THE SHORT-RUN COMPETITIVE EFFECTS OF MERGER ENFORCEMENT

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A. Introduction

The main purposes of this paper are twofold. On the one hand, we calculate the sign of the effect of merger and phase II announcement (or decision/referral) on merged firms' stock value, while on the other hand, we investigate the possible short-run effects of the scrutinised mergers on competitors' stock value. This paper extends the articles of Maynes and Rumsey,[1] Cox and Portes,[2] Duso *et al*[3] and Barthodly *et al*[4] by introducing the simple return approach so as to overcome the infrequent trading phenomenon. It also infers short-run outcomes regarding the competitive effects of four major phase II mergers that have been notified to the Hellenic Competition Commission (HCC) during the period 2006–10. Despite its crucial importance, to the best of our knowledge the infrequent trading phenomenon has not been incorporated yet in an event study examination of the competitive effects of mergers on competitor's stock value. Therefore, we argue that this kind of analysis will create strong benefits for other countries and their competition authorities as well.

1   E Maynes and J Rumsey, "Conducting Event Studies with Thinly Traded Stocks" (1993) 17 *Journal of Banking and Finance* 145.
2   A Cox and J Portes, "Mergers in Regulated Industries: The Uses and Abuses of Event Studies" (1998) 14 *Journal of Regulation Economics* 281.
3   T Duso, D Neven and L-H Röller, "The Political Economy of European Merger Control: Evidence Using Stock Market Data" (2007) 50(3) *Journal of Law and Economics* 455.
4   J Barthodly, D Olson and P Peare, "Conducting Event Studies on a Small Stock Exchange" (2007) 13(3) *European Journal of Finance* 227.

The present study focuses solely on the investigation of possible short-run effects of mergers on the stock value of their competitors and tries to draw inferences for merger enforcement policy in Greece during the above-mentioned period. We assume that the short-run movements of stock reactions of both merged firms and their competitors is a valuable guide to whether or not a merger is anticompetitive or not. Competition authorities, and especially the Greek Competition Authority, use an in-depth analysis with internal data and a larger information set of the competitive effects of mergers and does not rely on publicly available data.

However, we believe that the present study may provide some useful guidelines for monitoring future merger enforcement policy in Greece. In addition, event study methodology, in collaboration with internal information of competition authorities, may be a practical tool to use to better investigate the competitive effects of mergers.

The remainder of the paper is organised in the following way. Section B introduces phase I and phase II procedures under the Greek Competition Law (L 3959/11), as applicable, and Section C highlights the infrequent trading phenomenon. Section D reviews the empirical literature and Section E analyses the empirical tools employed in the research methodology (market model) in order to provide a better understanding of the mechanism that affect the competitive effects of merger and acquisitions (M&A). Section F applies market model methodology in four M&A notified to the HCC in recent years covering sectors that have great impact to the Greek economy (ie energy, food, oil products, etc). Following this application, there is a critical discussion of key competitive relationships in the competitive effect of M&A with reference to basic elements of the event study methodology. Finally, Section G encapsulates the main findings of our analysis together with some policy implications in order to better inform policy analysts and government officials.

B. PHASE I AND PHASE II DECISIONS OF LAW 3959/11

HCC follows only a pre-notification merger system since the introduction of the new Competition Act (L 3959/11 "Protection of Free Competition"), which replaced previous Competition Act (L 703/77).

The General Directorate of Competition (GDC) of the HCC conducts phase I and phase II mergers. More specifically, the GDC examines the notified concentration as soon as the relevant notification is submitted. If it is established that the notified concentration does not fall into the scope of application of Article 6 of Law No 3959/11 within 1 month from the notification, the chairman of the HCC issues an act that is notified to the natural persons or the undertakings that have proceeded to the notification. This act does not

restrict the application of the provisions of Articles 1, 2 and 11 of the Competition Law, as applicable.[5]

If it is established that the notified concentration, although falling into the scope of application of Article 6, does not raise serious doubts to restrict competition in the partial markets concerned, the HCC, by a decision issued within 1 month from the notification, allows the concentration (a phase I decision).[6] However, if it is established that the notified concentration falls into the scope of application of the present law and raises serious doubts about the concentration's compatibility with the requirements of the competition's functioning in the partial markets concerned, the chairman of the HCC, by a decision issued within 1 month from the notification, initiates the procedure of thorough investigation of the notified concentration—typically lasting 3 months or more—and informs without delay the participating undertakings with regard to his decision (a phase II decision/referral).[7]

A phase II merger analysis means that the transaction raises such serious doubt as to its compatibility with the national market that a more detailed investigation is necessary. Following an in-depth investigation of the notified transaction (45 days after the phase II decision), the GDC issues a formal written statement of objections (Article 8(5)), to which the involved firms formally respond with a written reply. The HCC must issue its final decision within 90 days (Article 8(6)) from the phase II decision.[8]

C. The Infrequent Trading Phenomenon

The infrequent trading phenomenon[9] appears when some stocks do not trade daily in the stock exchange. In such a case, the estimated variance and

[5]   See Art 8, para 2 of Law 3959/11.
[6]   *Ibid*, para 3.
[7]   *Ibid*, para 4.
[8]   Art 8, paras 8, 11, 12 and 14 may extend both the period of issuing the statement of objections and the final decision of the HCC.
[9]   M Scholes and J Williams, "Estimating Betas from Nonsynchronous Data" (1977) 5 *Journal of Financial Economics* 309; E Dimson, "Risk Measurement When Shares Are Subject to Infrequent Trading" (1979) 7 *Journal of Financial Economics* 197; RH McGuckin, FR Warren-Boulton and P Waldstein, "The Use of Stock Market Returns in Antitrust Analysis of Mergers" (1992) 7(1) *Review of Industrial Organization* 1; Maynes and Rumsey, *supra* n 1; A Cowan and A Sergeant, "Trading Frequency and Event Study Test Specification" (1996) 20(10) *Journal of Banking and Finance* 1731; Barthodly *et al*, *supra* n 4; P Fotis, "Competition Policy and Firm's Damages" in J Harrington, Y Katsoulacos and P Regibeau (eds), *Recent Advances in the Analysis of Competition Policy and Regulation* (Elgar Publications, 2012) (forthcoming); P Fotis, "Firm's Damages from Antitrust and Abuse of Dominant Position Investigations", MPRA Working Paper No 32788 (2011); P Fotis, "Antitrust Investigations and Firm's Damages: Evidences from Normal Returns", paper presented at the 6th Annual Competition and Regulation European Summer School and Conference CRESSE, 1–3 July 2011, Rhodes, Greece; P Fotis and M Polemis, "Are Mergers and Acquisitions Competitive in Specific Greek Relevant Markets? Evidence

covariance of the stock performance will positively correlate with their trade frequency.

In the literature alternative methodologies have been proposed to deal with the infrequent trading phenomenon. The most frequently used method among them is the *lumped returns method*, which calculates daily returns from the stock price series and produces zero returns for non-trading days and relatively large positive or negative returns on days when the stock trades. However, this method underestimates the variance of returns and therefore biases the *t*-statistics used to test abnormal performance.

The *simple returns method* calculates daily returns only for days for which stock prices are available. The daily abnormal return is obtained by subtracting the market return on these days. This method produces unbiased estimates of abnormal returns on the days calculated, but gives no information of returns on days with any trade. It may produce inconclusive outcomes regarding the event study if the number of days of no trade is quite high.

The rationale of the use of simple returns method used in the present study, given that this approach produces unbiased estimates of abnormal returns on the days calculated, is that the average trading frequency of the stocks of the firms under scrutiny is high and the average number of days between trades is low in the event windows under analysis (87.81% and 0.81% for merger announcement and 88% and 0.87% for phase II referral).[10] Therefore, the crucial interval which we use to assess the competitive effects of the mergers on competitor's stock value is almost unaffected by the missing non-trading days.

The *uniform returns method* calculates the daily returns between trading days and allocates the average daily return to each day for which trade does not occur. Therefore, the same stock return is allocated for all of the non-trading days. This method performs about the same as lumped returns method.

