Stock Market Reaction on Olympic Sponsorship Announcement Using Event-study Method

George S. Spais* · George N. Filis**

〈Abstract〉

The major objective of this study is to test if an Olympic Games sponsorship program can influence investors' behavior: stock returns, stock volatility and transaction volumes. The paper deals with stock market reaction on Olympic sponsorship announcement for service organizations using event study method. Our research intention is to test 440 daily stock prices and transaction volumes, in order investigate the potent influence between the announcement of a grand sport sponsorship program and investors' behavior. For this study we examined the announcement data of three grand sponsors of Olympic Games of Athens 2004 (Alpha Bank, Delta and G.T.O.). The main contribution of this study is to examine how stock investors' behavior is influenced by the sponsorship program of companies and to extend research scope of marketing field toward stock market. They authors suggest that organizations interested in influencing investors' behavior should invest in sponsorship activities at the sports' sector.

Key words: Olympic sponsorship, announcement and event study method

Acknowledgement: The authors would like to thank Professor Philip Hardwick and the three anonymous reviewers for their contributory comments.

Ⅰ. Introduction

According to Abratt, Clayton, & Pitt (1987), modern sponsorship has moved from primarily a philanthropic activity to mutually advantageous business arrangements between sponsors and the sponsored. The objectives being sought by sponsoring organizations are focusing more and more on exploitable commercial potential and measurable results (Farelly, 1997; Wilson, 1997; Cornwell, 1995) and less on altruism or a sense of social responsibility without expectation of return.

The manner in which sponsorship affects image is unique, and likely to be missed by conventional measurements of corporate and brand values (McDonald, 1991). McDonald (1991) also argues that current methods of sponsorship evaluation really measure the publicity surrounding the sponsorship and not the sponsorship as such. The problem that is arisen from the lack of a clear theoretical definition, considers the strategic objectives that result in sponsorship programs, reflects on the difficulties of measuring the success of

* University of Ioannina / gspais@cc.uoi.gr
** University of Winchester

sponsorship programs (noting that organizations will judge success in different ways), reflects on the controversial aspects of some sponsorship programs and examines groups at which sponsorship might be targeted. It concludes that sponsorship has a significant (some would say major) role to play in increasing sales, enhancing corporate image and leveraging employee morale. It concludes by suggesting significant areas that merit further research in this greatly neglected academic area.

The major objective of this study is to test if an Olympic Games sponsorship program can influence investors' behavior: stock returns, stock volatility and transaction volumes (p). So, our research aim is to test, if p is true.

The paper deals with stock market reaction on Olympic sponsorship announcement for service organizations using event study method. Our research intention is to test 440 daily stock prices and transaction volumes, in order investigate the potent influence between the announcement of a grand sport sponsorship program and investors' behavior. For this study we examined the announcement data of three (3) grand sponsors of Olympic Games of Athens 2004.

The following literature reviews attempt to demonstrate and support the hypotheses.

1. Background Study and Hypotheses

Behavioral finance

Behavioral finance deals with the influence of psychology in financial decisions and argues that factors such as fear, greed, risk seeking and peer group pressure have an important role in investment considerations. Hirshleifer's study (2001) argues that financial decisions are made not only under the examination of new information but also based on the investors' psychology for the stock prices. In addition, Barberis & Thaler (2001) points out that investors' behavior is a major consideration for decision-making and thus there should be models, which can capture investors' behavior in asset pricing.

Ritter (2003) argued that there are two blocks of behavioral finance, namely, how investors think and whether the markets are efficient or not. He pointed out that regarding the first block, i.e. how investors think, there are several influences. These influences can be outlined such as beliefs, preferences, heuristic behavior and overconfidence. According to Chana, Frankelb, & Kotharib (2004), investors tend to be over-confident which in return this causes an overweight of their private information and an underweight of the public information. The most recent evidence (Chen, 2003; Hirshleifer & Welch, 2001; Hong & Stein, 1999) show how investors' imperfect memory are prone to follow new information signals, in volatile environments. Investors tend to believe more in recent information rather than the old ones. Many times it has been observed that old news are of no

influence (Chen, 2003).

