

Merger Announcements and Insider Trading Activity: An Empirical Comparative Investigation in LSE and ASE

by

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ABSTRACT

This paper provides evidence of excess returns earned by investors prior to the first public announcement of planned mergers in the UK and Greek stock market. The study reassesses results for the LSE market and for the first time addresses results from the ASE market of significant abnormal returns from directors' trading for a sample of 2000-2005 merger announcement. The main finding of this paper is that merger announcements are poorly held secrets, however, due to the level of regulatory supervision, results differ in an emerging and in a developed market. In fact, there seems to be abnormal returns prior merger announcements in the ASE, which could be attributed mostly to camouflaged insider trading. The case is different in LSE, where insiders seem to avoid trading on their privileged information.

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1. Introduction

Insider trading has been the interest of research for many and different authors. In particular, the effects of insider trading in the welfare and the functioning of the markets have been discussed and in an extent have not been totally clarified. According to the theory of market efficiency, no insider trading can occur and no trader can “bit” the market. According to empirical evidence, however, markets are not strongly efficient. In fact insider trading produces large and significant cumulative returns. More precisely, Meulbroek (1992), who examined the relationship between insider trading and stock prices using as data all the insider trading detected by the Securities and Exchange Commission (SEC) argues that trade specific characteristics lead to the incorporation of the insider trading into prices, offering to insiders great abnormal returns. Moreover, Finnerty (1976) argues that insiders are able to outperform the market since they can and do in fact identify profitable as well as unprofitable situations within their corporations. In fact, the insiders gain from the fact that they sell stock following periods of positive abnormal returns and buy after periods of negative abnormal return (Lin and Howe 1990). However, Givoly and Palmon (1985) suggest that the observed profitability of insider trading derives either from market response to the information revealed through publication of the trades themselves or from longer-term developments not captured by the disclosure of specific events in the period immediately following insider trades. As noted above, investors may perceive insider trading as a signal conveying information about future events, or as a leading indicator. However, Calvo and Lasfer (2002) illustrated that the “leading indicator” effect stated by Givoly and Palmon (1985) and the under/overvaluation hypothesis does not hold fully in their sample.

The existing literature argues that inside traders can capitalize on their private information, with those receiving favourable information tending to buy the asset and those receiving unfavourable information tending to sell it. However, very often, because of the ability of uninformed traders to infer information from market prices the insider may moderate his actions. In particular, insiders may gradually reveal their information by initially buying less of the asset than would be the case if such learning did not occur while those receiving unfavourable information initially sell less (Mirman and Samuelson 1989). The overall effects of inside trading on the market cannot really be quantified. However, although in most countries insider

trading is illegal, empirical evidence illustrates that inside trading exists in most markets. Bhattachary and Daouk (2002) had examined the existence and enforcement of insider trading legislation in stock markets over 103 countries during the 1990s. Out of the 103 countries, in 87 of them insider trading laws existed, however, enforcement has taken place only in 38 of them.

Since the pioneer studies of Jaffe (1974) and Finnerty (1976), the profitability of insider trading has been deeply analysed in the US markets. Beyond US borders, only countries such as UK (Friederich, Gregory and Matatko, 2002; Calvo and Lasfer, 2002; Gregory et al, 1994), Norway (Eckbo and Smith, 1998), Spain (Del Brio, Miguel and Perote, 2002), Germany (Betzer and Theisen, 2004) and Mexico (Bhattacharya, Daouk, Jorgenson and Kehr, 2000) have attempted to measure the profitability of insiders transactions, concluding in most cases, that insiders over-perform the market, thus, rejecting the strong-form market efficiency hypothesis. More recently, Du and Wei (2004) have revised the relationship between market volatility and insider trading for a large list of countries (US, UK, Canada, Spain, Greece, China, Brazil, Turkey, Mexico, Poland, etc). The central finding is that countries with more prevalent insider trading have more volatile stock markets, even after one controls for liquidity/maturity of the market, and the volatility of the underlying fundamentals (volatility of real output and of monetary and fiscal policies). Moreover, the effect of insider trading is quantitatively significant when compared with the effect of economic fundamentals.

Inside trading has tremendous effects on the market in many ways. More precisely, according to Benabou and Laroque (1992) many types of insiders have both the ability and the incentives to manipulate public information and asset prices through strategically distorted announcements or forecasts. They show that in the short run inside trader can gain more by both speculation and spreading information and thus manipulating the market through biased messages. However, in the long run the insider can manipulate the market only if different agents follow one another in these positions and so learning remains incomplete leaving a constant scope for manipulation. Moreover, Allen and Gate (1992) argue that manipulation is possible even without actions to alter the true value of the firm or the release of false information. To the extent it is possible, traders can increase investor's beliefs that the trader is informed and will make manipulation more profitable.

Additionally, Lakonishok and Lee (2001) argue that insider sales are generally not informative at all and that trades at larger firms seems to be less informative than trades at small firms.

Moreover, Narayanan (2000) illustrated that the degree of managerial disclosure was increasing in their pay-performance sensitivity and ranged from nondisclosure to partial disclosure to full disclosure. While enforcement of insider trading laws and penalties induced managers to disclose more information and made stock prices more efficient, short sales prohibitions on insiders had the opposite effect. The presence of multiple insiders was seen to encourage more disclosure. When false disclosures are allowed, the degree of truth-telling by managers was increasing in the cost of lying. But any disclosure was always more likely to be true than false.

