

Market Reaction to Changes in the FTSE/ATHEX Indices

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ABSTRACT

This paper examines the effects of changes in the FTSE/ATHEX indices. The benefit of analyzing changes in these indices is that they are determined by a ranking by market capitalization at regular semi annual reviews. Changes in indices composition should therefore have absolutely no direct information content. I find that stocks added to or deleted from these indices experience significant changes in stock price on the announcement day and the effective day. The results suggest that temporary price pressure play a role in the observed revision effect.

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1. Introduction

A significant body of research documents that stocks added to the S&P 500 index generally experience positive abnormal returns on both the announcement date and the date they are actually included. While the S&P 500 has commanded most attention, in recent years, other US stock indices as well as prominent non-US stock indices have also been examined: Dow Jones Industrial Average index (Beneish and Gardner, 1995); Russell 2000 index (Biktimirov et al., 2004); S&P SmallCap 600 index (Shankar and Miller, 2006); MSCI country indices (Chakrabarti et. al., 2005); Nikkei 500 index (Liu, 2000); Nikkei 225 index (Okada et al., 2006); FTSE 100 index (Mase, 2006); TSE 300 index (Chung and Kryzanowski, 1998). To date, five hypotheses have been offered to explain the effect of index changes on stock prices. Despite the growing amount of literature documenting several aspects of index changes, results and conclusions differ widely.

This study focuses on changes in the composition of three indices operated in the Athens Exchange (ATHEX). More specifically the FTSE/ATHEX 20 Index, the FTSE/ATHEX Mid 40 Index and the FTSE/ATHEX SmallCap 80 Index. The FTSE/ATHEX Indices maintenance procedures have interesting implications for the empirical study of index changes. Additions and deletions occur on regularly scheduled dates, and the companies added or deleted can be predicated with relatively high precision even before the announcement date. However, the number of days between the announcement day and effective date could vary between twenty-seven to eighteen trading days. This time gap between the announcement and the effective change eliminate the announcement effects when I examine the market reaction around the

effective day of changes. Since the events I consider should allow me, in the absence of information about the stock's future prospects, to isolate the price pressure effect from the long-term downward sloping demand curve and to thereby test the long-term downward sloping demand curve hypothesis. It also tests empirically some of the hypotheses that have been advanced, by prior literature, to explain the abnormal price reaction to index changes. The institutional characteristics of the Greek stock market provide a useful experimental context to study index changes. For example, there are no specialists or market makers to affect the price formation as in the U.S., thus, ruling out any related microstructure-based explanations for the price reaction. This study contributes to the international literature on index changes because it examines the stock price reaction associated with the announcement and effective day of index changes in a stock market where the number of mutual funds benchmarked are less than in the markets covered by prior studies.

Similar to the evidence regarding U.S. index changes, I find evidence of positive price reaction around announcement and effective day of changes of indices additions and negative price reaction around announcement and effective day of changes of indices deletions. According to the price pressure hypothesis, I do not find permanent increase in the price of added firms in the FTSE/ATHEX 20 index, but permanent decline for deleted firms. The results of the other two indices support the price pressure hypothesis.

The rest of the paper is organized as follows. Section 2 reviews the literature on index changes. Section 3 overview the FTSE/ATHEX Indices management and construction and draws empirical implications. Section 4 describes the data and the sample. Section 5 presents and interprets the results and section 6 summarizes the paper.

2. Literature Review

It is well established in the literature the observed excess returns surrounding changes to the indices. The S&P 500 was the first to attract most attention¹. More recently, other indices have been examined. Several competing hypotheses put forward to explain stock market reactions to changes in indices. Despite the growing amount of literature documenting these hypotheses of index revisions, results and conclusions differ widely not only in the reason for abnormal returns but also in their predicted duration. These competing hypotheses are briefly described below.

