus, every facility can be attributed one certain sport it usually hosts and is most famous for. Four blocks refer to basketball, football, hockey and baseball. The reaction to the announcement might be prone to the type of sport the facility is based on. Factors which can affect the reaction depending on this factor are popularity of the sport among public or unreasonably high difference in average costs of deal.

Investors might react positively to baseball but negatively to basketball if those sports significantly

differ in popularity within the area. Nevertheless, the rankings of sport popularity give uncertain information on their rank:

- US Census Bureau, Statistical Abstract of the US, 2012 provides the following rating:

1. basketball
2. baseball
5. football
6. hockey

- Nielson TV ratings:

1. football
2. basketball
3. baseball
8. hockey

- According to site visits:

1. football
2. baseball
3. basketball
4. hockey

The fluctuations in ranking positions suggest that there is non-stable and not absolutely certain rating among sports. Only hockey can be defined as definitely the least popular among them. With rather equal popularity among public and similar frequency of games occurrence, the high difference in payments for stadiums might be considered unreasonable.

I examined the average price of football stadium contract with respect to the average price of other type of sport deals within the sample in this study. In general, naming rights contracts connected to stadiums with focus on football events, show higher average cost than others. The figures reflect the following costs: average yearly price paid for football stadiums is approximately \$5.73 million, for basketball stadiums \$2.7 million, for hockey arenas \$2.6 million and for baseball \$2.3 million. This shows reasonable difference in average annual payments. In order to compare it more deeper, I examined the average percent this value comprises of average market capitalization of the companies. For football the average price of deal reflects higher fraction: 0.04% of average market capitalization, while others make 0.005%, 0.008% and 0.002%, respectively.

Considering that the big events in the sport world in basketball, baseball and football happen approximately with equal frequency, investors might think such big costs for football facility not to be paid back completely in the form of future cash-flows. Thus, the diversity in reaction is probable, I expect football to be the most threatening to investors among the other equally popular sports. In the same time other sports are expected to face positive reactions due to their similarity in both popularity and rather small costs:

H<sub>01, 02, 03, 04</sub>: The announcement of acquisition of stadium naming rights has no impact on returns of companies acquiring baseball/ hockey/ football/ basketball stadium

H<sub>A1</sub>: The announcement of acquisition of stadium naming rights has negative impact on returns of companies acquiring football stadiums

H<sub>A2</sub>: The announcement of acquisition of stadium naming rights has positive impact on returns of companies acquiring baseball stadiums

H<sub>A3</sub>: The announcement of acquisition of stadium naming rights has positive impact on returns of companies acquiring basketball stadiums

H<sub>A4</sub>: The announcement of acquisition of stadium naming rights has positive impact on returns of companies acquiring hockey stadiums

#### 4.6 LEVEL OF TEAM LEAGUE

Each stadium is home to some certain team while teams can be included into national league or institutional league. In the USA and Canada the importance of institutional league and inter-institutional competitions is emphasized traditionally. However, the institutional and national leagues differ in their magnitude, so the difference in investors reaction might be expected.

The choice of being a sponsor of stadium with University league may be considered as a support to such league more than a run for profitability increase. World's giving index 2011 named the US the most generous country in terms of donations and charitable activity among citizens, making it 65% of population who gave money to charity. It implies appreciation of population of generous activities.

Signalling theory by Ross (1977) suggests that in state of asymmetric information, where the information is not equally available to each party, managers can use some signals in order to stress

the stability of the company to the investors. Here, the fact that millions of dollars are attributed to sponsorship of stadium, which are not expected to bring huge profitability and popularity to the company directly might emphasise the companies honorable intentions. This could be perceived as signal of company's confidence about its well-being and its belief that it can comfortably afford charitable activities.

As for the major league, the acquisition of stadium naming rights can also affect perceptions of investors. The major league is highly followed in the USA and Canada and participation in such dealership might hugely increase the occurrence of the brand name on the television, in the newspapers, as well as increase in exposure to public due to mass events. The investors might expect the media spotlight and connection to professional team to raise the brand awareness among consumers more rapidly. Consequently, the sales and profitability might be enhanced as well.