Furthermore, Allen (2001) finds that transactions of insiders and outside directors spun-off firms generate substantial average excess stock returns. Stock transactions by insiders in the first six months following spin-offs is highly informative of both positive abnormal stock performance and subsequent business failures and poor performance of public subsidiaries. The purchases by insiders and outsiders are also positively related to the likelihood of subsequent takeovers of spun-off firms.

We should note that merger announcements pose two unique and difficult problems to the regulatory authorities. First, they generally involve significant price sensitive information and secondly, their planning generally includes a wide circle of people all of whom possess material inside information. It appears that not only does the chance of leakage of inside information increase as the announcement date draws near, but the leakage actually takes place and is in fact quite common.

The purpose of this paper is to test one area of possible insider leakage – mergers and examines the impact of trading on inside information in advance of merger announcements by focusing on the daily stock price movements of firms prior to the first public announcement of their proposed merger in the London Stock Exchange and in the Athens Stock Exchange. Systematic abnormal price movements can be interpreted as a first evidence of the market's reaction to information in advance of its public announcement. Using residual analysis, the abnormal returns occurring prior to the announcement are calculated. The use of data regarding a developed market and an emerging market (Del Brio, Miguel and Perote (2002) research for Spain, Bhattacharya U., Daouk H., Jorgenson B. and Kehr C.H. (2000)

research for Mexico), is quite innovative. The examination of a developed and an emerging market is interesting in the sense that there are great differences between these two countries, especially, regarding the level of legal protection against insider trading, the market size as well as the size of the firms (their equity market value, total assets, sales and employees).

More precisely, in the UK, the 1985 Companies' Act specifies that directors are prohibited from dealing in the securities of their own companies for a period of two months prior to the preliminary announcement of year-end or half-year results, and at other times prior to the announcement of price-sensitive information. The difficulty is to define what "price-sensitive information" consists of: clearly included are dividend, earnings, acquisition or spin-off announcements, board appointments or departures, or security issues. This leaves a large grey area open to interpretation. According to FSA Disclosure Rules, insiders and other connected persons to them are obliged to inform their company for any transaction conducted within five working days after the trading day. Then, the company must inform the stock exchange by the following day and it must also enter this transaction in its registry.

Greece was very slow in implementing rules against insider trading in comparison to the UK. The law that put such restrictions into force was passed as late as May 2005. The legislation for the Athens Stock Exchange during the period examined, posed only limited reporting requirements. More specifically, according to Presidential Decree 51/1992, insiders (i.e. managers and members of the Board of Directors) were obliged to inform Hellenic Capital Market Commission for each trading performed on their firm's stock, which surpassed 5%, 10%, 20%, 1/3, 50% or 2/3 of the total voting rights of the firm. Connected persons to insiders had no obligation to report any trading they conducted. The disclosure requirements in Greece specify that insiders should notify their company about the transaction the day after its execution. The company is obliged to notify the public and the stock exchange as soon as it has received the notification and in nine days at the latest.

Both markets have incorporated Directive 2003/6/EC "on insider dealing and market manipulation (market abuse)" during 2005. The scope of this Directive is to ensure throughout the Community the same framework for allocation of responsibilities, enforcement and cooperation between national authorities. The basic points of the Directive are the following: a. it provides a common definition for

insider trading, b. it states that insider trading is considered illegal, c. it poses common reporting provisions for both insiders and connected with them persons.

The present paper presents results for abnormal returns prior to merger announcements in Greece and in UK. Several factors inform the choice of examining the Athens Stock Exchange. First, we wanted to study a stock market where undisclosed insider trading might be taking place. From insider trading inspection to the period covered in this study, there have been very few fines imposed to insiders and no trial of conviction in Athens Stock Exchange. Second, given that Greece is an emerging market, it formed an ideal pilot study for our quest to examine whether the lack of a strict legal framework for insiders increases their activity around price sensitive events. More specifically, we decided to examine for that purpose merger announcements, due to the fact that they have a significant impact on price of the firm. We test this using data on all mergers in UK and in Greece over the period June 2000 to June 2005 resulting in 147 events from 71 UK firms and from 53 Greek firms. Table 1 presents descriptive statistics for our samples in UK and in Greece.

Our main finding is that there is in fact difference in the trading activity of insiders in an emerging market in comparison to their activity in a developed market. In the UK, there seem to be no specific trend and few positive abnormal returns around merger announcement, indicating that insiders do not trade on their private information of merger. In comparison, in Greece, we find some positive abnormal returns around merger announcement. This finding coupled with the limited registered insider trading activity and the increase in the trading volume around announcement date, suggests that insiders tend to trade on their information. We assume that the lack of strict reporting rules as well as the few fines posed on insiders, has driven insiders to either not report their trading activity or to camouflage it in order to escape detection.

The remainder of this paper is organized as follows: Section two describes the methodology used in order to examine the abnormal returns around the announcement date. Section three presents the main findings of this paper in both LSE and ASE, while section four presents a more critical presentation of the findings coupled with a comparative analysis for the two markets. Finally, last section concludes the paper.