A method that incorporates the time interval of non-trading dates is the *adjusted trade-to-trade return method*. That is, assuming a constant one day return-generating process, the multiperiod return for firm j ending on date t is[11]

$$R_t = \ln\left[\frac{P_{j,t}P_{j,t-1}\dots P_{j,t\dots n_t+1}}{P_{j,t-1}P_{j,t-2}\dots P_{j,t\dots n_t}}\right]$$

from Small Stock Exchange", paper presented at the 5th Annual Competition and Regulation European Summer School and Conference CRESSE, 2–4 July 2010, Chania, Crete, Greece; P Fotis and M Polemis, "Ex Post Investigation of Anticompetitive Effects of Mergers: Evidence from Small Stock Exchange", paper presented at the 15th Annual Conference on Econometric Modelling for Africa, 7–9 July 2010, Cairo, Egypt.

[10]   See also Table III.
[11]   See also equation (3) in Mayens and Rumsey, *supra* n 1, 148.

where n_t is the length of the interval of non-trading dates[12] ending at date t and $\hat{P}_{j,t-u}$ is the unobserved stock price of firm j for date $t - u$ ($u = 1, \ldots, n_t$ $_{-1}$). Therefore, the trade-to-trade return is the sum of n_t unobserved one day returns. By dividing the multiperiod return for firm j ending on date t with n_t we derive the *adjusted trade-to-trade return*, which adjusts the variability in the interval length. The adjusted trade-to-trade return is as follows:[13]

$$R_{j,t} = \frac{\ln\left(P_{j,t}\right) - \ln\left(P_{j,t-u}\right)}{n_t}$$

The trade-to-trade approach,

> "uses all available information about total stock and market returns over time and no bias is introduced by attempting to estimate unobserved daily stock returns as occurs with the lumped or uniform techniques. However, since trade to trade returns ignore information about daily market returns over non-trading periods, it is not clear that it is theoretically superior to the lumped method."[14]

However, the above-mentioned conclusion regarding the use of the trade-to-trade approach holds only in the case where the stock of the firm under scrutiny is actually traded. For example, consider that the trade-to-trade return of the stock is calculated as

$$\bar{R}_t = \frac{1}{L_t}\left[\ln\left(P_t\right) - \ln\left(P_{t-L_t}\right)\right]$$

where L_t is the length of time between the trade in period t and the previous successive trade, P_t is the stock's traded price in period t and P_{t-L_t} is the price that the stock L_t was t periods in the past. If the stock is traded without having an impact on the stock price (zero returns), the returns are likely to lead to positive serial correlation in the return series. Therefore, the trade-to-trade approach will only reduce, but not eliminate, the bias on empirical findings towards the rejection of serial independence.[15]

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[12] The period of trading dates between the trade at period t and the previously successful traded date.

[13] See equation 2 in Fotis, "Antitrust Investigations and Firm's Damages", *supra* n 9, 10.

[14] Fotis, "Firm's Damages from Antitrust", *supra* n 9, 12.

[15] P Fotis and M Polemis, "The Use of Economic Tools in Merger Analysis: Lessons from US and EU Experience" (2011) 7(2) *European Competition Journal* 330.

D. LITERATURE REVIEW

The effect of merger announcements on notifying parties' stock value has long been a subject for analysis. On average, the owners of the target firms benefit from the announcement and the shareholders of the biding firms do not gain from it.[16]

Eckbo[17] analyses 259 US mergers, of which 76 were challenged by the antitrust enforcement authorities during the period 1963–78. In the same year, Stillman[18] conducts a smaller study, analysing 11 challenged mergers by the antitrust enforcement authorities attempted between 1964 and 1972. Both of them examine the anticompetitive effects of mergers[19] by using standard event study methodology (see Section E.1). They find support of the null hypothesis of no anticompetitive effects. That is, mergers are not expected to have any anticompetitive effects on product prices. This outcome can be captured by the implementation of the Eckbo–Stillman test. The basic principle of the test is to analyse the reaction of share prices to major new developments. For example, if a merger was viewed by the stock market as mainly increasing the efficiency of the merging companies, then it would be expected that the share prices of competitors would fall in reaction to the announcement of the merger. In that case, the merger would create a more efficient competitor. If, on the other hand, the merger were to lead to collective dominance, then it would be expected that the share prices of all companies would increase in reaction to the merger.

Wier,[20] by analysing US data and considering abnormal returns at the announcement and completion dates of M&As, concludes that a negative decision by the enforcement agency decreases the stock value of the target firm, even though the same firm had faced positive gains during the announcement of the merger. The study by Frank and Harris[21] constitutes the investigation of 80 M&As from 1965 to 1990. Their results, which are statistically significant

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[16] See, eg P Fotis, M Polemis and N Zevgolis, "Robust Event Studies for Derogation from Suspension of Concentrations in Greece During the Period 1995–2008" (2011) 11 *Journal of Industry Competition & Trade* 67; P Fotis, M Polemis and N Zevgolis, "Profitable M&A's and Derogation from Suspensions of Concentrations: Evidence from HCC Decisions" in A Tzavalis (ed), *Studies on the Greek Banking and Financial System* (Athens University of Economics & Business, 2010), 635 (in Greek).

[17] E Eckbo, "Horizontal Mergers, Collusion, and Stockholder Wealth" (1983) 11 *Journal of Financial Economics* 241.

[18] S Stillman, "Examining Antitrust Policy Towards Horizontal Mergers" (1983) 11 *Journal of Financial Economics* 225.

[19] In Eckbo's jargon, "improved collusive behaviour effect (market power theory)" of mergers; in Stillman's jargon, "the inefficiency hypothesis".

[20] P Wier, "The Cost of Anti Merger Lawsuits" (1983) 11 *Journal of Financial Economics* 207.

[21] J Franks and R Harris, "Shareholder Wealth Effects of UK Take-overs: Implications for Merger Policy" in M Bishop and J Kay (eds), *European Mergers and Merger Policy* (Oxford University Press, 1993), 134.

for target firms but not for bidding firms, support the main conclusion of the study by Wier. Forbes,[22] by exploring the stock price of 50 bidding firms in the UK from 1976 to 1990, concluded that "if a 3 day 'event window' is used, there is rather more evidence of losses" rather than gains.

Cox and Portes[23] present a detailed clarification in interpreting the outcomes derived from Eckbo–Stillman approach. Table I is taken from Fotis and Polemis[24] showing, inter alia, inferences of abnormal movements of merging firms and its competitors.

Oxera,[25] by analysing a small number of phase II referrals among UK firms listed on the stock exchange, concludes that, during the referral period, the

Table I: The Competitive Effects of Merger Announcements on Merging Firms and Competitor's Stock Value: An Event Study Approach

Value of notifying parties	Value of rival firms	Market analysis outcome
+	+	Vague[a] (IMPROVED COLLUSIVE BEHAVIOUR EFFECT or THE INEFFICIENCY HYPOTHESIS or ANTICOMPETITIVE)
+	−[b]	Increased efficiency of M&A parties, lower prices, increased competition, higher consumer welfare (COST SAVING EFFICIENCIES EFFECT or PRO-COMPETITIVE)
−	+	Decreased efficiency of M&A parties, higher prices, decreased competition, lower consumer welfare (THE INEFFICIENCY HYPOTHESIS or ANTICOMPETITIVE)
−	−	Vague[c] (PRO-COMPETITIVE)

Source: Fotis et al, *supra* n 16, 71, Table I. For a detailed analysis of "cost saving efficiencies effect and "improved collusive behaviour effect" see Eckbo, *supra* n 17, 241–47 (especially Table 1 on 245). For a detailed analysis of "inefficiency hypothesis" see S Stillman, *supra* n 18, 227–28. For an analysis of pro- and anticompetitive mergers see Duso *et al*, *supra* n 3, 455–89.
[a]In Cox and Portes's (*supra* n 2) jargon, "either reduced competition or no modification in competitive conditions of relative product market".
[b]In Eckbo's (*supra* n 17) jargon, "unrestricted".
[c]In Cox and Portes's jargon, "either increased competition or no modification in competitive conditions of relative product market".

[22] W Forbes, "The Shareholder Wealth Effects of MMC Decisions" (1994) 21 *Journal of Business and Financial Accounting* 763.