Nevertheless, the aims of these two deals might be perceived differently. The University league sponsorship, due to its charitable nature of support, might to be considered as an investment at all, rather, just a signal of already stable prosperity and confidence of company. At the same time, Major league stadiums might be understood as a project, whose costs need to be at least covered with expected future cash flows. Consequently, the different weight of signal might be noticed by investors and the following hypotheses are, thus, made:

#### HYPOTHESES:

H<sub>01,02</sub>: The announcement of acquisition of University league / Major League Stadium naming rights has no impact on returns of the acquiring company

H<sub>A1</sub>: The announcement of acquisition of University league Stadium naming rights has positive impact on returns of the acquiring company

H<sub>A2</sub>: The announcement of acquisition of Major League Stadium naming rights has positive impact on returns of the acquiring company

H<sub>A3</sub>: The announcement of acquisition of University League Stadium naming rights has larger positive impact than acquisition of Major League Stadium on returns of the acquiring company

## 5 RESULTS

The following chapter will be devoted to analysis of the obtained results. The hypothesis either supported the previous expectations or did not, in which case a discussion on possible factors of such impact was made. The results are according to p-values of 7 characteristics of constructsclusters, 3 artificially defined by k-menas, the Quetlet Index results are explained and advice for future contracts, as a 'secret to success' will be provided. The list of p-values for all the cluster can be found in Table 3.

### 5.1 S&P500

The results obtained in this study suggest that there is indeed significant negative reaction ( $p\text{-value} < 0.01$ ) in shareholders wealth to the announcement made by companies that are not listed in S&P500 index. This confirms our expectations on agency cost theory and uncertainty of the proposed strategy success among the investors. More precisely, it suggests that even if some cash flows will be obtained due to the investment, market participants concerns about reasonability of this strategy outweigh the supposable future profitability. This might imply, that investors find such action rather as a signal of inefficient investment, than as a progressive marketing strategy.

The expected positive effect on company's value for S&P500 components did not prove itself, being rejected by the test. They seem to be rather confident that the strategy will not depress the value of the company, proving our expectation of trust to S&P500 company's decision, while still having the lack of high awareness in the big success of such deal. It might imply, that the rate of participation in such deals in the past being 40% is still not enough to encourage investors completely. This might mean that investors do not find this deal as changing company's prosperity in either positive or negative way. Rather, the costs associated with the investment are expected to be covered by future benefits.

The hypothesis of abnormal returns being significantly higher for S&P500 components than S&P500 non-components is not rejected ( $p\text{-value} < 0.01$ ), suggesting that, eventhough the overall impact of S&P500 returns are not significantly higher than zero, investors react significantly better to the new strategy announcement by S&P500 component than S&P500 non-components.

## 5.2 PRICE OF DEAL-TO-CAPACITY

The results obtained suggest not rejecting the null hypothesis for all companies except those with the middle price of naming rights-to-capacity of stadium ratio. This supports what we expected earlier. The fact that neutral reaction is observed for low and high ratios, while the negative reaction in stocks, associated with middle level of costs paid per seat, is significant ( $p < 0.05$ ), seems to be consistent with 'stuck-in-the-middle' theory. That might confirm, that investors indeed perceive such characteristics of deal as the signal of lack of target policy. The absence of clear path implies that managers are uncertain about what actions should be undertaken, and try to avoid bad outcome by choosing the middle one. Consequently, such move brings the worst results, as it is neither directed to effect certain type of customers, nor is a cheap trial.

In this case, while low price of the deal relative to capacity may be signal of strategy to have small costs and receive some benefits from higher exposure, large price of deal relative to capacity might be accepted as a sound and progressive marketing step, the middle ones seem to be confusing in their aim to investors. The lack of clear goal they perceive seem to impact their market participants beliefs of company's performance in a depressing way.

## 5.3 SECTOR

Classification by sectors gave interesting insights. The companies connected to brewing and food industry experience strong beneficial effect on shareholders wealth after the announcement ( $p < 0.01$ ), rejecting the null hypothesis of no effect. Also, the results show negative reaction to similar activity in financial sector ( $p < 0.01$ ) as well as neutral impact in industries defined as 'others' ( $p > 0.05$ ): electric utility, airlines, cable providers, telecommunication, etc. Furthermore, the impact of announcement is significantly higher for beer and food industry in comparison to both the financial sector ( $p < 0.01$ ) and 'others' ( $p < 0.05$ ).

This confirms the previously outlined expectations. Investors do acknowledge the opportunity of exploitation by brewing and food industry to be wider than for other sectors. The fact that this industry can observe very direct and immediate change in sales encourages investors. They realise that the contract is favourable to this type of company and should be expected to yield profitability, as well as brand awareness due to traditional compatibility of beer and fans. Moreover, the sector is

absolute leader among the rest, showing significantly more beneficial reactions than both of other sectors in this study.