2.1. Price pressure hypothesis (or short-term downward sloping demand curve)

According to the price pressure hypothesis, advanced by Harris and Gurel (1986) an index changes causes temporary price pressure. This hypothesis assumes that the demand curves are less than perfectly elastic in short and long run. Market frictions can create short-run liquidity constraints, resulting in a price pressure effect. For example, if an investor submits a buy or sell order that is small relative to the float, we expect that trade to have little to no price impact. However, index fund managers must add or delete the stock from their portfolios to avoid unfavorable tracking errors. Reflecting a supply and demand imbalance, stock prices adjust to new levels in response to this buying and selling pressure by the index fund managers. Harris and Gurel (1986) report that the price increases following index changes are temporary and are fully reversed two weeks after the change.

2.2. Long-term downward sloping demand curve hypothesis (or Imperfect substitutes)

The long-term downward sloping demand curve hypothesis, suggested by Shleifer (1986) implies a permanent price effect from index revisions. Since one of two similar stocks is added to the index, these stocks are no longer close substitutes for each other. Index funds place excess

¹ Chen et al. (2004) and Elliott et al. (2006) provide comprehensive surveys of prior studies on S&P 500 index changes.

demand on the stock added to the index, and assuming downward-sloping demand curves, equilibrium prices rise when demand curves shift to compensate. Beneish and Whaley (1996), Lynch and Mendenhall (1997), Kaul et al. (2000), and Wurgler and Zhuravskaya (2002) present evidence consistent with this hypothesis. However, Chen et al. (2004) find a permanent price increase for firms added to the S&P 500 index. On the other hand, they find that firms deleted from the index do not experience a permanent negative price effect.

2.3. Information signaling hypothesis (or certification)

The information hypothesis supports the idea that an index revision comprises information about a company's future performance. Jain (1987) expands the discussion of the index inclusion effect by suggesting that S&P decisions convey new information about the firm's prospects. He argues that inclusion can be viewed as a signal of a reduction in a stock's riskiness or as a signal of confidence in the management. Dhillon and Johnson (1991) and Denis et al. (2003) support the information hypothesis. Therefore, the evidence from index changes cannot be said to unambiguously support short-term or long-term downward sloping demand curves.

2.4. Liquidity hypothesis

According to the liquidity hypothesis, index revisions affect the liquidity of a stock. Index admission results in increased liquidity with lower trading costs and higher trading volumes, with a one-time jump in a share's price as the result. The reverse applies to stocks that are deleted. In both cases, the price effect is permanent. Amihud and Mandelson (1986) argue that if liquidity is priced, an increase in liquidity will result in lower expected returns and hence, a positive price reaction to the addition of the stock to the index. Erwin and Miller (1998) find a long-term decrease in daily quoted spreads on added stocks without listed options. Beneish and Whaley (1996) find a long-term increase in trading volume that lasts up to at least 60 days following the effective day of addition and significant increase in average trade size for the first 10 days after

addition. Hegde and McDermott (2003) find not only a significant and long-term improvement in market liquidity for the S&P 500 stocks following index additions but also a decrease in the time-weighted quoted spread and an increase in the time weighted quoted depth.

2.5. Investor awareness hypothesis

The investor awareness hypothesis predicts an asymmetric price response for index changes. For additions, it predicts a permanent increase in price. In contrast, the investor awareness hypothesis implies no price effect associated with removal from the index, since once investors already are aware of the stock, they do not become unaware of it after it has been deleted from the index. This hypothesis holds that because investors cannot invest in a security of which they are unaware, firms have a shadow cost for being unknown. This shadow cost decreases as the firms become better recognized. Chen et al. (2004) find an asymmetry in the observed price effects. They argued that changing investor awareness is the most likely explanation, given that deletion from an index is unlikely to affect negatively investor awareness of a firm.

3. Overview of the FTSE/ATHEX indices management and construction

The FTSE/ATHEX Index Series comprises the FTSE/ATHEX 20 Index² (introduced in September 1997) the FTSE/ATHEX Mid 40 Index³ (introduced in December 1999), the FTSE/ATHEX SmallCap 80 Index⁴ (introduced in June 2001), the FTSE/ATHEX 140 Index⁵

² The FTSE/ATHEX 20 Index is the large cap index, capturing the 20 largest blue chip companies within the Big Cap segment of the Athens Exchange.