2. Data and Methodology

A. Data

In order to examine the price movements of stocks of firms announcing a merger, we consider the 71 stocks listed on the London Stock Exchange (LSE) and the 53 stocks listed on the Athens Stock Exchange (ASE), which have announced a proposed merger during June 2000 to June 2005. The merger announcements for the London Stock Exchange were retrieved from Perfect Analysis Database, which provides all the news items disclosed by the UK companies to the Regulatory News Service (RNS), while for the Athens Stock Exchange these announcements were collected from the Exchange's Daily Reports (through the ASE's internet site). We should note that as far as insider trading data are concerned they were collected manually firm by firm both for the LSE¹ and the ASE² through the Perfect Analysis Database and the ASE's internet site, respectively.

From Datastream International Database, the daily stock prices and dividends of the sample firms were gathered for 156 trading days surrounding the announcement date, with 125 trading days occurring before and 31 trading days on and after the announcement date.

For each of the sample securities daily rates of return were calculated as:

$$R_{jt} = \ln[(P_{jt+1} + D_{jt+1})/P_{jt}]$$

¹ The collection of the data in the UK had to be done firm by firm because director's shareholding news were not fully given, i.e., there was a link in most of them which should be clicked in order to obtain the complete news. Companies have to disclose the following information in the UK under Continuing Obligations Section of the Listing Rules, Yellow Book: Name of director, whether notification indicates that it is in respect of holding of the shareholder named before or in respect of a non-beneficial interest or in the case of an individual holder if it is a holding of that person's spouse or children under the age of 18, name of the registered holder (s) and, if more than one holder, the number of shares held by each of them (if notified), nature of transaction, Number of shares acquired or disposed, Class of security, Date of transaction, Date company was informed, total holding following this notification, Total percentage holding of issued class following this notification, and date of notification.

The disclosure requirements in UK specify that insiders should report to the company any transaction carried out personally 5 days after the trading day. Then, the company must inform the stock exchange by the following day and it must also enter this transaction in its register.

² The collection of data for the Greek market had also to be done firm by firm. Companies had to disclose the following information according to Presidential Decree 51/1992: Name of holder, the number of shares held by him, Number of shares acquired or disposed, Date of transaction, total holding following the notification.

The disclosure requirements in Greece specify that insiders should notify their company about the transaction the day after its execution. The company is obliged to notify the public and the stock exchange as soon as it has received the notification and in nine days the latest.

Where P_{jt} =the closing price for security j on day t, D_{jt+1} = cash dividend on the ex dividend day t+1.

We have also acquired the trading volume for each of the firm both in the LSE and the ASE by the Datastream International Database.

B. Methodology

In order to compute the abnormal returns we use the event study methodology. Event studies are widely used to study the information content of corporate events. Such studies typically have two purposes: i) to test for the existence of an “information effect”(i.e. the impact of an event on the announcing firm’s value) and to estimate its magnitude, and ii) to identify factors that explain changes in firm value on event date.

For our sample, the event day (day 0) is taken as the day the merger announcement was released by either the RNS or the ASE for each firm. We use that date as the announcement date because it is the day the “price-sensitive” information becomes publicly available.

Abnormal returns are the residuals which are produced by the estimation of the market model:

$$R_{jt} = \alpha_j + \beta_j R_{mt} + \varepsilon_{jt} \quad [1]$$

Where α_j , β_j = the intercept and slope respectively of the linear relationship between the return of stock j and the returns of the market; R_{jt} , R_{mt} = the return of the stock j, and the market index on day t, respectively (FTSE all shares for the LSE, and for ASE); ε_{jt} = the estimated part of the non-systematic component of firm’s j return, i.e. the Abnormal Returns of firm j.

We should note that Brown and Weinstein (1985) have illustrated that the degree of improvement using the factor model instead of the market model is marginal.

The average abnormal return (AAR) over all companies in LSE and ASE are computed for the period t as:

$$AAR_t = \frac{1}{N} \sum_{j=1}^N AR_{jt} \quad [2]$$

The statistical significance of the AAR may be tested by:

$$t - stat = \frac{AAR_t}{\sigma(AAR_{EP})} \quad [3]$$

where $\sigma(AAR_{EP})$ stands for the standard deviation of the AAR during the estimation period $[-126,+31]$. We use this estimation period because the abnormal returns of a wider estimation period could be affected by other events that may be occurring. This period is also covering abnormal returns after the announcement date in order to examine which has been the market's response to the merger announcement.

If the AARs are independent and identically distributed, the test statistic is distributed as Student's t under the null hypothesis. Brown and Warner (1985) illustrate that as the degrees of freedom increase the distribution converges to a normal distribution.

The cumulative average abnormal returns over the period (t_1, t_2) , defined as the sum of previous daily average residuals, is also determined for each trading day of the study over time as follows:

$$CAR(t_1, t_2) = \sum_{t_1}^{t_2} AAR_t \quad [4]$$

In order to examine the statistical significance of $CAR(t_1, t_2)$, we use the following formula:

$$t - stat = \sum_{t_1}^{t_2} \frac{AAR_t}{\sqrt{\sum_{t_1}^{t_2} \sigma^2(AAR)}} \quad [5]$$

In case of strong form efficiency, there should be no unusual price movements around to the announcement date and therefore one would expect that both the AAR and the CAR to fluctuate randomly around zero. However, if there is leakage of and trading on inside information just prior to the announcement date, this should show up in the form of positive daily average abnormal returns as t approaches 0 and a corresponding build up in the CAR_t .

It might be expected that the regulation of organized exchanges and the added visibility associated with stocks trading on them would reduce the extent of leakage of inside information and the subsequent trading on this information.