On the contrary, the financial's sector dealership does not seem to satisfy the public. This might be a confirmation of the fact, that such marketing strategy is not clear to investors neither in direct, nor in indirect measure. The sales within stadium cannot surge drastically, while the combination of sport and finance as an ideology does not seem to outweigh that. Moreover, financial institutions pay on average \$4.2 million for the contract annually, while 'others' pay on average \$2.2 million, beer and food - \$1.45 million. By observing this acquisition as an investment, the higher average payment combined with uncertain future cash flows make people expect negative NPV, and, thus, lead to negative impact.

The 'other' sector shows neutral expectations, which might mean that, indeed, more optimistic expectations about the exploitation rate of stadium, but still no revolutionary success is expected. At more precise look at the companies which make this sector, 47% seem to be able to involve in higher sales (telecommunications, IT, cable provider, construction), while the rest does not suggest the same (courier service, self-care, airlines, automobile industry). This might be the reason why the overall reaction is out-weighted to neutral.

#### 5.4 CAPACITY

This factor shows non-rejection of hypothesis of insignificant returns for companies acquiring high capacity stadium. However, low capacity acquisition does have larger magnitude of impact, favouring the hypothesis of negative reaction ( $p\text{-value} < 0.05$ ).

As was expected, the low capacity might raise scepticism in investors attitude. This could happen because the low capacity stadiums are of limited nature, even if they are applicable to different events. The concerts, festivals and games provided by them cannot have the same resonance as those provided by 90 000 seats facilities. However, as it was previously outlined, numerous small stadiums are paid almost as high as very large ones. Hence, shareholders feel negative impact on their wealth due to market's perception of such deal as of unreasonably costly with respect to benefits they are able to bring. The contract might be found as inadequate estimation by manager rather than implementation of successful policy.

The insignificance of the large capacity acquisition was surprising result. This figure might suggest that beliefs about future benefits are on average outweighed by cost of deal. The price of stadium's title does rapidly increase with time, because they are of limited supply, but rising demand. Consequently, some stadiums are extremely expensive, for example, MetLife Stadium receiving \$17 million per annum. Such considerable year payment might be perceived by investors as unreasonably high price which will not exploit even large events revenues, due to covering their annual costs. Consequently, eventhough they might bring large benefits they are also often associated with huge costs, investors seem to react neutrally to these sound announcements and it might be caused by too high prices paid for the deal.

## 5.5 LEVEL OF TEAM LEAGUE

The obtained p-values suggest that while companies which participate in acquisition of university league do not obtain significant effect, they tend to outperform the major league ( $p\text{-value}<0.05$ ). Moreover, major league contracts show negative reaction to the announcement ( $p<0.01$ ). Though quite surprising result for major league, the highlighted importance in charitable activity in USA and CANADA seems to have impact.

The perception of announcement associated with University League occurs neutral. This suggests that the investors value it as zero NPV prohect. The charitable payments are expected to be equally outweighed with increased awereness of stability. The signalling effect does not seem to be radically persuasive, but still suggests comforting impression among the investors. No threats in company's value is expected, while no rapid increase in profitability is observed as well. This suggests charity to be a a signal, which covers it's expenditures.

As for major league stadiums, the negative rection suggest disturbing reaction. As, initially, it would be reasonable to expect major league to affect positively, this result might suggest that too many of such acquisitions where already made and some are showing very unsatisfactory experience. There are numerous examples of scandals occuring after such deal. For example, CMGI Inc. purchased title rights for the home field of NFL team in 2000 and did not even make until the first big game due to bankrupcy. PSINet Stadium did the same with NFL team in 1999 and after 2 years taken off the stadium's logo due to bankrupcy as well. Another NHL stadium experienced the



same within 3 years of contract in case of ANC Rental company. These are only 3 out of numerous examples, CNNMoney suggests that 62% of sponsors had observed huge fluctuations in value over the last year. This does not mean that the company is cursed to become bankruptcy, but people might connect that as cause-and-effect relationship. Consequently, even though there might be no evidence to do so, they might believe in increased probability of getting bankrupt in the near future due to the shocking examples they know.