[23] Cox and Portes, *supra* n 2, 282.

[24] Fotis and Polemis, "Are Mergers and Acquisitions Competitive", *supra* n 9, 4; Fotis and Polemis,"Ex Post Investigation", *supra* n 9, 5.

[25] Eg http://www.oxera.com/cmsDocuments/Agenda_March%2006/Blocking%20the%20deal_merger%20decisions%20and%20share%20prices.pdf (accessed on 25 April 2011).

effect of the announcement on targets' stock value is negative, "ranging from –3% to –37%, and averaging between –8% and –12%". For bidding firms, the negative effect holds only for completed concentrations, while for anticipated transactions the effect is almost neutral, ranging from –0.5% to 0.6%. This result is dependent on the period of the event window under analysis. For example, for event windows prior to the announcement of the referral, the cumulative effect is positive, while those after the announcement exhibit negative cumulative share movements.[26]

Duso *et al*[27] explore 164 merger control decisions in the EU from 1990 to 2002 and find results that are the opposite of those from Eckbo's and Stillman's studies. By evaluating the anticompetitive effects from the abnormal reaction of competitor's stock value, they suggest, inter alia, that the "Commission's decisions cannot be solely accounted for by the motive of protecting consumer surplus". In particular, the "Commission made a strong type I errors[28] in 4 of 14 prohibitions and it made a type II errors[29] in about 23% of the cases that it has cleared without remedies".

Beverley[30] explores the effect of seven merger announcements on competitor's stock value in the UK during the period from 2003 to 2007. Her study concludes that only one merger exhibits cost saving effects. Kokoris[31] explores the effect of three merger announcements on competitor's stock value in the UK during the period from 2003 to 2007. He concludes that almost all the phase I mergers under analysis exhibit improved collusive behaviour effects.

Aktas *et al*[32] investigate 259 merger cases within the EU during the period 1990–2000. They conclude that the more negative the abnormal return of the companies, the greater the potential for regulatory intervention, especially when the acquiring firm in the merger under scrutiny is not from the EU.

All the above-mentioned studies use the market model so as to explore the abnormal movement of competitors around the announcement of the merger. None of them incorporates the infrequent trading phenomenon. Maynes and Rumsey[33] explore Canadian infrequently traded stocks of notifying parties and provide a good framework for conducting event studies on a small stock

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26   *Ibid*, Table 2.
27   Duso *et al*, *supra* n 3, 457.
28   The Commission has prohibited mergers that the stock market regarded as pro-competitive (a merger that increases consumer surplus).
29   The Commission has failed to prohibit mergers that the stock market regarded as anticompetitive (a merger that reduces consumer surplus).
30   M Beverley, "Stock Market Event Studies and Competition Commission Inquiries" working paper (Centre for Competition Policy, 2007), 8–16.
31   I Kokkoris, "A Practical Application of Event Studies in Merger Assessment: Successes and Failures" (2007) 3 *European Competition Journal* 65.
32   N Aktas, E de Bodt and R Roll, "European M&A Regulation is Protectionist" (2007) 11(7) *The Economic Journal* 1096.
33   *Supra* n 9.

exchange. The authors indicate that thin trading may be adjusted by using trade-to-trade returns, and the phenomenon of non-normality of stock returns may be eliminated by the use of nonparametric test statistics.[34]

Barthodly et al,[35] by examining infrequently traded data from the Copenhagen Stock Exchange, have suggested that event studies can be performed in small stock exchange with lumped returns provided that certain adjustments are made, such as: (i) a minimum of 25 events appears necessary to obtain acceptable size and power in statistical tests; (ii) trade-to-trade returns should be used; (iii) one should not expect to consistently detect abnormal performance of less than about 1% (or perhaps even 2%), unless the sample contains primarily thickly traded stocks; (iv) nonparametric tests are generally preferable to parametric tests of abnormal performance; (v) researchers should present separate results for thickly and thinly traded stock groups; and (vi) when non-normality, event-induced variance, unknown event day and problems of very thin trading are all considered simultaneously, no one test statistic or type of test statistic dominates the others.

However, there are also proponents of the view that the event studies cannot be used as a compass antitrust analysis practices. In particular, Fridolfsson and Stennek,[36] Bhattacharya et al,[37] Bris[38] and Ackerman et al[39] indicate some drawbacks of this kind of analysis.

Fridolfsson and Stennek[40] state that

"competition authorities should be cautious when using event study techniques to assess proposed mergers' effects on competition. While an increase in competitors' share price indicate that a merger is anticompetitive, a decrease in their share prices does not indicate that a merger is precompetitive."

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[34] For the use of parametric and non parametric test statistics on event study methodology see J Corrado, "A Nonparametric Test for Abnormal Security-price Performance in Event Studies" (1989) 23 *Journal of Financial Economics* 385; E Boehmer, J Musumeci and A Poulsen, "Event-study Methodology under Conditions of Event-induced Variance" (1991) 30 *Journal of Financial Economics* 253; M Salinger, "Standard Errors in Event Studies" (1992) 27 *Journal of Financial and Quantitative Analysis* 39. The studies that have dealt with the infrequent trading phenomenon using US data are: R Heinkel and A Kraus, "Measuring Event Impacts in Thinly Traded Stocks" (1988) 23 *Journal of Financial and Quantitative Analysis* 71; J Campbell and E Wasley, "Measuring Security Price Performance Using Daily NASDAQ Returns" (1993) 33 *Journal of Financial Economics* 73; A Cowan and A Sergeant, *supra* n 9.

[35] *Supra* n 4.

[36] "eg http://swopec.hhs.se/iuiwop/papers/iuiwop0542.pdf accessed on 2 November 2011". S-O Fridolfsson and J Stennek, "Why Mergers Reduce Profits and Raise Share Prices—A Theory of Preemptive Mergers" (2005) 3 *Journal of the European Economic Association* 1083.

[37] U Bhattacharya, H Daouk, B Jorgens and C-H Kehr, "When an Event is Not an Event: The Curious Case an Emerging Market" (2000) 55 *Journal of Financial Economics* 69.

[38] A Bris, "Do Insider Trading Laws Work?" (2005) 11 *European Financial Management* 267.

[39] A Ackerman, JV Halteren and E Maug, "Insider Trading Legislation and Acquisition Announcements: Do Laws Matter?" Working Paper, University of Mannheim, 2008.

[40] Fridolfsson and Stennek, *supra* n 36, 6.

In Fridolfsson and Stennek,[41] the authors also indicate that,

"If being an 'insider'[42] is better than being an 'outsider',[43] firms may merge to preempt their partner merging with a rival. The stock-value is increased, since the risk of becoming an outsider is eliminated. Mergers increasing consumers' prices, while increasing competitors' profits, may reduce their share-prices."[44]

Bhattacharya *et al*[45] indicate a significant negative (positive) return bias on the good (bad) news announcement explained by a severe insider trading in the Mexican stock market. They conclude that this problem in event studies can bias the researcher towards falsely concluding that corporate news announcements are a non-event. By investigating 75 events from Bloomberg that took place in Mexico from 1994 to 1997, the authors conclude that there is in fact no stock price reaction on the announcement day due to insider trading.

Bris[46] examines general patterns of stock price run-ups prior to takeovers before and after the implementation of insider trading laws and not around the implementation of enforcement rules. The same conclusion is reached in the study by Ackerman *et al.*[47] They find that the insider trading laws, and not the actual enforcement of the laws by independent authorities, is more important for explaining the pattern of pre-announcement price run-ups for takeovers.