One potential limitation of the study is event clustering which can affect the results through the cross-sectional correlation of the excess returns. Friederich et al (2002) argue, though, that this is not necessarily a strong limitation when different industries and daily data are used because the probability of events being clustered decreases under those circumstances.

Several studies of insider trading also examine trading volume data under the presumption that insider trading should be associated with larger volumes (e.g. see Keown and Pinkerton, 1981; Meulbroek, 1992; Bhattacharya U., Daouk H., Jorgenson B. and Kehr C.H., 2000). During our study, we will calculate weekly average volume of trading for each of the one, two and three weeks prior to the announcement date and we will compare that to the respective average weekly volume three months prior to the announcement date. The comparison of the trading volume of each share prior to announcement date to the trading volume of the same share three months ago is examined in order to discover if there is any extreme change in its size. An excessive increase in volume close to the announcement suggests increasing trading activity of the share during that period.

In addition, we consider registered insider trading activity (i.e. number of shares traded by insiders and number of firms whose insiders traded during that period) during a month prior to the announcement date. The increase in the trading volume can be associated to insiders' or other traders' activity. The absence of registered insider trading activity could suggest that insiders camouflage their trading through other channels (such as family, other connected persons).

3. Empirical Results

3.1. The London Stock Exchange

Table 2 and Figures 1 and 2 present the Daily Average Abnormal Returns and the Cumulative Average Abnormal Returns for all firms which have reported a merger announcement. In examining the movement of CAR_t , there appears to be no specific “significant” positive or negative drift, but rather both AAR and CAR seem

to follow a random walk. Ten days prior to the announcement day, some CARs appear to present positive values, few of which are significant. It should be noted that half of the Daily Residuals are positive and half negative during these ten days prior to the announcement. Therefore, the results presented in Table 2 as well as the figures 1 and 2, illustrate that there seems to be few positive and significant CARs the period around the event announcement. The absence of any trend and the limited positive significant values of CAR, suggests that in fact insiders do not seem to trade on their information regarding mergers.

(TABLE 2)

Although the buildup of CAR just prior to the announcement day doesn't seem to indicate a specific trend, we find that 53%, 54% and 50% of the firms exhibited higher volume one, two and three weeks prior to the announcement date than they had three months earlier, with the weekly average volume over this three week period 436%, 132% and 80% percent higher than it was three months earlier. The great increase appeared especially one and two weeks prior to the announcement date coupled with the appearance of some positive abnormal returns during this period, could be an indication of the existence of trading by insiders.

Table 3 reports the trading reported by insiders to the RNS during one month prior to the announcement date. As it can be inferred by the numbers presented, the great increase in trading volume illustrated above was not caused by registered insiders' trading. In fact 66% of firms studied in the sample experienced no open market purchases or sales by registered insiders during the month prior to the announcement date. Only 20% of the sample had positive net open market purchases during this period. These figures illustrate that the increase in trading volume that occurred prior to the merger announcement was not caused by registered insiders.

(TABLE 3)

(FIGURE 1)

(FIGURE 2)

The behavior of market agents that the results illustrated above, seem consistent with the UK regulation, according to which insider trading is not allowed for a period of two months prior to the announcement of price-sensitive information.

The great increase in trading volume and the existence of some positive values of CARs just prior to the announcement date, however, cannot state the existence of intense insider trading around merger announcements.

3.2. The Athens Stock Exchange

Table 4 presents the Average Abnormal Returns as well as the Cumulative Abnormal Returns for firms listed in the Athens Stock Exchange. There appears to be a downward drift during the first 50 days of the study: Brown and Warner (1985) suggest that “like any process which follows a random walk, the CAR can easily give the appearance of “significant” positive or negative drift, when none is present”. We find that, though CAR_t becomes positive six trading days prior to the announcement date, however, few of its values are statistically significant. We should note that CAR_t appear to exhibit a clear increasing trend during ten days prior to the announcement date. Moreover, half of the daily average abnormal returns are positive during the 6 days prior to the announcement. This suggests trading upon inside information concerning the prospective merger, with abuse occurring in the six trading days immediately prior to the announcement date.

(TABLE 4)

These results are strengthened by the increase in volume which leads further support to the insider information leakage hypothesis. It was found that 62%, 62% and 52% of the firms exhibited higher volume one, two and three weeks prior to the announcement date than they had three months earlier with the weekly average volume over this three week period 125%, 190% and 63% higher than it was three months earlier. Such a pattern of volume is, of course, what one would expect to find prior to a public merger announcement if insider trading volume was not caused by the trading of registered insiders. In fact, 94% of firms studied experienced no open market purchases or sales by registered insiders during the month prior to the announcement date. Further, only 5.66% of the sample firms had positive net market sales during that period (Table 5). It is evident from the above information that the trading conducted prior to the announcement date was performed by non registered insiders.

(TABLE 5)

As explained earlier in the paper, for the period examined insiders were obliged to inform Capital Market Committee for each trading performed on their firm stock, which surpasses 5%, 10%, 20%, 1/3, 50% and 2/3 of the total voting rights of the firm, while there was no specific provision for trading reporting obligations regarding connected with the insider persons. Given this legislative framework, it was quite easy for insiders to camouflage their trading either through connected persons or through small amount of trading which they were not obliged to announce.