## 5.6 K-MEANS CLUSTERS RESULTS

This study implies three k-mean clusterization. Observations were numerized according to cluster it belongs to and can be viewed in Table 3, along with other classifications, in Appendix. The following centroids were obtained:

Cluster	Centroid
1	-0.0067
2	0.0110
3	-0.0284

**Table 4.** Clusters and corresponding centroids by k-mean clusterisation

Wilcoxon-Mann-Whitney test showed the following results on significance of cluster's abnormal returns: cluster 1 showed significant negative reaction in stock prices ( $p=0.0000$ ), cluster 2 showed significant positive reaction ( $p=0.0000$ ), cluster 3 showed significant negative reaction ( $p=0.0112$ ). Next, abnormal returns of cluster 2 are significantly greater than abnormal returns in cluster 1 ( $p=0.0000$ ) and cluster 3 ( $p=0.0000$ ). Furthermore, abnormal returns of cluster 3 are significantly greater than abnormal returns of cluster 1 ( $p=0.0136$ ). This suggests that cluster 2 experiences positive impact, cluster 3 middle impact, cluster 1 the largest negative impact. The table of p-values can be observed in Table 5 in Appendix.

Thus, three clusters with minimized within-cluster sum of squares show that the announcement of acquisition of naming rights is significant. By categorizing abnormal returns to three groups according to their performance, not to their contract's characteristics difference, their significance showed that indeed the effect to announcement exists, but is prone to numerous factors rather than one separately.

## 5.7 THE QUETLET INDEX

By devoting companies to clusters according to their closest centroid and observing significant but differently directed effects, the next step is to find the relationship between previously determined clusters with clusters defined by k-means. Results will enable to see the change in probability of being in the successful cluster (cluster 2) with each characteristic defined earlier (S&P500 component, high capacity, etc). Mirkin (2011) defines Quetlet index as strategy for visualization of correlation patterns without removing the 'non-fitting' entities (Mirkin, 2011). In other words, the next step results show conditional probabilities by Quetelet index. The results are presented in the Table 6 in Appendix.

The results obtained by separating each factor from others gave insights on how investors react to certain characteristics of contract separately. Analyzing the factors separately evidenced different directions and magnitudes of expectations, depending on various possible psychological concepts underlining the reaction. Nevertheless, investors are rarely observing each factor separately, rather, they accept the announcement as a combination of information about those factors. More precisely, each factor separately influences his opinion, but one might be outweighed by another in their combination.

## 5.8 STRATEGY FOR FUTURE CONTRACTS

Observing the results and keeping in mind the gradation of goodness of clusters, the following advices can be formed for companies, which are considering the acquisition of stadium naming rights:

- Not being the company listed in S&P500 index cuts down the probability of occurring in the positive reaction group by 100%. Moreover, it is associated with 43% higher chance to become part of the worst negative reaction cluster. The figures suggest that non-components of S&P500 index should be highly sceptical about taking part in such deal.

On the contrary, strong evidence of 50% higher likelihood of the successful naming right deal occurs for S&P500 index components. It is further supported by decline in probability of occurring in any cluster with negative reaction, showing high potential of participating in the dealership.

- The middle price of naming rights-to-capacity ratio is highly recommended to be avoided,

as such characteristics of contract enhances probability of occurring in the negative reaction group by 80%. Other two ratios are quite neutral, but more promising, as they do not imply high likelihood of negative returns. So, the non-middle ratios are suggested.

- Beer and Food sectors are highly recommended to motivate naming rights contracts, as they almost guarantee to have positive effect: 200% increase in likelihood of experiencing wealth-enhancing reaction. The probability of unfavourable effect decreases by 100% for such company, implying that huge benefits can be extracted from such deal.

Financial sector should, on the contrary, place high doubts on the success of the deal: being in this industry enhances likelihood of observing the worst negative reaction by 40%, while decreases the possibility to enter either of two more favourable clusters by more than 44%.

Being the 'other' sector participant, it is 56% more likely to get into middle reaction cluster, which is not highly recommended, but is not a run-away situation either.

- Small capacity in the contract is almost predetermined to lack of success: this characteristics of deal enhances likelihood of experiencing the dramatic negative stock effect by 17 per cent, while makes fitting two other more favourable clusters 20% less likely to happen.

High capacity tends to direct the impact towards two most favourable clusters, implying 20% enhanced probability of achieving positive investor's reaction and 16% secured probability of not entering the worst scenario case. Large capacity is, thus, unquestionably more preferable.

- The contract associated with football drives the deal towards the depressing effect, increasing the probability of its' occurrence by 16% and decreasing the probability of good effect scenario by 25%. Very depressing result suggests that football is highly recommended to be excluded from the list of deals. Hockey shows quite unpromising results as well, pointing towards the worst negative effect cluster. Basketball seems to drive the company to experiencing stable middle effect by 123%, while baseball promises the most welfare-enhancing results by increase in probability of fitting the successful cluster by 17%.