The following behavioral finance studies, highlight the contribution of the psychological research in this field.

Evidence from the psychology literature indicates that both desiring and expecting a particular experimental outcome not only biases one's memory retrieval but also the reconstruction of existing memory traces (McDonald & Hirt, 1997). Study participants prompted to expect an outcome conflicting with their desires gave no weight to the expectancy in recall and seemed to actively attempt to refute the implications of that expectancy by recalling inconsistent information more accurately (McDonald & Hirt). BRSN* may be such a consistent pattern because it represents a powerful correlation between our desires (security price appreciation) and our expectations (imminent monetary reward). In situations where expectations and desires are synchronized, dissonant perceptions arouse mental mechanisms of defense that guard against the conscious awareness of potential frustration.

Predictions of stock returns, stock volatility, transaction volume in positive events

Mellers Schwartz & Ritov (1999) discovered that individuals can accurately forecast the emotions they will experience after either outcome of a gamble. Investors may correctly anticipate how they will feel if the outcome of an investment is negative, but they may either not be aware of or deny the potential difficulty in controlling their behavior when that outcome arouses strong reactive affect states.

McDonald & Hirt (1997) report that affective preference correlates with self-forecasts of investing behavior. Mellers Schwartz & Ritov (1997) find that gamblers' choices are closely related to the strategy of selecting the monetary gamble associated with the better expected feeling. People prefer the gamble that, on average, gives them the greatest emotional satisfaction (Mellers Schwartz & Ritov, 1999). There is evidence that affective preferences drive buying and selling behaviors (Raaij, Veldhoven & Warneryd, 1988). Anticipation of stock related reward induces positive affect. Investors are thus predisposed to invest in (purchase) those stocks that they feel good about (positive affect). Investors are more likely to purchase a stock for which they can anticipate a rewarding future event.

Based on the above evidence, we believe that investors (in a stable environment) optimally responds to memory loss with excess inertia, defined as a higher probability of following old decisions than would occur under full recall.

---

* The traders' aphorism "buy on the rumor and sell on the news"(BRSN) describes a strategy for exploiting a frequently observed financial market price pattern. This pattern (BRSN) is characterized by security prices rising prior to and falling subsequent to positively anticipated events. Security prices are, paradoxically, often observed to decline following an event outcome that is equal-to or better-than "expectations."

Some communications effects of sponsorship activities

Several empirical efforts have investigated the objectives companies try to achieve through their organizational sponsorship activities (Witcher, Craigen, Culligan & Harvey, 1991). Sponsorship has traditionally been seen as having an effect on brand awareness and image (Hoek, Gendall & Theed, 1999; Shanklin & Kuzma, 1992; Abratt, Clayton, & Pitt, 1987; Waite, 1979). Some studies point to a shift in the priority of the objectives. Gardner & Shuman (1987) conducted a survey among 300 of the Fortune 500 companies regarding their sponsorship practices. They reported that the highest priority was given to broad corporate objectives. A survey among the Fortune 1000 companies in the US supports this trend. The two main objectives of sponsorship reported were to enhance corporate image (corporate objective) and to increase awareness of brands (marketing objective). Fatt, Poon, Wei, Yuen, & Suan (2000) study look at the enhancement of corporate image, which is considered as a strategic objective, in order to shift expectations of the various stakeholders and investors.

Event studies in the sponsorship context

Clark, Cornwell, & Pruitt (2002) consider the sponsorship of stadiums and arenas and Cornwell, Pruitt & Van Ness (2001) consider the value of winning an auto racing event. Of particular relevance to our study, however, is the work of Farrell & Frame (1997), which considered Olympic sponsorships. All the above studies are considered important, as sponsorship announcement data are used.