These results suggest that there is the need for a stricter legislative framework and a severe enforcement of these rules in order to force insiders both to reveal their trading activities and to refrain from trading on the price-sensitive information they possess.

We should note, however, that with the adoption of Directive 2003/6/EC, which was incorporated in greek legislation on May 2005 and which poses stricter reporting requirements and stricter fines for insiders who do not comply with legislation, the results presented above may change.

(FIGURE 3)

(FIGURE 4)

3.3 Further Discussion of the Results

The results presented above suggest that the market reaction to intended mergers begins before its first public announcement in Athens Stock Exchange. In fact, insiders seem to trade on their information just few days prior to the announcement date. The inexistence of registered insider trading activity can be attribute either to the non reporting by insiders of their trading activity or by the camouflage of their trading by delegating it to a third person. Our results are consistent with those found by Del Brio, Miguel and Perote (2002) for Spain. They have also come to the conclusion that insiders earn excess profits when investing on corporate public information. Their results are consistent with ours in that insiders camouflage their trading by delegating it to a third person.

As far as evidence in the LSE market is concern our results are different from those of Calvo and Lasfer (2002), who found that insiders time their trades and that most purchases by insiders are followed by good new. Their research has examined a number of events (e.g. earning announcements, initial public offerings, share

repurchases, rehiring), among which was also merger announcements. We should note that due to the fact that all events are categorised in groups, it is possible that some of the events in each group produce positive significant returns and some do not. Therefore, there is not really a contradiction between the two studies. However, it would be interesting to examine also other events in order to see which of these, insiders do tend to exploit and which they do not.

Moreover, the fact that the ASE results suggest insider trading activity while the LSE results don't, provide a rationale for the UK type of regulation that prevents insiders from trading prior to price sensitive information. The fact that merger announcements are exploited by insiders in order to obtain abnormal returns, especially few days prior to the announcement, could be a good tool for regulators to be especially cautious to trading around merger announcements.

Furthermore, we believe that our results enforces those of Narayanan (2000) stating that stricter enforcement of insider trading laws and/or larger penalties for violating these laws could drive more managers towards full disclosure because expected insider trading profits would decline. Therefore, we consider that a stricter regulatory framework in the ASE could refrain, insiders, from trading and would increase disclosure of their trades, improving the market efficiency of the market.

Finally, we should note that part of the great increase in trading volume prior to the merger announcement can be attributed to other legal trading by arbitrageurs, stock analysts or other expert professionals as suggested by Meulbroek (1992).

4. Conclusion

Greece was quite late in adopting a legislation that required corporate insiders and third connected parties to report their trading activity. In this paper we provide first empirical analysis of abnormal returns around merger announcement in Greece, which in addition to the increase of the trading volume and the non-existence of registered insider trading activity one month prior to the announcement date, suggest camouflaged activity by insiders in order to avoid detection. The findings illustrate what appears to be common knowledge: impending merger announcements are poorly held secrets, and trading on this non-public information abounds.

The case is not the same for abnormal returns around merger announcements in LSE. Contrary to the findings of Calvo and Lasfer (2002), we find that insiders do seem to trade on their privileged information regarding proceeding mergers. These

results can be explained by the fact that mergers tend to affect prices of firms involved and therefore the regulatory authorities tend to scrutinise more trading around these events. Therefore, in comparison to the ASE results in this more developed market, insiders tend to avoid trading around merger announcements.

Finally, we should note that with the incorporation into both UK and Greek market of the Directive 2003/6/EC, the results presented above and especially those for the ASE, may change. It should therefore quite interesting for someone to examine insider trading activity around merger announcements after June 2005.

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Tables & Figures

Table 1. Descriptive Statistics of Abnormal Returns

1.1. L.S.E.

N	Mean	Std Dev	Skew
81	0.0000002	0.000005169	-10.736166233 [0.01]

1.2 A.S.E.

N	Mean	Std Dev	Skew
66	0.0000883	0.121461321	0.460935891 [0.01]

Notes:

- Figures in square brackets [.] indicate significance levels
- N is the number of merger announcements for each market
- Skew is the estimated centralized third moments of the data, denoted \hat{a}_3 ; its asymptotic distributions under the null is $\sqrt{T}\hat{a}_3 \sim N(0,6)$.

**Table 2. Average Abnormal Returns & Cumulative Abnormal Returns in LSE
(Market Model Statistics for the sample over the period $t = +60$ to $t = -10$)**