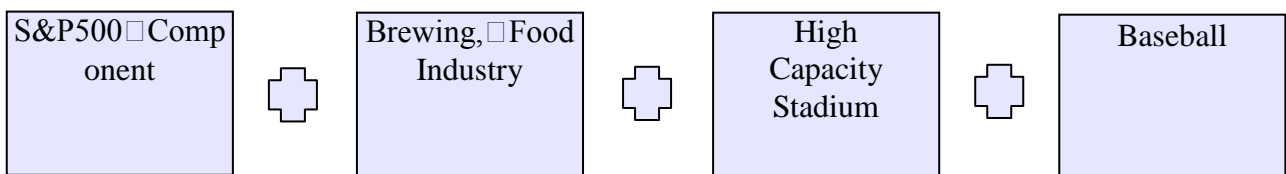
Consequently, football is recommended to be avoided, while the best scenario can happen in baseball contracts, so company should probably aim for that.

- The involvement with National League is shown to be for risk-lovers: the deal equally likely places the outcome either in the most successful cluster or in the most depressing cluster, avoiding the middle one. At the same time, the University League increases probability of obtaining the middle reaction by 109% stably. This suggests that National League is a risky project, which can bring very favourable but at the same time the worst results, while University League is more considered as a less profitable but at the same time less

fluctuative investment opportunity.

Consequently, placing different weights on factors, according to the magnitude of change in probability of achieving success they bring, the companies can evaluate are they more likely to achieve the welfare-enhancement or the opposite effect.

*The deal is most likely to become welfare-enhancing if the following characteristics can be attributed to it:*



*The deal is most likely to become a failure, if the following characteristics can be attributed to it:*

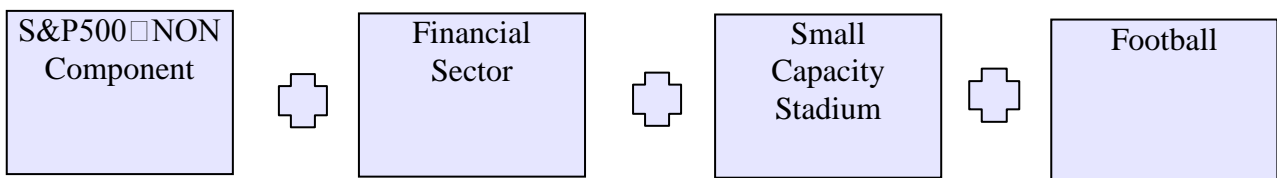


Figure 3. The best and the worst set of characteristics for naming rights deal.

## 6. CONCLUSIONS

The performed study suggest that absence inclusion of various firm-specific factors was indeed the cause of insignificant results of the announcement and consequent paradoxal conclusions. The results obtained confirm that the naming rights sponsorship impact significantly shareholders' wealth at the date of the announcement of this new strategy. The direction and magnitude differened among the results, but that was expected: various factors tend to signal to investor various conclusions.

In general, the significant results were obtained within each the cluster, though some were quite surprising. We can observe an overall tendency of companies non-listed in S&P500 to cause disbelief in such strategy and perception of that as a inefficient management. Furthermore, it seems like middle price of naming rights to capacity ratio is perceived by investors as a bad signal of company's stability and reasonability of such investment. Interesting insight is caused by the fact, that football tends to perceive market participants the contract as a possible threat to company. The definite leader of the positive significant performance is Beer and Food industry, whose results suggest strong abnormal positive returns in the day of announcement. As for Financial sector the opposite is true, meaning that investors do not see the reason for the success of such marketing strategy. The involvement with major league seems to have unexpected negative result, showing sceptical attitude towards such new strategy.

The K-mean clustering method enables determination of cluster and their abnormal returns without any predetermined pattern by the researcher. Such clusters show undoubtedly significant results, where secont cluster tends to experience significant positive reaction, while two others significant negative but in differencnt magnitude reaction. Further, the Quetelet index showed how each characteristics affects the probability of becoming a part of successful or less successful industries.