E. Selection of Sample and Empirical Methodology

1. Model Selection

The abnormal return is the residual between the actual and predicted returns:[48]

$$AR_t = R_{j,t} - E\left(\frac{R_{j,t}}{X_t}\right)$$

(1)

where AR_τ is the abnormal return, $R_{j,\tau}$ is the actual return of firm j at day τ and $E(R_{j,t}/X_\tau)$ is the expected or conditional return on a given event at day τ under normal conditions. The actual return of firm j at day τ is given by

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[41] *Ibid.*
[42] Victim of a merger.
[43] A competitor of a merged entity.
[44] These results are derived in an endogenous merger model, predicting the conditions under which mergers occur, the time of merger and the split of surplus.
[45] *Supra* n 37.
[46] *Supra* n 38.
[47] *Supra* n 39.
[48] Fotis and Polemis, *supra* n 15, 329.

$$R_{j,\tau} = \left(\frac{P_{j,\tau} - P_{j,\tau-1}}{P_{j,\tau-1}} \right) \times 100$$

Following Aktas *et al*,[49] Duso *et al*,[50] Davis and Garces[51] and Fotis *et al*,[52] the market model forecasts that firm *j*'s stock return at time τ ($R_{j,\tau}$) is proportional to a market return. That is,

$$R_{j,\tau} = \alpha + \beta R_{m,\tau} + \varepsilon_{j,\tau} \tag{2}$$

where $R_{m,\tau}$ is the return on the market index for day τ in the event window.

We estimate the market model over 200 trading days (clean window), starting 2 days prior to the announcement day.[53] Since we adopt the simple return method so as to calculate abnormal returns, the clean window is greater than a calendar year.

We use the estimated values for the model's parameters (the Greek parameters α and β of equation (2)) to predict what firm *j*'s stock return would have been, had the merger not been announced ($\hat{R}_{j,\tau}$). Therefore,

$$E\left(\frac{\hat{R}_{j,\tau}}{R_{m,\tau}} \right) = \hat{\alpha} + \hat{\beta} R_{m,\tau} + \varepsilon_{j,\tau} \tag{3}$$

Subtracting equation (3) from the actual return of firm *j* at day τ ($R_{j,\tau}$), we get equation (1) or the abnormal return/residual around the merger announcement day τ ($AR_{j,\tau}$).

We define an event window from 1 day prior to 1 day after the day 0[54] of the event. The events under scrutiny are the announcement of the merger and the phase II decision/referral. We use the market model so as to calculate short-run firms' stock reactions around the announcement of the events.[55]

For each day in the event window, the abnormal returns are averaged across firms to produce AAR for that day τ ($AAR_{j,\tau}$). Thus,

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[49] Aktas *et al*, *supra* n 32, 1101.

[50] Duso *et al*, *supra* n 3, 111–13.

[51] P Davis and E Garces, *Quantitative Techniques for Competition and Antitrust Analysis* (Princeton University Press, 2009), 111–13, 545–52.

[52] Fotis *et al*, "Robust Event Studies", *supra* n 16, 77.

[53] We have chosen a clean period from 2 to 221 trading days prior to the event period.

[54] Day 0 is the day of the announcement of the merger and the day of the phase II referral. It is made for a particular firm and will be on different calendar dates for the different sample firms.

[55] For the use of mean adjusted return and market adjusted return models in a standard event study approach see eg Fotis *et al*, "Robust Event Studies", *supra* n 16, 78–79; Davis and Garces, *supra* n 51.

$$AAR_{j,\tau} = \frac{\sum\limits_{j} AR_{j,\tau}}{N} \tag{4}$$

where N is the number of the sample firms (22).

We then sum the values of $AAR_{j,\tau}$ for each day over the event window to deduce $CAAR_{j,\tau}$. Therefore,

$$CAAR_{j,\tau} = \sum_{\tau=-m}^{+n} AAR_{j,\tau} \tag{5}$$

where $m = n = 1$ a day prior to and after the announcement day.

Under the normality assumption, the distribution of equation (5) is normal $CAAR_{j,\tau} N\left(\mu_\tau, \sigma_\tau^2\right)$, mean and variance at day τ respectively. We use the traditional t-statistic,[56]

$$\tau(1,\ldots,n) = \frac{CAAR_{j,\tau}}{\sigma_\tau}$$

where $1, \ldots, n$ are the days of the event window, to test whether $\mu_\tau = 0$ (H_0).[57]

Lastly, the $CAR_{j,\tau}$ over the event window is defined as:

$$CAR_{j,\tau} = \sum_{\tau=-m}^{+n} AR_{j,\tau} \tag{6}$$

where $m = n$, as in equation (5).[58]

2. Sample selection

The merger sample consists of four phase II merger investigations that took place in Greece from 2006 to 2010. Table II presents the M&As under scrutiny.

In the ELPE/BP and Pegasus/Anaptixiaki merger cases, we examine the competitive effects of mergers on horizontal competitors. In the former merger

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[56] For the calculation of standard deviation ,we assume normal abnormal returns. See, eg S Brown and J Warner, "Using Daily Stock Returns: The Case of Event Studies" (1985) 14 *Journal of Financial Economics* 3, equations 5–8; Corrado, *supra* n 34, equations 1–3; Maynes and Rumsey, *supra* n 1, equations 6–9.

[57] The results we get from the traditional *t*-statistic do not differ dramatically from those introduced by J Patell, "Corporate Forecasts of Earnings Per Share and Stock Price Behaviour: Empirical Tests" (1976) 14(2) *Journal of Accounting Research* 246; see also Boehmer *et al*, *supra* n 34. The latter incorporates the possibility that many events may cause changes in both mean and variance, and it has been also used in the generalised autoregressive conditional heteroscedasticity model and the time-varying market model beta to account for the temporal changes in the return process during the event period.

[58] Since CAR_{jt} of individual firms are usually quite noisy, which may reduce the reliability of any inference, we prefer to analyse the traditional *t*-statistic, $\tau(1, \ldots, n) = CAAR_{j,\tau}/\sigma_\tau$.

**Table II: Phase II Mergers Attempted in Greece During the Period
2006–09**

Merger (year)	Announcement day	Notification day	Phase II referral	Clearness day	No of merged parties/ competitors
ELPE/BP (2009)	26.6.2009	10.7.2009	5.8.2009	20.10.2009	1/4
PPC/Halyvourgiki (2009)	12.2.2009	16.2.2009	12.3.2009	29.5.2009	1/2
Pegasus/Anaptixiaki (2008)	14.3.2008	31.3.2008	24.4.2008	30.6.2008	1/6
Delta/Chipita (2006)	30.3.2006	17.4.2006	17.5.2006	10.7.2006	0/7
Total					3/19

Source: HCC (http://www.epant.gr).

we also analyse the competitive effects on three vertical competitors.[59] In the last two mergers in the table (PPC/Halyvourgiki and Delta/Chipita), we focus on the conglomerate effects. The link between competitive effects of a merger, consumer surplus and competitors' profit still holds in the aforementioned conglomerate merger between Delta and Chipita. For this specific merger, the conglomerate effects were not among the leading arguments for the HCC's decisions. For the merger between PPC and Halyvourgiki, the HCC's main argument was the exclusionary effects of the merger. Therefore, the competitive effects of the specific merger on competitors stock value and hence consumer surplus may be inconclusive.

We exclude from the sample three competitors since the estimation of coefficient β of equation (1) is not statistically significant at least at $p = 0.10$. We also exclude five notifying parties due to missing data. As a result, the sample consists of 22 companies listed in the Athens Stock Exchange, which are involved as notifying parties (3) and competitors (19) in the four above-mentioned phase II mergers.[60] The infrequent trading phenomenon appears for the sample firms. Table III illustrates the trading frequency of the 22 stocks of the sample, both during the merger announcement and during the phase II decision/referral periods.

Following Barthodly *et al*,[61] the stocks we analyse in the present study exhibit a thick trading phenomenon. A thick traded stock is defined as "one trading of more than 80% of trading days or an average of than [*sic*] four days per

[59] Eckbo, *supra* n 17, 24550.
[60] The data are available from the authors upon request.
[61] *Supra* n 4, 7.