Thus, the influence of psychology in financial decisions and the clear shift of service organizations to prioritize the strategic objective of corporate image empowerment suggest two (2) hypotheses:

(H_1): If p is true, then q_1 is true ($p \supset q_1$)

where:

(q_1). Null Hypothesis: *Stock volatility and transaction volumes are equal for different periods (pre, between, post).*

Alternative Hypothesis: *Stock volatility and transaction volumes are not equal for different periods (pre, between, post).*

(H_2): If p is true, then q_2 is true ($p \supset q_2$)

where:

(q_2). Null Hypothesis: *Stock returns equal normal return after announcement.*

Alternative Hypothesis: *Stock returns not equal normal return after announcement.*

Ⅱ. Method

We address the core research themes of our study using an event study methodology. Our intention is to test daily stock prices and transaction volumes, in order investigate the potent influence of the investors' behavior of

three (3) grand sponsors of Olympic Games of Athens 2004 (Alpha Bank, Delta and G.T.O.), as an indicator of sponsorship programs' effectiveness.

In order to reject or accept the stated hypotheses, we will perform an event study. The event-study methodology is used to examine the reaction of investors to positive and negative news. It involves the following steps: (1) identification of the events of interest and definition of the event window. In addition we define a pre-event window and a post-event window; (2) prediction of a 'normal return' during the event window in the absence of the event; (3) estimation of the abnormal return within the event window, where the abnormal return is defined as the difference between the actual and predicted returns; and (4) testing whether the abnormal return is statistically different from zero. In order to determine the 'normal return' of the stock, the market model will be introduced, as one of the most widely used model (Dasgupta et al., 1998). The model assumes that there is a linear relationship between the return of any stock to the return of the market portfolio: $E(R_{st}) = a + bR_{mt} + e_t$ [1],

where:

$E(R_{st})$ = expected or normal return of the stock at time t

R_{mt} = return of the market at time t

Equation [1] will be estimated based on the pre-event window period. Having estimated the 'normal returns' we will estimate the abnormal returns, within the event window, as: $AR_{st} = R_{st} - E(R_{st})$ [2]. Finally, under the null hypothesis, the abnormal returns should have a mean of zero. The event window will include -20 and +20 days before and after the event day. The pre-event window will be from -220 until -21 days before the event day and the post event window will be from +21 until +220 days after the event day.

The analysis of the pre- and post-event data such as transaction volumes, volatility and stock returns will enable us to make significant comments regarding the effect of the sponsorship programs on investors' behaviour. As we were able to conclude from the literature review, investors' behaviour is an important issue for the stock markets. However in order to test the effect of an information to the investor, one has to take samples from the pre- and post-event period. For example if there is an event that has negative impact on investor's thinking, then we should expect that the stock prices will fall and the trading volumes should become lower as well. Investors' behavior analysis through transaction volumes and stock price fluctuation was also documented by Huddart, Lang, & Yetman (2003).

In total 440 daily stock prices and transaction volumes are tested.

1. Measures

Huddart, Lang, & Yetman (2003) performed a study of the investors' behaviour on trading volumes and stock price fluctuations. Performing an event study, they were able to conclude that investors' behaviour is influencing the trading volumes of the stock market and the stock prices themselves.

The measures used to test the hypotheses were obtained through classical buying behavior and trading analysis. The key variables were volatility (risk) and transactions volume (Barberis & Thaler, 2001; Hirshleifer, 2001; Daniel, Hirshleifer, & Teoh, 2001).

2. Data Analysis

Apart from the event study, we will also use t-statistics and F statistics, in order to examine the impact of the announcement on: a. stock's risk level and b. stock's transaction volumes. The t statistics will be performed between: i. the pre event window and the event window, ii. between the pre- and post event window and iii. between the event window and the post-event window.

Ⅲ. Results

1. Descriptive Statistics

We start our analysis with the descriptive statistics of the three stocks for the whole sample, the pre event period and the post event period. Tables 1, 2 and 3 report the mean, median, mode, maximum, minimum and standard deviation of the three series. We focus our attention on the pre- and post-event period. We can observe that Alpha Bank and Delta exhibit negative returns during the pre-event period, which become positive in the post event period. However this does not apply for GTO, where in both periods GTO has positive returns. Further, some interesting observation can be generated from the standard deviation figures. The standard deviation for Alpha Bank and Delta is lower in the post event period, compared to the pre-event period. Yet for GTO we find the reverse result. GTO has a minor increase in the standard deviation of the post-event period.