Day	AAR _t	t-statistics	CAR(t ₁ ,t ₂)	t-statistics	Percentage of positive daily abnormal returns
-60	0.4901	0.825661	0.7536	1.124205	54.32%
-59	-0.8626***	2.370714	-0.372	-0.53497	39.51%
-58	-0.0786	0.262201	-0.941**	-1.99674	46.91%
-57	-0.1653	0.500168	-0.244	-0.54666	50.62%
-56	-0.3370	1.204667	-0.502	-1.16002	41.98%
-55	0.0791	0.262225	-0.258	-0.62701	50.62%
-54	-0.2790	1.043456	-0.2	-0.49601	40.74%
-53	0.0917	0.174118	-0.187	-0.31711	53.09%
-52	0.2236	0.675633	0.3153	0.506935	50.62%
-51	1.3912*	1.322192	1.6148*	1.46399	53.09%
-50	0.2770	0.739209	1.6682*	1.49355	55.56%
-49	-0.4257	1.019279	-0.149	-0.26506	48.15%
-48	-0.2769	0.724310	-0.703	-1.2409	46.91%
-47	-0.6570**	1.984969	-0.934**	-1.84682	41.98%
-46	0.4052*	1.455385	-0.252	-0.58218	56.79%
-45	-0.7611***	2.382924	-0.356	-0.83993	41.98%
-44	-0.3009	0.695618	-1.062**	-1.97493	49.38%
-43	0.0928	0.354920	-0.208	-0.41172	50.62%
-42	0.4610	0.894231	0.5538	0.958057	50.62%
-41	0.1329	0.370248	0.5939	0.945436	53.09%
-40	0.0208	0.046202	0.1537	0.266718	49.38%
-39	-0.1680	0.566496	-0.147	-0.27266	53.09%
-38	-0.2449	0.872985	-0.413	-1.01144	46.91%
-37	-0.2504	1.207905	-0.495*	-1.41998	46.91%
-36	-0.1902	0.567913	-0.441	-1.11863	49.38%
-35	-0.0908	0.274205	-0.281	-0.59665	54.32%
-34	0.3819*	1.392117	0.2911	0.677037	61.73%
-33	0.4559*	1.485526	0.8378**	2.035308	55.56%
-32	-0.1904	0.557432	0.2655	0.578198	58.02%
-31	0.4794**	1.739144	0.289	0.658416	60.49%
-30	-0.1089	0.453187	0.3705	1.013486	48.15%
-29	-0.1151	0.492557	-0.224	-0.66829	48.15%
-28	0.3999	1.206546	0.2849	0.702452	55.56%
-27	-0.4404*	1.394332	-0.041	-0.08848	55.56%
-26	0.1674	0.546798	-0.273	-0.62064	53.09%
-25	0.0755	0.251476	0.2429	0.566516	56.79%
-24	-0.0575	0.178485	0.018	0.040853	53.09%
-23	0.3776	1.209114	0.3202	0.71356	58.02%
-22	0.3580	0.524405	0.7356	0.979914	46.91%
-21	0.2135	0.712019	0.5714	0.766444	51.85%
-20	-0.2072	0.531369	0.00621	0.012633	53.09%
-19	-0.2502	0.707173	-0.00457	-0.86871	45.68%
-18	0.1548	0.552716	-0.095	-0.21151	53.09%

-17	0.2283	0.708871	0.3831	0.897602	53.09%
-16	0.4910	1.103188	0.7194*	1.3093	56.79%
-15	-0.1902	0.468445	0.3009	0.499438	48.15%
-14	-0.1111	0.341608	-0.301	-0.57918	53.09%
-13	-0.3924	0.956913	-0.504	-0.96205	44.44%
-12	0.1866	0.501554	-0.206	-0.37159	48.15%
-11	-0.3995*	1.522277	-0.213	-0.46747	43.21%
-10	0.3761	1.026140	-0.023	-0.05192	49.38%
-9	0.4465	1.178181	0.8227*	1.560271	54.32%
-8	-0.0129	0.044671	0.4336	0.909317	41.98%
-7	-0.1799	0.656639	-0.193	-0.48386	44.44%
-6	0.3412	1.079456	0.1613	0.385707	51.85%
-5	0.3102	1.160733	0.6514*	1.573718	53.09%
-4	0.0416	0.146339	0.3518	0.901424	54.32%
-3	-0.2867	0.958092	-0.245	-0.5936	44.44%
-2	0.7719*	1.591776	0.4852	0.851548	51.85%
-1	-0.9410*	1.531389	-0.169	-0.21607	50.62%
0	-1.8270**	2.017519	-2.768***	-2.52933	49.38%
1	0.1398	0.404658	-1.687**	-1.74088	50.62%
2	-0.5868	1.762799	-0.447	-0.932	39.51%
3	-0.8715**	2.220866	-1.458***	-2.83393	38.27%
4	0.8313*	1.406042	-0.04	-0.05662	58.02%
5	-0.0895	0.385468	0.7418	1.167747	46.91%
6	-0.2578	0.754631	-0.347	-0.84079	44.44%
7	0.0825	0.257093	-0.175	-0.37413	49.38%
8	-0.5681*	1.504266	-0.486	-0.98007	45.68%
9	0.0926	0.227196	-0.475	-0.85556	50.62%
10	-0.0143	0.017304	0.0783	0.084725	43.21%

Notes:

The table reports the average (Equation [2]) and cumulative abnormal returns (Equation [4]) around event announcement using the market model. More specifically, the abnormal returns are computed as the estimated residuals from the market model (Equation [1]). The last column reports the percentage of positive daily abnormal returns.. ***, **, * Significant at 0.01, 0.05 and 0.1 level, respectively.