Table III: Trading Statistics

Merger (year)	No of stocks	Total average number of days of no trade[a]	Total average number of days between trades[b]	Average number of days between trades in the event windows[c]	Average trading frequency in the event windows (%)[d]	Total average trading frequency (%)[d]
			Merger announcement			
ELPE/BP (2009)	5	37.2	1.29	0.4	96.67%	82.37%
PPC/Halyvourgiki (2009)	3	10.7	1.02	0	100%	94.75%
Pegasus/Anaptixiaki (2008)	7	28.8	1.17	1.86	84.52%	86.26%
Delta/Chipita (2006)	7	25.6	1.17	1	91.7%	87.89%
Total	22	25.58	1.16	0.81	93.21%	87.81%
			Phase II referral			
ELPE/BP (2009)	5	39.8	1.29	0.6	80%	82.29%
PPC/Halyvourgiki (2009)	3	38	1.02	0.33	88.89%	94.16%
Pegasus/Anaptixiaki (2008)	7	28.71	1.16	0.86	66.7%	94.67%
Delta/Chipita (2006)	7	25.81	1.17	0.71	71.43%	88.74%
Total	22	26.72	1.16	0.87	77%	88%

Source: author's elaboration of statistical data.
[a]Interval between non-trading days.
[b]Average number of non-trading trades{not days?}.
[c]Event windows [–1 +1], [–1 +10], [–1 +3].
[d]Percentage of trading days with respect to non-trading days.

week".[62] Both average trading frequency and average number of days between trades in the event windows of both event periods under analysis are quite high and low respectively (87.81% and 0.81% for merger announcement and 88% and 0.87% for phase II referral—see Table III). That is, the crucial interval which we use to assess the competitive effects of the mergers on competitor's stock value is almost unaffected by the missing non-trading days.

[62] A medium traded stock is defined as the one trading for between 40 and 80%, and a thin traded stock as one trading less than 40%, of the trading days per week.

F. Empirical Results

1. Acquisition of BP Hellas SA by ELPE SA

On 10 July 2009, Hellenic Petroleum SA (ELPE) notified the HCC of its proposed share purchase of BP Hellas SA Oil Trading (BP).[63] On 5 August 2009, the HCC initiated a phase II investigation on the ground that the concentration raised serious doubts as to its compatibility with effective competition in certain affected relevant markets (ie retail markets for petrol and diesel in certain prefectures of Greece).

The results from the event study analysis of the specific merger in Table IV indicate that ELPE shares suffered a cumulative abnormal negative return of –0.22% around the announcement date of the merger (26 June 2009). As regards the abnormal return (AR), this showed a negative reaction to the relevant acquisition on the day after the announcement. The magnitude of this evolution is low (–0.44%), though it is still statistically significant. The negative cumulative abnormal return of the merging entity in combination with the positive reaction of the rival firms (ie Motor Oil Hellas, Revoil, Cyclon, Elin) after the announcement day indicates a short-run negative effect of the merger.

The positive reaction of the competitors either at horizontal (eg Motor Oil) or vertical market segment (eg Revoil, Elin and Cyclon) constitutes an indication that, in the short run, investors expected the merger to be profitable for the rival firms. As regards rivals' negative abnormal returns prior to the announcement date (–1.22%), it is worth mentioning that, according to relevant press releases, Motor Oil Hellas, which holds a 25% market share in the refining segment in Greece, had expressed its interest to acquire the shares of BP in order to gain total control of the company and a strong (integrated) position in the oil industry.

The negative cumulative abnormal return of competitor firms prior to the announcement day can be explained by the events surrounding the dissemination of information regarding the imminent ELPE/BP merger. From Fig 1, it is evident that, during the merger announcement and the phase II referral period, the ELPE's CAR continues to be negative, while most of the competitors' stock value, except for that of one vertical rival, exhibits an upward trend, confirming the positive effect of the merger on their market value in the short run.

Table IV also reveals that, during the phase II referral announcement, all the firms involved in the event study of the BP–ELPE merger exhibit a statistically insignificant decrease in their market value. Overall, the cumulative effect

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[63] The acquisition includes the entire network of BP in Greece, which accounts for approximately 1,200 service stations and storage facilities throughout Greece, as well as the channel for commercial and industrial customers.

Table IV: Abnormal Returns in the ELPE/BP Merger Case

Event	All firms ($n = 5$)		Competitors ($n = 4$)		Notifying parties ($n = 1$)	
	AAR	CAAR	AAR	CAAR	AR	CAR
Merger announcement						
−1	−0.99%	−0.99%	−1.22%	−1.22%	−0.06%	−0.06%
0	0.03%	−0.96%	−0.03%	−1.25%	0.28%	0.22%
+1	4.01%	3.05%	5.12%	3.87%	−0.44%	−0.22%
			t-statistic			
−1	−0.38	−0.22	−0.36	−0.21	−0.17	−0.10
0	0.01	−0.21	−0.01	−0.21	0.78	0.35
+1	1.52***	0.67	1.52***	0.66	−1.22***	−0.35
Phase II referral						
+1	−1.23%	−1.52%	−1.52%	−1.90%	−0.07%	0.00%
			t-statistic			
	−1.57***	−1.12	−1.57***	−1.13	−1.08	−0.04
Both events						
+1	2.78%	1.53%	3.22%	3.07%	−0.51%	−0.22%

Source: authors' estimates.
*Statistically significant at $p = 0.01$.
**Statistically significant at $p = 0.05$.
***Statistically significant at $p = 0.10$.

of both events on firm's stock value in the short run is positive for competitors and negative for notifying party.

2. Joint Venture between PPC and Halivourgiki

On 16 February 2009, PPC SA and Halyvourgiki SA notified the HCC of the formation of a joint venture to undertake the construction and operation of two power plants with a total capacity of 880 MW, within the facilities of Halyvourgiki. HCC approved the notified concentration (29 May 2009), while attaching conditions intended to ensure the effective level of competition in the relevant market for electricity.[64]

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[64] See, eg http://www.epant.gr/apofasi_details.php?Lang=gr&id=289&nid=578 (accessed on 17 March 2011).
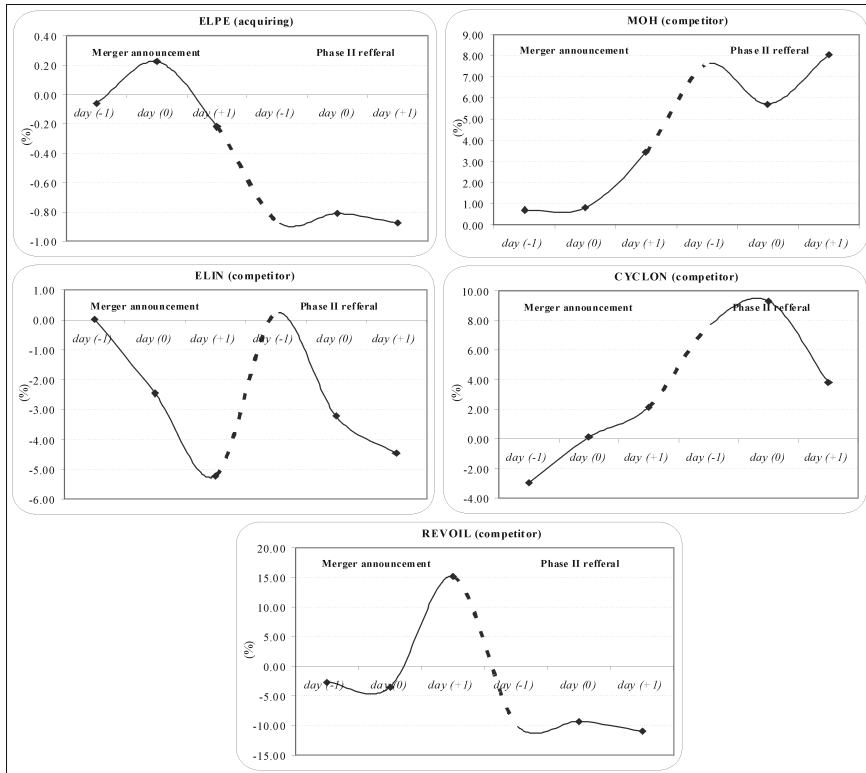
Fig 1   Horizontal and Vertical Effects in the ELPE/BP Merger Case (CAR) Around
the Announcement of the Merger and the Phase II Referral
Source: authors' estimates

The Greek electricity industry comprises four distinct markets (generation of electricity; supply of electricity from wholesalers or importers to final consumers; transmission of electricity through a high-voltage grid; and distribution of electricity through a medium- or low-voltage grid). It should be noted that, before the liberalisation of the electricity supply segment (February 2001), PPC was the only supplier of electricity (though a few individual manufacturers produced electricity for self-consumption). Up to 2007, nine supplier companies, holding licences from the Ministry of Development, were selling electricity to PPC, imported via the interconnectors.[65]

The announcement date of significant news about the relevant joint venture was 12 February 2009 and the corresponding date of the phase II referral

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[65]   See generally I Fafaliou and M Polemis, "Trends in the European Electricity Markets: The Case of Greece" (2010) 2(5) *International Journal of Economics and Business Research* 369.

was 12 March 2009. Table V illustrates the abnormal returns of the stock prices of the notifying parties (only PPC) and their competitors (Terna and Mytilinaios) around both the announcement day and the day of the phase II referral. The results from Table V indicate that PPC's stock price showed a significant positive abnormal return of around 0.34% prior to the announcement of the formulation of the joint venture. Moreover, PPC's shares exposed a cumulative abnormal positive return of 0.38% around the announcement date of the merger.