In addition, Figure 1 presents the stock price fluctuations for Alpha Bank, GTO and Delta. The most interesting finding of Figure 1 is that Delta's fluctuations are becoming lower after the event window (almost at observation 300). We can notice, as well, that after the event period Alpha bank starts to recover and thus presents an increasing pattern.

2. Interpretation of the findings

1) Impact of the announcement on stocks' returns:

Delta's abnormal returns are significant (see table 4). This means that Delta's announcement as a Grand Sponsor had a significant impact at its returns. The announcement caused higher returns for Delta, than the expected ones. Regarding to the two other, (Alpha and GTO) it seems that the event did not affect significantly their returns. Not surprising, as Alpha Bank and GTO are two of the largest firms of the Greek Economy and investors were quite sure of their presence as sponsors. Something that didn't happened for Delta.

2) Impact of the announcement on stocks' volatility (risk):

Alpha Bank had lower volatility during the event window than in the pre-event period (see tables 5, 6, and 7). Furthermore, there were not significant differences during the event window and after the event. However, there is a significant difference in Alpha Bank's volatility before and after the event. One of our observations for Alpha Bank is that before the event, volatility was higher than the post-event period. Opposing with Delta's risk, it seems that there is an impact from the announcement as a Grand Sponsor. Note that the risk was significant higher before the announcement (pre-event period).

3) Impact of the announcement on stocks' transaction volumes:

Tables 8, 9, and 10 indicate that there is an impact at the transaction by the announcements of both three sponsors. The only exemption was GTO. Regarding to Alpha Bank, during the event window, the transaction volumes were increased compared to the pre-event window. The transaction volumes were increased, if we compare the pre event window and the post-event window. The event window, regarding to Alpha Bank, shows a highly significant increase in the transaction volumes, compared to the pre event window. Also, there is a significant increase, for the transaction volumes of Delta, after the event, compared to the transaction volumes before the event.

Based on the above findings, we can accept the alternative hypotheses of q_1 and q_2. So p is true.

Ⅳ. Discussion

The major objective of this study is to test if an Olympic Games sponsorship program can influence investors' behavior: stock returns, stock volatility and transaction volumes. The paper deals with stock market reaction on Olympic sponsorship announcement using event-study method. Our research intention is to test 440 daily stock prices and transaction volumes, in order investigate the potent influence between the announcement of a grand sport sponsorship program and investors' behavior. For this study we examined the announcement data of three grand sponsors of

Olympic Games of Athens 2004 (Alpha Bank, Delta and G.T.O.). The main contribution of this study is to examine how stock investors' behavior is influenced by the sponsorship program of companies and to extend research scope of marketing field toward stock market.

1. Implications for Investors' Relations Managers

According to the literature there are some influences of how investors making decisions. These influences are related to: beliefs, preferences, heuristic behavior and overconfidence.

This means that investors tend to be over-confident, which in return this causes an overweight of their private information and an underweight of the public information. Investors' imperfect memory is prone to follow new information signals, in volatile environments. Investors tend to believe more in recent information rather than the old ones.

The theory suggests that purchase decisions for financial assets should be made on the basis of investor beliefs regarding the future return and risk of those assets.

Based on the theoretical and empirical evidence, we believe that investors, in a stable environment, optimally responds to memory loss with excess inertia, defined as a higher probability of following old decisions than would occur under full recall. So, investors' relations managers must seriously assess the volatility of the environments, as the strongest force, which influences investors' behavior.

Because of the problem of intangibility in services organizations, we strongly believe those investors' relations managers (especially of services organizations) must realize the adding value of building sport sponsorship programs targeting the public of investors. Such activities can empower issues such as: confidence, trust, reliability and quality.