Table 3. Total registered insider trading transactions one month prior to announcement in LSE

Transaction	Number of Firms
None	33
net Purchases 1-1,000 shares	1
net sales 1-1,000 shares	
net purchases 1,001-10,000 shares	14
net sales 1,001-10,000 shares	
net purchases 10,001+ shares	2
net sales 10,001+ shares	
Total	50

*TEMPORARY RESULTS

**Table 4. Average Abnormal Returns & Cumulative Abnormal Returns in ASE
(Market Model Statistics for the sample over the period $t = +60$ to $t = -10$)**

Day	AAR _t	t-statistics	CAR(t ₁ ,t ₂)	t-statistics	percentage of daily positive returns
-60	1.239219	0.933531	2.062674	1.154573	50.00%
-59	0.277629	0.209881	1.516848	0.809414	43.94%
-58	0.51465	0.428791	0.792279	0.443568	45.45%
-57	0.054147	0.042876	0.568797	0.326473	43.94%
-56	-0.3451	0.26444	-0.29095	0.16021	43.94%
-55	0.038885	0.02639	-0.30621	0.15557	53.03%
-54	-0.29338	0.2044	-0.2545	0.12372	40.91%
-53	0.664406	0.478351	0.371021	0.185755	45.45%
-52	0.317474	0.214046	0.98188	0.483206	45.45%
-51	1.143256	0.819034	1.46073	0.71719	51.52%
-50	0.468168	0.344733	1.611424	0.827433	48.48%
-49	-0.18481	0.12915	0.283361	0.143633	46.97%
-48	-0.11499	0.09459	-0.2998	0.15967	53.03%
-47	0.24775	0.197112	0.132758	0.075921	43.94%
-46	0.357968	0.271409	0.605718	0.332463	45.45%
-45	0.508888	0.344079	0.866856	0.43744	50.00%
-44	-0.30122	0.23995	0.207668	0.107049	42.42%
-43	0.461458	0.388237	0.160238	0.092688	53.03%
-42	-0.42096	0.36144	0.040498	0.024336	48.48%
-41	0.095963	0.090423	-0.325	0.20626	46.97%
-40	-0.03748	0.03805	0.058482	0.040388	54.55%
-39	-0.46449	0.54198	-0.50197	0.38444	54.55%
-38	-1.05675	1.06976	-1.52123	1.16322	46.97%
-37	-2.32873***	2.54952	-3.38548***	2.51633	39.39%
-36	-0.70313	0.83536	-3.03186***	2.44094	48.48%
-35	-1.34524*	1.51538	-2.04837**	1.67442	39.39%
-34	-1.81327**	1.81829	-3.15851***	2.36572	46.97%
-33	-1.22307	1.12253	-3.03634**	2.0557	45.45%
-32	-1.39209	1.2252	-2.61516**	1.66125	37.88%
-31	-1.48092*	1.35678	-2.87301**	1.8235	43.94%
-30	-0.87508	0.77151	-2.356*	1.49671	50.00%
-29	-0.07042	0.06741	-0.9455	0.61315	50.00%
-28	-0.95469	1.06126	-1.02511	0.74356	45.45%
-27	-2.16029**	2.17139	-3.11498**	2.32238	33.33%
-26	-1.84044**	1.7876	-4.00073***	2.79437	39.39%
-25	-1.92269**	1.90877	-3.76313***	2.61264	40.91%
-24	-1.65102*	1.60477	-3.57371***	2.48204	45.45%
-23	-0.56934	0.54322	-2.22037*	1.51182	43.94%
-22	-1.12877	1.02833	-1.69811	1.11887	40.91%
-21	-0.9426	0.91183	-2.07137*	1.37375	39.39%
-20	-1.26057*	1.3757	-2.20317*	1.59489	40.91%
-19	-1.22792*	1.31676	-2.48849**	1.90341	46.97%

-18	-1.51645*	1.48978	-2.74437**	1.98797	37.88%
-17	-0.41125	0.3978	-1.9277*	1.3287	56.06%
-16	-0.33347	0.32202	-0.74472	0.50895	46.97%
-15	-0.16141	0.16086	-0.49488	0.3432	50.00%
-14	-0.55304	0.50106	-0.71445	0.47895	45.45%
-13	-1.84001*	1.59747	-2.39305*	1.50007	42.42%
-12	-1.30283	1.22654	-3.14284**	2.00586	42.42%
-11	-0.69819	0.70191	-2.00102*	1.37506	43.94%
-10	-1.09614	1.17835	-1.79434*	1.31753	46.97%
-9	-0.43716	0.4593	-1.53331	1.15209	43.94%
-8	-0.53067	0.52981	-0.96783	0.70045	56.06%
-7	0.082545	0.084803	-0.44813	0.32085	48.48%
-6	0.051432	0.05545	0.133977	0.099646	57.58%
-5	0.75933	0.868517	0.810762	0.636075	57.58%
-4	0.613383	0.597845	1.372714	1.018354	45.45%
-3	1.102723	1.000021	1.716106	1.13937	50.00%
-2	1.33068	1.15919	2.433403*	1.528746	50.00%
-1	1.847917**	1.574194	3.178597**	1.935952	50.00%
0	3.070118**	2.243643	4.918035***	2.727861	62.12%
1	2.41713**	1.91553	5.487248***	2.947958	54.55%
2	2.429038**	1.817242	4.846168***	2.636376	51.52%
3	1.940026	1.279074	4.369064**	2.161111	51.52%
4	1.203623	0.715487	3.143649*	1.387894	46.97%
5	1.970328	1.052213	3.173951	1.260894	45.45%
6	3.372286**	1.788918	5.342615**	2.010711	59.09%
7	3.317768**	1.933262	6.690055***	2.624304	54.55%
8	3.592945**	2.151871	6.910714***	2.886232	57.58%
9	2.629778*	1.351768	6.222723***	2.427242	63.64%
10	1.974074	1.116898	4.603852**	1.75156	62.12%

Notes

The table reports the average (Equation [2]) and cumulative abnormal returns (Equation [4]) around event announcement using the market model. More specifically, the abnormal returns are computed as the estimated residuals from the market model (Equation [1]). The last column reports the percentage of positive daily abnormal returns.. ***, **, * Significant at 0.01, 0.05 and 0.1 level, respectively.