The positive abnormal returns of the notifying party, in combination with the negative average and cumulative statistically significant reaction of the rival firms after the announcement day, indicate an increased efficiency of the

Table V: Abnormal Returns in the PPC/Halivourgiki Merger Case

Event	All firms ($n = 3$)		Competitors ($n = 2$)		Notifying parties ($n = 1$)	
	AAR	CAAR	AAR	CAAR	AR	CAR
Merger announcement						
−1	−0.50%	−0.50%	−0.92%	−0.92%	0.34%	0.34%
0	−0.46%	−0.95%	−0.64%	−1.56%	−0.08%	0.26%
+1	−0.44%	−1.39%	−0.72%	−2.28%	0.12%	0.38%
			t-statistic			
−1	−15.96*	−9.21*	−6.47*	−3.74*	1.60***	0.92
0	−14.65*	−17.67*	−4.54*	−6.36*	−0.40	0.69
+1	−13.99*	−25.75*	−5.05*	−9.28*	0.57	1.03
Phase II referral						
+1	−0.46%	−1.95%	−1.77%	−2.98%	0.22%	0.30%
			t-statistic			
	−1.34*	−3.28***	−2.60***	−2.53***	0.58	0.46
Both events	All firms ($n = 5$)		Competitors ($n = 4$)		Notifying parties ($n = 1$)	
+1	−0.90%	−3.34%	−2.49%	−5.26%	0.34%	0.68%

Source: authors' estimates.
*Statistically significant at $p = 0.01$.
**Statistically significant at $p = 0.05$.
***Statistically significant at $p = 0.10$.

merged firm, lower prices and higher consumer welfare in the short run.

The fact that competitors' share prices (see Fig 2) illustrated negative significant abnormal returns (AAR = –0.72% and CAAR = –2.28%) indicates that investors expected the merger in the long—run to be profitable for the notifying parties and not for the rivals and thus, would not likely induce adverse effects on competition in the post-merger oligopolistic relevant market (ie production of electricity).

It is worth mentioning that a statistically significant decrease in the market value of all firms under scrutiny (CAAR = –1.39%) may indicate that concentration in the relevant market is unaffected. It should also be noted that the HCC allowed the merger after taking into consideration some behavioural remedies, which the market perceived as having a positive impact on competition.

The results regarding the abnormal and cumulative returns of the stock prices of the notifying party and its two competitors during the phase II referral announcement, which can also be drawn from Table V, reveal that the movement of the stock value of competitors continues to show a negative sign in relation to the "vague" result for the bidding firms (see Table I), indicating that the competitors strongly believe that the merger will reinforce the efficiency level of merged firm after its clearance. As it concerns the movement of the share value of the biding firm, Table V clearly shows that the market expects
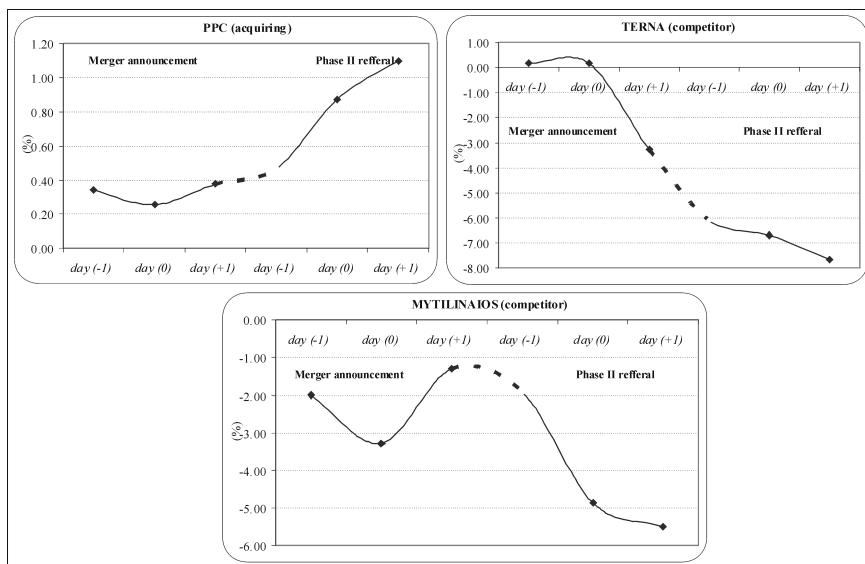

Fig 2   Conglomerate Effects in the PPC/Halivourgiki Merger Case (CAR) Around the Announcement of the Merger and the Phase II Referral
Source: authors' estimates

the merger to be cleared in the near future. Overall, the phase II decision by the chairman of the HCC increases the magnitude of loss of competitor's market value, while marginally increasing the market value of the bidding firm in the short run.

3. Acquisition of Anaptixiaki Media SA. by Pegasus

On 31 March 2008, Pegasus Publishing SA (Pegasus) notified the HCC of its proposed share purchase of 30% of Anaptixiaki Media SA (Anaptixiaki). Before the clearance date of the notified merger, Pegasus already held 40% of Anaptixiaki's share capital. On 24 April 2008, the HCC initiated a phase II investigation on the ground that the concentration raised serious doubts as to its compatibility with effective competition in certain affected relevant markets (ie television, magazines and newspapers). Based on the evidence gathered during the course of the investigation, the HCC concluded that the notified transaction could not potentially impede effective competition through the creation or strengthening of a dominant position in certain relevant markets. By a decision dated 3 June 2008, the Competition Commission approved the notified concentration.[66]

Pegasus shares (the acquiring firm) show a significant positive cumulative abnormal return of almost 6.5% around the announcement of the merger (Table VI). It is noteworthy that the stock value of the rival firms as captured by the CAAR increases around the same day by 2.02%.

The above-mentioned effect of the merger announcement might be revealed by the increase in the market value of all firms. More specifically, CAAR is positive and statistically significant on the day after the announcement of the merger. The average abnormal return (AAR) is also positive, though not statistically significantly so. This evolution may lead to the conclusion that the level of concentration in the media industry might increase after the clearance of the merger by HCC. Therefore, in the long run, such an increase in the stock prices of all firms may be due to an increase in the ability of firms to coordinate their business strategies to facilitate collusion or create a collective dominant position in the media industry.[67]

The positive short-run stock reaction of the rival firms to the merger is evident in Fig 3. More specifically, the stock value as measured by the CAR of the four competitors (DOL, Attikes Ekdoseis, Ixou and Eikonas and Tegopoulos) showed an upward trend around the announcement day. It is worth mentioning that DOL, which is the main competitor of Pegasus, showed the most significant increase in CAR on the day after the announcement (6.71%). The fact

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[66] See, eg http://www.epant.gr/apofasi_details.php?Lang=gr&id=284&nid=528 (accessed on 5 March 2011).

[67] See *supra* Section D and the Eckbo–Stillman test.