The results enabled to form the advice for future contracts. It implies that several factors are strongly weighted in investors multi-criterial approach to the evaluation of success, while some are less crucial. Considering the probabilities of becoming a part of successful, medium and least promising cluster, I highlighted the most weighted characteristics which companies whould be aware of before they enter such dealership. Following the suggested strategy significantly increases their probability of experiencing positive impact, especially if all the proposed characteristics are

followed. As such, the leader in naming rights contract should be S&P500 index participant from Beer and Food industry, buying large stadium for baseball. While the 'run-away' situation if the company has the following set of characteristics: non-component of S&P500 index, from Financial sector, small stadium focused on football activities.

This study yields deeper insight on how the reactions are split up between different factors. Nevertheless, the realistic approach of investor as a multi-criterial decision-maker enabled to determine the weights he puts on the information and use it for developing the future contracts advice.

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APPENDIX

Table 1. List of companies and relevant data for the study.

Stadium	Company	Announcement Date	Capacity	Annual Price, \$
AIR CANADA ARENA	Air Canada	15/02/07	20 000	2 000 000
BMO FIELD	Bank of Montreal	31/08/06	22 000	2 700 000
INVESTORS GROUP FIELD	IGM Financial	14/12/11	40 000	1 500 000
ROGERS CENTRE	Rogers Communication	01/06/05	49 280	<b>250 000</b>
SCOTIABANK PLACE	Bank of Nova Scotia	11/01/06	20 500	1 330 000
SCOTIABANK	Bank of Nova Scotia	07/10/10	19 290	1 200 000
SADDLEDOME	Alerus Financial	22/06/95	21 000	150 000
ALERUS CENTER	AT&T	04/04/96	41 915	<b>2 080 000</b>
AT&T PARK	AT&T	20/07/00	18 580	2 050 000
AT&T CENTER	Bank of America	27/06/96	73 780	<b>2 000 000</b>
BANK OF AMERICA	BB&T Corporation	05/09/07	31 500	3 500 000
STADIUM	BOK Financial Corporation	27/10/05	19 200	550 000
BB&T FIELD	Bridgestone	23/02/10	19 400	2 500 000
BOK CENTER	Citigroup	13/11/06	41 920	<b>20 000 000</b>
BRIDGESTONE ARENA	Molson Coors Brewing Comp.	12/06/05	50 480	<b>150 000</b>
CITI FIELD	FedEx	18/11/99	85 000	<b>7 600 000</b>
COORS FIELD	H. J. Heinz Company	25/06/01	65 050	<b>2 850 000</b>
FEDEXFIELD	FedEx	16/10/02	18 120	4 500 000
HEINZ FIELD	Dick's Sporting Goods	08/10/06	18 090	2 000 000
FEDEXFORUM	First Energy	14/01/13	73 200	<b>6 000 000</b>
DICKS SPORTING GOODS	Ford Motor Company	11/10/96	65 000	<b>2 000 000</b>
PARK	AT&T	26/08/00	60 860	<b>4 000 000</b>
FIRST ENERGY STADIUM	Yum!Brands	19/04/10	22 090	1 350 000
FORD FIELD	Lincoln National Corporation	03/06/02	68 530	<b>6 650 000</b>
JONES AT&T STADIUM	Louisiana-Pacific Corporation	06/06/06	69 140	<b>3 000 000</b>
KFC YUM! CENTER	M&T Bank	06/05/03	71 000	<b>5 000 000</b>
LINCOLN FINANCIAL FIELD	Daimler AG	03/11/11	55 000	<b>5 000 000</b>
LP FIELD	MetLife	27/06/11	80 570	<b>17 000 000</b>
M&T BANK STADIUM	Oracle Corporation	20/10/06	19 590	3 000 000
MERCEDES-BENZ	PNC Financial Services	09/06/11	19 770	4 000 000
SUPERDOME	PNC Financial Services	06/08/98	38 360	1 500 000
METLIFE STADIUM	Progressive Insurance	11/01/08	42 870	<b>3 600</b>
ORACLE ARENA	Qualcomm	17/07/97	70 560	<b>1 060 000</b>
PNC ARENA	Raymond James Financial	26/06/98	65 860	<b>2 500</b>
PNC PARK	Sun Life Financial	18/01/10	80 120	<b>7 500</b>
PROGRESSIVE FIELD	Target Corporation	19/09/11	19 360	5 000 000
QUALCOMM STADIUM	Time Warner Cable	08/04/08	20 200	1 010 000
RAYMOND JAMES	TD Ameritrade	08/06/09	24 505	750 000
STADIUM	US Cellular	31/01/03	40 615	<b>2 960 000</b>
SUN LIFE STADIUM				
TARGET CENTER				
TIME WARNER CABLE				
ARENA				
TD AMERITRAD PARK				
OMAHA				
U.S. CELLULAR FIELD				

Table 2. List of companies and their corresponding clusters.