Table 5. Total registered insider trading transactions one month prior to announcement in ASE

Transaction	Number of Firms
None	50
net Purchases 1-1,000 shares	-
net sales 1-1,000 shares	-
net purchases 1,001-10,000 shares	-
net sales 1,001-10,000 shares	1
net purchases 10,001+ shares	-
net sales 10,001+ shares	2
Total	53

Figure 1: Daily Cumulative Abnormal Returns in LSE

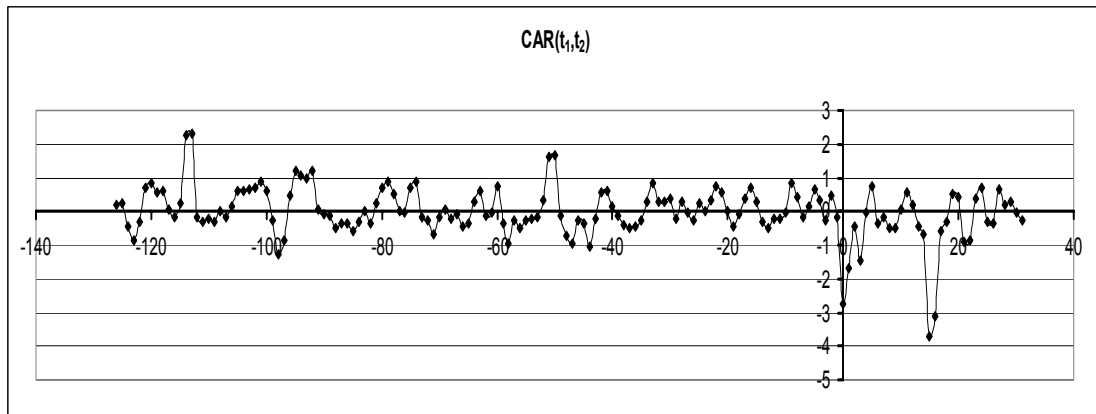


Figure 2: Daily Average Abnormal Returns in the LSE

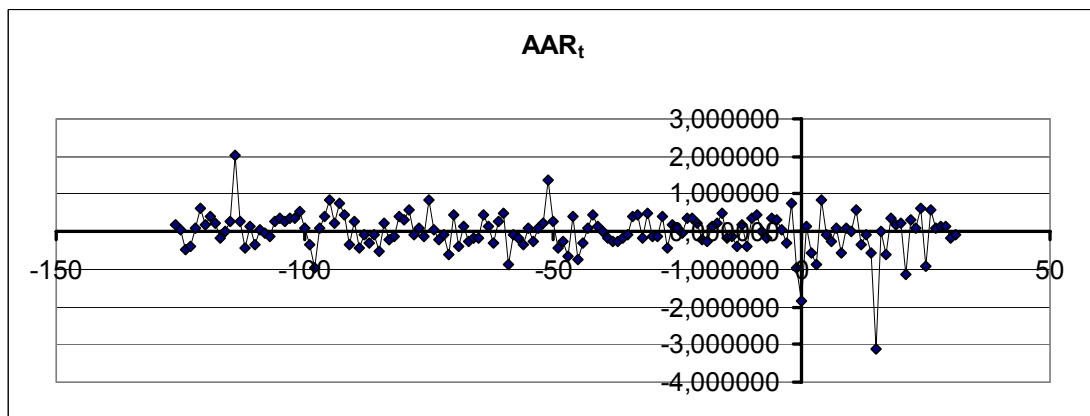


Figure 3: Daily Cumulative Abnormal Returns in ASE

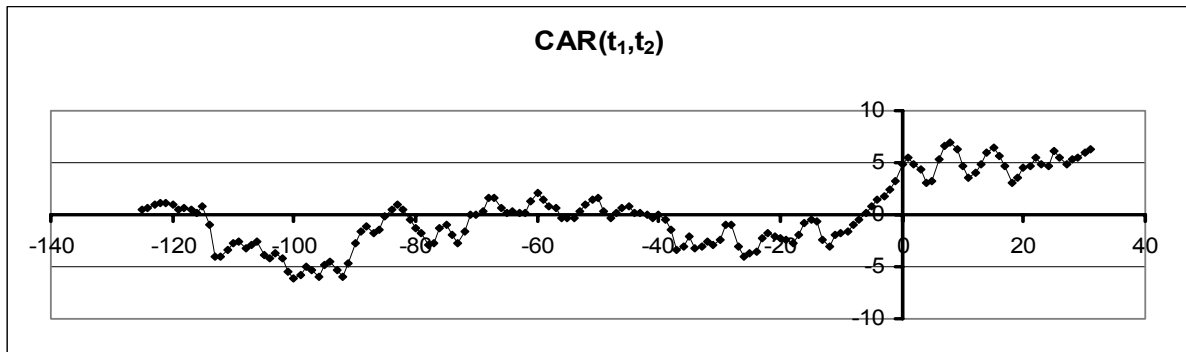


Figure 2: Daily Average Abnormal Returns in ASE