³ The FTSE/ATHEX Mid 40 Index is the mid cap index and captures the performance of the next 40 companies within the Big Cap segment of the Athens Exchange.

⁴ The FTSE/ATHEX SmallCap 80 Index is the small cap index and captures the performance of the largest 80 companies within the Mid/Small Cap segment of the Athens Exchange.

⁵ The FTSE/ATHEX 140 Index is the benchmark index and captures the performance of all eligible companies within the Big Cap segment of the Athens Exchange, plus the constituents of the FTSE/ATHEX SmallCap 80 Index.

(introduced in January 2003) and the FTSE/ATHEX International Index⁶ (introduced in January 2006). There are three groups involved in the management of these indices: the FTSE/ATHEX Indices Advisory Committee; the FTSE International Limited; and the Athens Exchange. The Advisory Committee has been established by FTSE and the Athens Exchange to ensure that the management and ongoing operation of the indices is independent and transparent. The Chairman of the Athens Exchange is ex-officio Chairman of the Advisory Committee and there are six other members, three representing the trading and investment community in Athens and three representing the international investment industry. The Athens Exchange is responsible for the daily operation of the indices. It monitors all corporate actions and price changes and implements all constituent and weighting changes to the indices. The FTSE is responsible for monitoring changes to the indices, auditing its operation and advising the Athens Exchange on the treatment of complex corporate actions. The FTSE will present an audit report to the Advisory Committee twice per year. The committee may recommend changes to the operation of the indices following consideration of the audit report. The managing director of FTSE is the auditor to the indices. The Advisory Committee meets at least twice a year and reviews and approves all constituent changes to ensure that such changes are implemented in accordance with the ground rules. The committee is also responsible for ensuring that the ground rules continue to reflect best market practice and will review and approve all changes to the rules.

The Advisory Committee will meet semi-annually in the last week of April and October to review the constituents of the indices. The constituent reviews will be based on data collected as at the end of March and September. Constituent changes will be implemented after the close of business after the last trading day in May and November.

⁶ The FTSE/ATHEX International Index is the representative index for all eligible companies, Greek & non-Greek, that trade on the ATHEX Common Trading Platform and are eligible for the Big Cap segment of the Athens

The periodic reviews of constituents of the FTSE/ATHEX 20 Index have been conducted by ranked all stocks, from highest to lowest by market capitalization, if a stock has risen to position 10 or above has been included in the index. In contrast, existing constituent that has fallen to position 31 or below has been removed from the index. Stock that has been removed from the FTSE/ATHEX 20 Index automatically be included in the FTSE/ATHEX Mid 40 Index provided it ranks above the lowest ranking existing FTSE/ATHEX Mid 40 constituent. Non constituents of the FTSE/ATHEX Mid 40 Index that have reached position 40 or above have been qualified for entry into the index provided that they are not members of the FTSE/ATHEX 20 Index. However, existing constituent that has fallen to position 81 or below will be removed from the index at the periodic review. Before November 2005⁷, securities that have been removed from the FTSE/ATHEX Mid 40 Index at periodic review were eligible for inclusion in the FTSE/ATHEX SmallCap 80 Index. Non constituents of the FTSE/ATHEX SmallCap 80 Index that have reached position 120 or above have qualified for entry into the index provided that they are not members of the FTSE/ATHEX Mid 40 Index. Existing constituents which have fallen to position 161 or below will be removed from the index at the periodic review.

4. The Sample and Data

I analyze FTSE/ATHEX indices changes over the period September 1997 through October 2005.

Over the study period, as there is one deletion for every addition, the initial sample consists of 28

Exchange.