Table VI: Abnormal Returns in the Pegasus/Anaptixiaki Merger Case

Event	All firms (n = 7)		Competitors (n = 6)		Notifying parties (n = 1)	
	AAR	CAAR	AAR	CAAR	AR	CAR
Merger announcement						
−1	1.91%	1.91%	1.61%	1.61%	3.74%	3.74%
0	−0.48%	1.44%	−0.45%	1.16%	−0.67%	3.07%
+1	1.22%	2.66%	0.85%	2.02%	3.43%	6.50%
			t-statistic			
−1	1.56***	0.90	1.55***	0.89	1.52***	0.88
0	−0.39	0.67	−0.43	0.65	−0.27	0.72
+1	0.99	1.25***	0.82	1.12	1.39***	1.52***
Phase II referral	All firms (n = 3)		Competitors (n = 2)		Notifying parties (n = 1)	
+1	−1.33%	−2.08%	−1.17%	−1.79%	−2.26%	3.78%
			t-statistic			
	−1.34*	−3.28***	−2.60***	−2.53***	0.58	0.46
Both events	All firms (n = 5)		Competitors (n = 4)		Notifying parties (n = 1)	
+1	−0.09%	0.58%	−0.32%	0.23%	1.17%	2.72%

Source: authors' estimates.
*Statistically significant at $p = 0.01$.
**Statistically significant at $p = 0.05$.
***Statistically significant at $p = 0.10$.

that the other three competitors had much lower positive abnormal returns than DOL indicates that, according to the investors, in the long run the positive impact of the merger on DOL may be greater than the impact on the smaller competitors (especially on Tegopoulos). It can be argued that the latter fact indicates that Pegasus was constrained by DOL more than it was constrained by the three smaller players and therefore they were not effective competitors of Pegasus. The same argument also applies for Eleutheri TV, whose share price indicated a negative abnormal return the day after the announcement (−0.03%).

During the phase II referral announcement, the stock reaction of all the firms under scrutiny is negative. Even though the overall effect of both events on the market value of both the competitors and the notifying parties continues to be positive and therefore value increasing for all firms that are involved in

Fig 3   Horizontal Effects in the Pigasos Merger Case (CAR) Around the Announce-
ment of the Merger and the Phase II Referral
Source: authors' estimates

the merger, the statistically negative reaction of competitor's stock value during
the phase II referral announcement possibly illustrates the risk that an anticom-
petitive merger will not to be cleared.[68]

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[68]   A belief that was reinforced after the phase II decision by the chairman of the HCC.

4. Merger between Delta and Chipita

On 17 April 2006, Delta Holdings SA (Delta) and Chipita International SA (Chipita) notified the HCC of a merger agreement. After completion of the merger, Delta gained absolute control of the Chipita, which is active in several segments of the food sector (ie savoury and salted snacks, croissants, etc). Based on the evidence gathered during the course of the investigation, the HCC concluded that the notified transaction could not potentially impede effective competition through the creation or strengthening of a dominant position in certain relevant markets. By a decision dated 10 July 2006, the HCC approved the notified concentration.[69]

In this conglomerate merger case, a statistically significant negative CAAR of about –0.67% the day after the announcement of the merger in the market value of all competitors marginally indicates that, in the short run, the degree of competition in the relevant market is unaffected, and that the market expects the merger to be cost-reducing and not price-increasing in the long run. Such a decrease in the stock prices of all firms may be due to a relevant decrease in the ability of firms to coordinate production and pricing decisions in the relevant food industry (ie dairy products, beverages, frozen foods, savoury snacks, etc). This evolution might be the outcome of the absence of horizontal and vertical effects (conglomerate merger).

Fig 4 depicts the stock reaction of competitors around the announcement of the merger. More specifically, the stock value of the two competitors (Evrofarma and Kri-Kri) showed a downward trend around at day 0. Coca Cola 3E, which is the leader in the relevant market of beverages in Greece along with Kanakis and Nutriart, which is active in the production and distribution of standardised foods principally with a flour base (ie salted and savoury snacks, croissants, cakes, etc), showed a positive CAR after the announcement day, whereas Elgeka, which has a strong position in the standardised food products, showed the most significant stock price increase after the announcement day (CAR = 5.50%). During the phase II referral announcement the majority of the competitors' share value indicates a negative sign, the exceptions being Kanakis and Kri-Kri, whose stock reaction is positive.

The results of Table VII reveal that the market did not continue to have the same beliefs about the specific merger as it had almost 1 month previously, during the merger announcement. The significant positive CAAR of the competitors during the merger announcement of the initiation of the phase II referral indicates that the market discounts the possible conglomerate effects of the merger. As has already been mentioned, the HCC cleared the merger without taking any remedies. This decision raises serious concerns against the

[69] See, eg http://www.epant.gr/apofasi_details.php?Lang=gr&id=268&nid=349 (accessed on 10 March 2011).
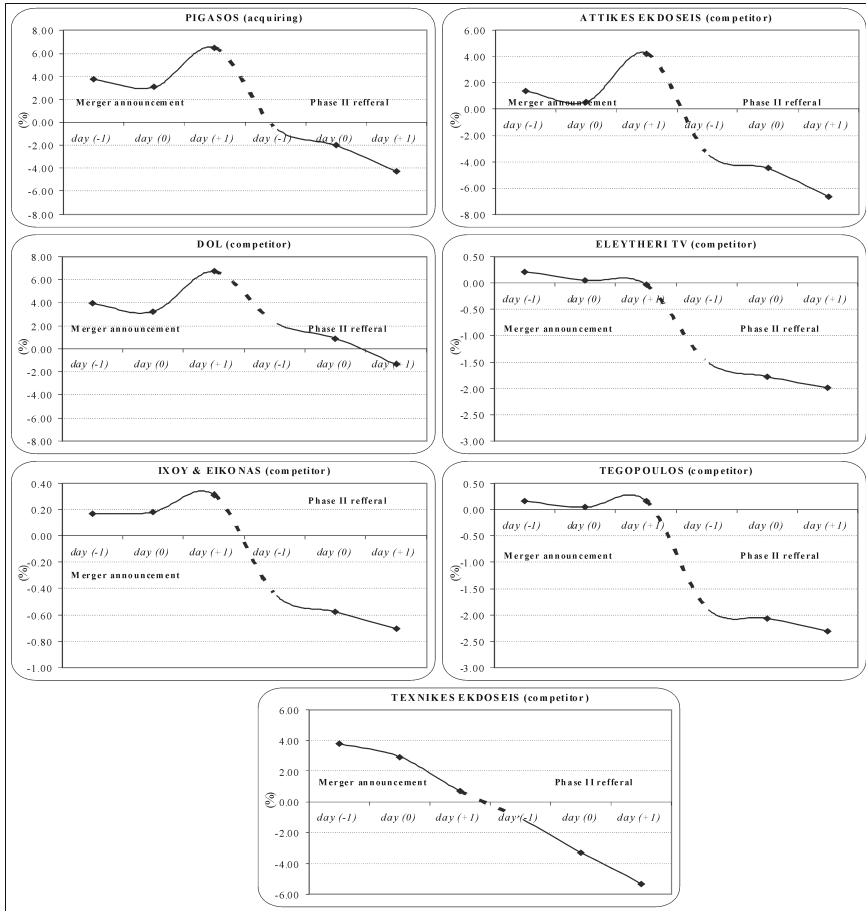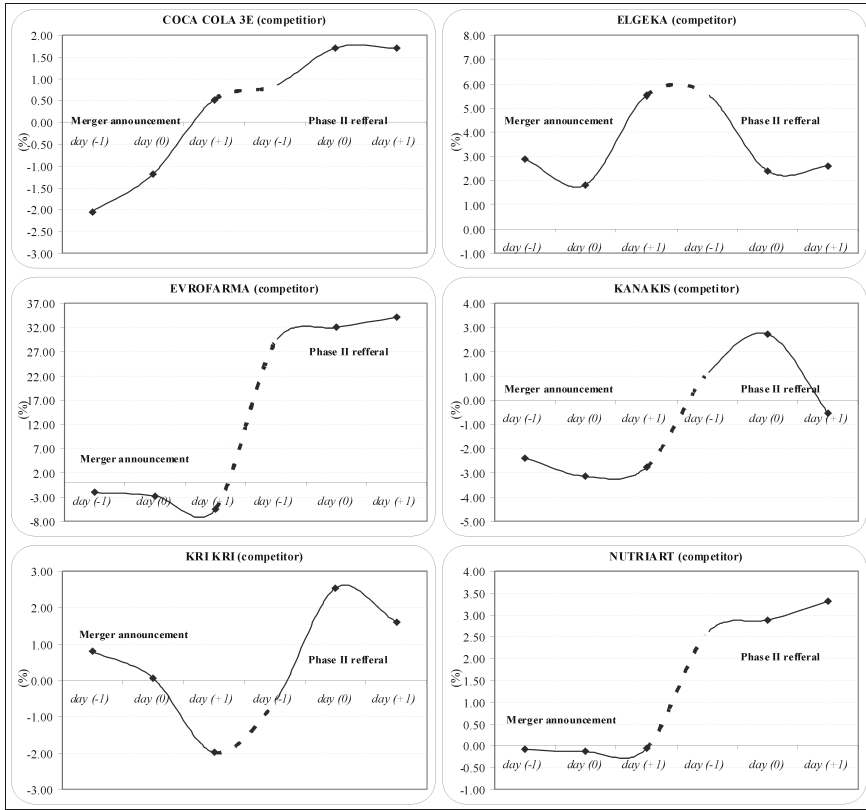
Fig 4   Conglomerate Effects in the Delta/Chipita Merger Case (CAR) Around the Announcement of the Merger and the Phase II Referral
Source: authors' estimates