STADIUM NAME	T=0	T=+1	K-MEANS	S&P500	PR/CAP	SECT.	CAPAC.	SPORT	LEAGUE
AIR CANADA ARENA	-0,00190	-0,00516	1	0	1	0	0	3	1
BMO FIELD	0,00367	-0,00629	1	1	2	1	0	1	1
INVESTORS GROUP FIELD	-0,00001	-0,01345	1	0	0	1	0	2	1
ROGERS CENTRE	-0,01580	-0,00168	1	0	0	0	1	0	1
SCOTIABANK PLACE	0,00380	-0,00081	1	1	1	1	0	1	1
SCOTIABANK SADDLEDOME	0,00221	-0,01543	1	1	1	1	0	1	1
ALERUS CENTER	0,00008	-0,00017	1	0	0	1	0	2	0
AT&T PARK	-0,02034	0,00716	2	1	1	0	1	1	1
AT&T CENTER	-0,02034	0,00716	2	1	2	0	0	3	1
BANK OF AMERICA STADIUM	0,00902	0,01062	2	1	0	1	1	2	1
BB&T FIELD	0,00098	0,00830	2	1	2	1	0	0	1
BOK CENTER	-0,00352	0,00144	1	0	0	1	0	0	0
BRIDGESTONE ARENA	0,00855	-0,00105	1	0	2	0	0	1	1
CITI FIELD	-0,00098	-0,00433	1	1	2	1	1	0	1
COORS FIELD	0,01874	0,00250	2	1	0	2	1	0	1
FEDEXFIELD	-0,00287	-0,02410	3	1	2	0	1	2	1
HEINZ FIELD	-0,01108	0,01487	2	1	1	2	1	0	1
FEDEXFORUM	-0,00769	0,00830	2	1	2	0	0	0	1
DICKS SPORTING GOODS PARK	0,01929	-0,00468	1	0	2	0	0	0	1
FIRST ENERGY STADIUM	-0,00839	0,01029	2	1	1	0	1	2	1
FORD FIELD	0,00192	0,02482	2	1	0	0	1	0	0
JONES AT&T STADIUM	0,00911	0,01926	2	1	0	0	1	0	0
KFC YUM! CENTER	-0,00493	0,00234	2	1	1	2	0	3	0
LINCOLN FINANCIAL FIELD	0,00618	-0,01701	1	1	1	1	1	2	1
LP FIELD	-0,01978	-0,01998	3	0	1	0	1	0	1
M&T BANK STADIUM	-0,00785	-0,00305	1	1	1	1	1	2	1
MERCEDES-BENZ SUPERDOME	0,01525	-0,02918	3	0	1	0	1	3	1
METLIFE STADIUM	-0,00455	-0,00302	1	1	2	1	1	2	1
ORACLE ARENA	0,00276	0,00105	1	1	2	0	0	3	1
PNC ARENA	-0,00996	0,01665	2	1	2	1	0	1	1
PNC PARK	-0,00488	-0,01111	1	1	0	1	0	0	1
PROGRESSIVE FIELD	-0,01227	-0,01102	1	1	0	0	1	0	1
QUALCOMM STADIUM	-0,02761	0,01038	2	1	0	0	1	0	1
RAYMOND JAMES STADIUM	0,00542	-0,01026	1	0	0	0	1	0	0
SUN LIFE STADIUM	0,01410	-0,01699	1	0	0	1	1	0	0
TARGET CENTER	0,00797	-0,00823	1	1	2	0	0	3	1
TIME WARNER CABLE ARENA	0,00992	-0,02215	3	1	1	0	0	3	1
TD AMERITRAD PARK OMAHA	0,02080	-0,04634	3	0	0	1	0	0	0
U.S. CELLULAR FIELD	-0,00031	-0,00888	1	0	1	0	1	0	1

The list of descriptions of clusters:

K-MEANS	Centroid 1	-0.0067
	Centroid 2	0.0110
	Centroid 3	-0.0284
S&P500	YES	1
	NO	0
PR/CAPAC.	HIGH	2
	MIDDLE	1
	LOW	0
SECT	BEER, FOOD	2
	FINANCIAL	1
	OTHERS	0
CAPACITY	HIGH	1
	LOW	0
SPORT	BASKETBALL	3
	FOOTBALL	2
	ICE HOCKEY	1
	BASEBALL	0
LEAGUE	NATIONAL	1
	UNIVERSITY	0