If we accept that there is an adding value of building sport sponsorship programs for services organizations, another important consideration for investors' relations planning is the on going analysis of investors' behavior. The on-going analysis of the structure of the investors' decision making process, will allow investors' relations managers to establish specific and measurable communication goals for the corporate sponsorship programs.

2. Research Implications, Limitations & Research Directions

This study examines the impact of a sponsorship program, which targets the public of investors. There is an extensive literature the sponsoring company perspective: issues such as identifying the sponsoring companies objectives (e.g. McDonald, 1991; Meenaghan, 1991; Polonsky, Sandler, Casey, Murphy, Porelli, & VanVelzen, 1996; Shanklin & Kuzma, 1992), the allocation and preference among various sponsorship opportunities such as sport, art, music (e.g. Meenaghan, 1991;

Parker, 1991). Some effort has been devoted to the process and the required input of choosing the best sponsorship opportunities (Cornwell, 1995; Irwin & Asimakopoulos, 1992; Komorosky & Biemond, 1996). Very few works used sponsorship announcement data, in order to assess the effectiveness of sponsorships programs (Clark, Cornwell, & Pruitt, 2002; Cornwell, Pruitt, & Van Ness, 2001; Farrell & Frame, 1997). Most of the research efforts have been conceptual in nature. There is no study, which has specifically stressed the adding value of the public of investors to services organizations.

The use of event study methodology is both strength and a weakness of this study. The event study methodology enhances generalizability because volatility (risk) and transactions volume (sales) measures studied are based on measures of the general buying behavior analysis for a wide variety of products, services and brands. However, more solid results can be achieved, if more than one stock (at the same event date) could be analyzed. Yet in this study, because of the different dates of announcements, the analysis was focused only on one stock per event date.

Further research could continue to add examples from other kinds of sponsorship, for example, from different kinds of sports and arts sponsorship.

V. Conclusion

Empirical research in marketing on sponsorship effect has largely focused on sponsoring corporate objectives such as enhancement of corporate image and increase of brands awareness. But few (Fatt, Poon, Wei, Yuen, & Suan, 2000) have specifically focused on shifting expectations of the investors.

Our findings suggest that services organizations should target at the public of investors. Organizations can measure the success of a sponsorship program, which targets investors, using an event study methodology (based on the "market model").

This study provides useful extension of past research streams on the measurement of sponsorship program effectiveness, based on sponsorship announcement data. Because of the characteristics of services, services organizations should recognize the adding value of the public of investors to the accomplishment of strategic goals. Also, marketers should recognize that the problem of measurement is arisen from the lack of a clear definition of sponsorship program's goals and targeting publics.

(논문 접수일: 2005년 11월 18일)
(게재 확정일: 2006년 5월 26일)

References

Abratt, R., Clayton, B.C., & Pitt, L.F. (1987). Corporate objectives in sports sponsorship. *International Journal of Advertising, 6,* 299-311.

Barberis, N., & Thaler, R. (2001). A survey of behavioral finance. *NBER Working Paper.*

Chana, W.S., Frankelb, R., & Kotharib, S.P. (2004). Testing behavioral finance theories using trends and consistency in financial performance. *Journal of Accounting and Economics, 38,* 3-50.

Clark, J. M., Cornwell, T. B., & Pruitt, S. W. (2002). Corporate Stadium Sponsorship, Signaling Theory, Agency Conflicts and Shareholder Wealth. *Journal of Advertising Research, 42,* 16-32.

Cornwell, T.B. (1995). Sponsorship linked marketing development. *Sport Marketing Quarterly, 4,* 13-24.

Cornwell, T. B., Pruitt, S. W., & Van Ness, R. (2001). An Exploratory Analysis of the Value of Winning in Motorsports: Sponsorship linked Marketing and Shareholder Wealth. *Journal of Advertising Research, 41,* 17-31.

Daniel, K.D., Hirshleifer, D.A., & Teoh, S.H. (2001). Investor Psychology in Capital Markets: Evidence and Policy Implications. Dice Center WP.