pro-competitive nature of the scrutinised merger in the short run, as verified by the upward slope of the distribution of the stock value of competitors during the announcement of the decision of the HCC. The CAAR increases by 1.61% and is statistically significant at $p = 0.10$. Overall, the effect of the three events on the stock value of competitors is 1.39%.

Table VII: Abnormal Returns in the Delta/Chipita Merger Case

Event	All firms $n = 7$ (competitors)	
	AAR	CAAR
Merger announcement		
−1	−0.44%	−0.44%
0	−0.38%	−0.82%
+1	0.14%	−0.67%
	t-statistic	
−1	−1.37***	−0.79
0	−1.17	−1.47***
+1	0.45	−1.21***
Phase II referral		
+1	−0.09%	1.45%
	t-statistic	
	−0.18	1.59***
HCC decision		
+1	−0.03%	1.61%
	t-statistic	
	−0.06	1.76***
First two events		
+1	0.05%	0.78%
All three events		
+1	−0.01%	1.39%

Source: authors' estimates.
*Statistically significant at $p = 0.01$.
**Statistically significant at $p = 0.05$.
***Statistically significant at $p = 0.10$.

G. Concluding Remarks and Policy Implications

The examination of competitive effects of M&As on competitors as well as notifying parties' abnormal movements was first adopted by Eckbo[70] and

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[70] *Supra* n 17.

Stillman.[71] By using standard event study methodology, the authors find support for the null hypothesis of no anticompetitive effects. That is, mergers were not expected to have any anticompetitive effects on product prices.

This paper adopts a simple return method developed for infrequent trading phenomenon using Cox and Portes's[72] methodology and investigates the possibly short-run competitive effects of four major phase II M&As in Greece during the period 2006–10. The empirical results reveal that, during the specified period, at least in the short run, the merger announcements negatively affect the stock value of the firms under scrutiny in two out of the four phase II mergers. More specifically, in the BP–ELPE merger, the short-run negative cumulative abnormal return of competitor firms prior to the announcement day can be explained due to the events surrounding the dissemination of information regarding the imminence of the merger.

In the Anaptixiaki Media SA–Pegasus merger, even though the overall effect of both events on the market value of both the competitors and the notifying parties is positive and therefore increasing for all firms that are involved in the merger, the statistically negative reaction of the competitor's stock value during the phase II referral announcement possibly illustrates the risk that an anticompetitive merger will not to be cleared.

The short-run event study of the merger between Chipita and Delta indicates that a clearance with remedies of the merger by the HCC might have been a more pro-competitive decision. The empirical results of the same merger during the period of phase II referral show that the market is concerned about the possibly conglomerate effects of the merger.

In terms of the merger between PPC and Halivourgiki, the positive abnormal returns of the notifying party, in combination with the negative average and cumulative statistically significant reaction of the rival firms (Terna and Mytilinaios) after the announcement day of the merger, indicate an increased efficiency of the merged firm, lower prices and higher consumer welfare in the short run.

We argue that the present study may provide some useful guidelines for monitoring future merger enforcement policy in Greece. In any event, and to the contrary of the proposition by Fridolfsson and Stennek,[73] event study methodology, in collaboration with internal information of competition authorities, may be a practical tool with which to better investigate the competitive effects of mergers.

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[71] *Supra* n 18.
[72] *Supra* n 2.
[73] *Supra* n 36.

Appendix 1: Model Estimations

Firm	Coefficients		Statistical measures				Diagnostics		
	α (constant)	b (slope coefficient)	Standard error	Adjusted R^2	F statistic	Durbin Watson	LM test	White test	ARCH test
ELPE/BP									
ELPE (acquiring)	0.026	0.045*	0.420	0.074	16.977*	1.796	28.361*	0.412	28.361*
CYCLON (competitor)	0.288	1.112*	3.946	0.380	122.834*	2.113	–	0.470	1.798
ELIN (competitor)	−0.114	0.244*	2.790	0.045	10.428*	1.770	1.548	14.618*	3.887**
MOH (competitor)	−0.138	0.579*	2.042	0.376	120.759*	2.139	0.981	12.217*	3.957**
REVOIL (competitor)	0.259	0.963*	3.397	0.380	123.298*	2.134	0.930	0.336	15.105*
PPC/Halyvourgiki									
PPC (acquiring)	−0.017	0.120*	0.724	0.152	36.881*	1.784	2.321	0.013	2.238
TERNA (competitor)	0.252	0.822*	2.736	0.368	116.832*	1.682	5.012**	1.953	0.0015
MYTILINAIOS (competitor)	0.183	1.093*	2.544	0.552	246.221*	1.867	0.874	3.635**	0.105
Delta/Chipita									
COCA COLA (competitor)	−0.050	0.847*	1.267	0.227	59.262*	2.164	1.489	1.664	19.743*
ELGEKA (competitor)	0.034	1.020*	2.820	0.081	18.538*	1.763	2.529***	1.427	0.021
EVROFARMA (competitor)	−0.051	1.997*	3.093	0.222	58.048*	2.058	0.230	0.489	0.457
KANAKIS (competitor)	−0.019	0.309	2.565	0.007	2.413***	2.180	2.005	0.198	18.407*
KARAMOLEGOS (competitor)	−0.066	0.343**	1.708	0.021	5.287**	1.740	1.939	1.355	42.243*
KRI—KRI (competitor)	0.135	0.602*	1.621	0.080	18.379*	2.119	0.888	0.875	0.386
NUTRIART (competitor)	−0.025	0.158*	0.712	0.0348	8.169*	1.904	0.153	0.497	0.577

Appendix: continued

Firm	Coefficients		Statistical measures				Diagnostics		
	α (constant)	b (slope coefficient)	Standard error	Adjusted R^2	F statistic	Durbin Watson	LM test	White test	ARCH test
			Pegasus/Anaptixiaki						
PIGASOS (acquiring)	0.007	0.061**	0.848	0.005	1.903***	2.207	2.166	0.802	24.136*
ATTIKES (competitor)	0.130	0.197**	2.275	0.012	3.500**	2.314	5.025**	0.115	48.328*
DOL (competitor)	0.053	0.078*	0.644	0.022	5.516*	2.102	0.521	0.474	27.939*
ELEFTHERI TV (competitor)	0.062	0.072*	0.805	0.010	3.052**	1.727	3.985**	0.161	4.656**
IXOU and IKONAS (competitor)	0.007	0.072*	0.587	0.021	5.388*	2.573	17.786*	0.324	6.632*
TEGOPOULOS (competitor)	0.077	0.066**	0.847	0.006	2.300***	2.480	12.213*	0.347	6.092*
TEXNIKES (competitor)	0.066	0.153***	1.999	0.006	2.247***	1.631	6.803*	0.554	41.991*

The LM and ARCH tests are maximum likelihood tests for first order autocorrelation and autoregressive heteroskedasticity respectively. White test is a maximum likelihood test for heteroskedasticiy.

Source: Authors' estimates.

*Statistically significant at $p = 0.01$.
**Statistically significant at $p = 0.05$.
***Statistically significant at $p = 0.10$.