Table 3. Wilcoxon-Mann-Whitney one-sided test P-values for clusters by characteristics of contract

	MWW		MWW
S&P500	P-value	CAPACITY	P-value
AR(0)>NR(0)	1.0000	AR(0)>NR(0)	0.9679
NR(0)>AR(0)	0.0000	NR(0)>AR(0)	0.0324
AR(1)>NR(0)	0.2546	AR(1)>NR(0)	0.9233
NR(1)>AR(0)	0.7468	NR(1)>AR(0)	0.0774
AR(0)>AR(1)	0.9968	AR(0)>AR(1)	0.6091
AR(1)>AR(0)	0.0032	AR(1)>AR(0)	0.3924
PR/CAP		TYPE	
AR(0)>NR(0)	0.7968	AR(0)>NR(0)	0.7738
NR(0)>AR(0)	0.2047	NR(0)>AR(0)	0.2276
AR(1)>NR(0)	0.9835	AR(1)>NR(0)	0.8862
NR(0)>AR(1)	0.0167	NR(1)>AR(0)	0.1154
AR(2)>NR(0)	0.8123	AR(2)>NR(0)	0.9831
NR(0)>AR(2)	0.1893	NR(2)>AR(0)	0.0173
AR(0)>AR(1)	0.1811	AR(3)>NR(0)	0.7129
AR(0)>AR(2)	0.5356	NR(3)>AR(0)	0.2896
AR(1)>AR(1)	0.8200	AR(0)>AR(1)	0.5857
AR(1)>AR(2)	0.8425	AR(0)>AR(2)	0.3195
AR(2)>AR(0)	0.4661	AR(0)>AR(3)	0.5458
AR(2)>AR(1)	0.1585	AR(1)>AR(0)	0.4161
SECTOR		AR(1)>AR(2)	0.1850
AR(0)>NR(0)	0.9244	AR(1)>AR(3)	0.6062
NR(0)>AR(0)	0.0762	AR(2)>AR(0)	0.6822
AR(1)>NR(0)	0.9992	AR(2)>AR(1)	0.8166
NR(1)>AR(0)	0.0008	AR(2)>AR(3)	0.8541
AR(2)>NR(0)	0.0031	AR(3)>AR(0)	0.4559
NR(2)>AR(0)	0.9970	AR(3)>AR(1)	0.3961
AR(0)>AR(1)	0.2449	AR(3)>AR(2)	0.1472
AR(0)>AR(2)	0.9763	LEAGUE	
AR(1)>AR(1)	0.7563	AR(0)>NR(0)	0.5014
AR(1)>AR(2)	0.9998	NR(0)>AR(0)	0.5014
AR(2)>AR(0)	0.0240	AR(1)>NR(0)	0.9974
AR(2)>AR(1)	0.0002	NR(1)>AR(0)	0.0027
		AR(0)>AR(1)	0.0105
		AR(1)>AR(0)	0.9897

Table 5. K-Means clusters p-values

	P-value
AR(1)>NR(0)	1.0000
AR(1)<NR(0)	0.0000
AR(2)>NR(0)	0.0000
AR(2)<NR(0)	1.0000
AR(3)>NR(0)	0.9895
AR(3)<NR(0)	0.0112
AR(1)>AR(2)	1.0000
AR(1)>AR(3)	0.9868
AR(2)>AR(1)	0.0000
AR(2)>AR(3)	0.0000
AR(3)>AR(1)	0.0136
AR(3)>AR(2)	1.0000

Table 6 The Quetelet index results.

K-MEANS CLUS.	SNP500=0	SNP500 = 1	PR/CAP=0	PR/CAP=1	PR/CAP=2	SECT=0	SECT=1	SECT=2
1	0,43	-0,21	0,06	-0,14	0,08	-0,16	0,39	-1
2	-1	0,5	0,07	-0,08	0	0,05	-0,44	2
3	0,8	-0,4	-0,44	0,8	-0,35	0,56	-0,51	-1

K-MEANS CLUS.	CAPAC=0	CAPAC=1	SPORT=0	SPORT=1	SPORT=2	SPORT=3	LEAGUE=0	LEAGUE=1
1	0,17	-0,16	-0,07	0,24	0,16	-0,2	-0,27	0,07
2	-0,21	0,2	0,17	0	-0,25	-0,14	-0,19	0,05
3	-0,18	0,17	-0,13	-1	-0,02	1,23	1,09	-0,28