Dasgupta, S., Laplante, B., & Mamingi, N. (1998). Capital Market Responses to Environmental Performance in Developing Countries. The World Bank, Development Research Group, Working Paper.

Farell, K.A., & Frame, W.S. (1997). The value of Olympic Sponsorships: Who Is Capturing the Gold?. *Journal of Market Focused Management, 2,* 171-182.

Farelly, F.J. (1997). Integrating sports sponsorship into the corporate marketing function: an international comparative study. *International Marketing Review, 14,* 170-182.

Fatt, J., Poon, T., Wei, M., Yuen, S., & Suan, W. (2000). Enhancing corporate image in organisations. *Management Research New, 23,* 28-54.

Gardner, M.P., & Shuman, P.J. (1987). Sponsorship: an important component of the promotions mix. *Journal of Advertising, 16,* 11-17.

Hirshleifer, D.A. (2001). Investor Psychology and Asset Pricing. *AFA New Orleans Meetings.*

Hirshleifer, D.A., & Welch, I. (2001). An Economic Approach to the Psychology of Change: Amnesia, Inertia, and Impulsiveness. Dice Working Paper No. 2000-4; Yale Cowles Foundation Discussion Paper No. 1306; Yale ICF Working Paper No. 00-47.

Hoek, J., Gendall, P., & Theed, K. (1999). Sports sponsorship evaluation: a behavioural analysis. *International Journal of Sports Marketing & Sponsorship, 4.*

Hong, H., & Stein, J. (1999). A united theory of underreaction, momentum trading, and overreaction in asset markets. *Journal of*

Finance, 54, 2143-2184.

Huddart, S., Lang, M., & Yetman, M. (2003). Psychological Factors, Stock Price Paths and Trading Volume. Smeal College of Business, Penn State University.

Irwin, R.L., & Asimakopoulos, M.K. (1992). An approach to the evaluation and selection of sport sponsorship proposals. *Sport Marketing Quarterly, 1,* 43-51.

Komoroski, L., & Biemond, H. (1996). Sponsor accountability: designing and utilizing an evaluation system. *Sport Marketing Quarterly, 2,* 35-39.

McDonald, C. (1991). Sponsorship and the Image of the Sponsor. *European Journal of Marketing, 25,* 11.

McDonald, H.E., & Hirt, E.R. (1997). When expectancy meets desire: motivational effects in reconstructive memory. *Journal of Personality and Social Psychology, 72,* 5-23.

Meenaghan, J.A. (1991). The role of sponsorship in the marketing communications mix. *International Journal of Advertising, 10,* 35-47.

Mellers, B.A., Schwartz, A., & Ritov, I. (1999). Emotion based choice. *Journal of Experimental Psychology, 128,* 332-345.

Parker, K. (1991). The sponsorship - the research contribution. *European Journal of Marketing, 25,* 22-30.

Polonsky, M., Sandler, D., Casey, M., Murphy, S., Portelli, K., & VanVelzen, Y. (1996). Small business and sport sponsorship the Australian experience. *Journal of Promotion Management, 3,* 121-139.

Raaij, F. van, Veldhoven, G. van, & Warneryd, K.E. (1988). *Handbook of Economic Psychology.* Kluwer Academic Publishers.

Ritter, J.R. (2003). Behavioral finance. *Pacific Basin Finance Journal, 11,* 429-437.

Shanklin, W.L., & Kuzma, J.R. (1992). Buying that sporting image. *Marketing Management, (Spring),* 59-65.

Waite, N. (1979). Sponsorship in context. Unpublished Ph.D. thesis. Cranfield Institute of Management.

Wilson, G.A. (1997). Does sport sponsorship have a direct effect on product sales?. *The Cyber Journal of Sports Marketing, 1.*

Witcher, B., Craigen, J.G., Culligan, D., & Harvey, A. (1991). The links between objectives and function in organizational sponsorship. *International Journal of Advertising, 10,* 13-33.

Appendix

Descriptive statistics on the returns of the series

Table 1: Descriptive Statistics (total sample)

	Alpha Bank	Delta	GTO
Mean	0.000346	0.000133	0.001070
Median	0.000000	0.000000	0.000000
Maximum	0.062002	0.111614	0.083830
Minimum	-0.067711	-0.123195	-0.088795
Std. Dev.	0.017525	0.021176	0.016956

Table 2: Descriptive Statistics (pre-event period)

	Alpha Bank	Delta	GTO
Mean	-0.000130	-5.54E-05	-0.000213
Median	-0.002414	0.000000	-0.001297
Maximum	0.060855	0.111614	0.057457
Minimum	-0.053380	-0.123195	-0.056869
Std. Dev.	0.018622	0.027883	0.016828

Table 3: Descriptive Statistics (post-event period)

	Alpha Bank	Delta	GTO
Mean	0.002813	0.000321	0.000731
Median	0.001315	0.000000	0.000000
Maximum	0.062002	0.033564	0.083830
Minimum	-0.067711	-0.105483	-0.088795
Std. Dev.	0.015995	0.011061	0.017022

Impact of the announcement on stocks' returns

Table 4: T-test on the abnormal returns during the event window:

Sponsors	T statistic	Prob.
Alpha Bank	0,366	0,71
GTO	-1,081	0,28
Delta	2,18	0,03

Impact of the announcement on stocks' volatility (risk)

Table 5: F-test on the difference between stock's volatility
(comparison between the pre-event window and during the event window)

Sponsors	F statistic	Prob.
Alpha Bank	2,24	0,0003
GTO	1,04	0,81
Delta	3,53	0,00

Table 6: F-test on the difference between stock's volatility
(comparison between the event window and the post-event window)

Sponsors	F statistic	Prob.
Alpha Bank	1,01	0,99
GTO	1,14	0,64
Delta	1,18	0,44

Table 7: F-test on the difference between stock's volatility
(comparison between the pre-event window and the post-event window)

Sponsors	F statistic	Prob.
Alpha Bank	2,27	0,00
GTO	1,19	0,21
Delta	2,97	0,00

Impact of the announcement on stocks' transaction volumes

Table 8: T-test on the difference between stock's transaction volumes
(comparison between the pre event window and during the event window)

Sponsors	T statistic	Prob.
Alpha Bank	3,11	0,0021
GTO	0,73	0,46
Delta	0,85	0,39

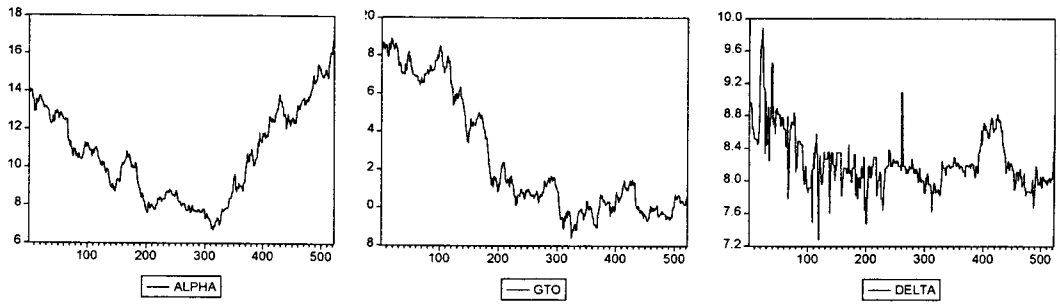
Table 9: T-test on the difference between stock's transaction volumes (comparison between the event window and the post-event window)

Sponsors	T statistic	Prob.
Alpha Bank	0,16	0,87
GTO	0,09	0,92
Delta	1,57	0,11

Table 10: T-test on the difference between stock's transaction volumes (comparison between the preevent window and the post-event window)

Sponsors	T statistic	Prob.
Alpha Bank	4,39	0,00
GTO	1,63	0,09
Delta	4,10	0,00

Stock Price fluctuations



a. Alpha Bank b. GTO c. Delta

Figure 1: Stock Price fluctuations