⁷ Following the changes to the structure of the Athens Exchange markets (November 2005), the advisory committee has approved a number of changes to the ground rules for the management of the FTSE/ATHEX Indices, for example: the FTSE/ATHEX 20 and FTSE/ATHEX Mid Cap 40 Index constituents will be drawn from the Big Cap segment of ATHEX; the FTSE/ATHEX SmallCap 80 Index constituents will be drawn from the Medium and Small Cap segment of ATHEX. These changes effected the construction of the FTSE/ATHEX SmallCap 80 Index as follows: ranked all stocks from the Medium and Small Cap segment, from highest to lowest by market capitalization, if a stock non-constituent of the FTSE/ATHEX SmallCap 80 Index has risen to position 60 or above has been

additions and 28 deletions for the FTSE/ATHEX 20 Index, 51 additions and 51 deletions for the FTSE/ATHEX Mid 40 Index and 100 additions and 100 deletions for the FTSE/ATHEX SmallCap 80 Index. I have constructed from the initial sample a complete sample and a pure sample. In order, to construct the complete sample from the initial sample observations were eliminated for several reasons. First, I adopt the sample stratification approach used by Biktimirov et al. (2004) for Russell 2000 index and Shankar and Miller (2006) for the S&P 600 index excluded the subset of index changes arising from downward shifts⁸ and upward shifts⁹ of firms from (to) other FTSE/ATHEX indices¹⁰. Second, firms that were suspended or delisted or merger. A pure sample is then obtained by excluding firms from the complete sample for which the announcement day (AD) and the effective date of change (ED) are not separated by at least one clear trading day (i.e., the effective date is not two or more days after the announcement). All these changes in composition made outside of the semi-annually review. These are generally a result of a merger or suspension or deletion. Table 1 presents the constructions of the samples for index additions and deletions for the FTSE/ATHEX Indices.

Table 1 goes here

From the website of the Athens Exchange I ascertain the announcement day, the listing day, and whether the firms involved in the changes are being moved between the FTSE/ATHEX Indices or are firms that are entering or exiting the FTSE/ATHEX Index universe. All announcement dates and effective dates are verified with the Greek daily and periodical press. Daily stock

included in the index. In contrast, existing constituent that has fallen to position 101 or below has been removed from the index.

⁸ Downward shifts are stocks that were shifted from the FTSE/ATHEX 20 Index to the FTSE/ATHEX Mid 40 Index and from the FTSE/ATHEX Mid 40 Index to the FTSE/ATHEX SmallCap 80 Index.

⁹ Upward shifts are stocks that were shifted from the FTSE/ATHEX Mid 40 Index to the FTSE/ATHEX 20 Index and from the FTSE/ATHEX SmallCap 80 Index to the FTSE/ATHEX Mid 40 Index.

¹⁰ Shankar and Miller (2006) examine separately the subset of index changes arising from transfers of firms from (to) other S&P indices and the subset of index changes arising from new additions (deletions). They find substantial differences in the price, volume and institutional ownership effects between these subsets.

returns, market returns, trading volume data and all other information were extracted from electronic data files of the Athens Exchange.

5. Tests and Results

5.1. Price reaction

The abnormal return around the announcement day and the effective date of change is estimated by applying, respectively, the market adjusted returns model, the market model, and the market model with the Scholes-Williams beta estimation method¹¹. Since most of the results concerning abnormal returns are qualitatively similar, I report only the findings derived from the market adjusted return model. The composite index of the ATHEX is used as the proxy for the market portfolio. To apply the event type methodology the model parameters are estimated over a 180-day period starting 31 days after the event. I used two tests to assess the statistical significance of abnormal returns: the time-series standard deviation test and the cross-sectional standard deviation test. Following Brown and Warner (1985), in the case of missing returns, parameter estimation excludes both the day of the missing return and the return of the subsequent day.

Table 2 reports the findings on index additions associated with the two event days (announcement day and effective day) for each of the three indices, while Table 3 reports the same results for deletions. In particular, they show the event days -5 to +5 relative to event day 0, the daily average abnormal returns (AAR) for each event day -5 to +5, relative to event day 0 and the t- statistics for the corresponding AARs (both the time-series standard deviation test (t_{ts}) and the cross-sectional standard deviation test (t_{cs})). Each table contains results for the complete

¹¹ Lynch and Mendenhall (1997) and Chen, Noronha and Singal (2004) find that their results are very similar to those obtained from a market adjusted returns model and a market model. Similarly, Shankar and Miller (2006) suggest that there is little difference between the abnormal returns estimated using a market adjusted returns model, a market model and a Fama and French three-factor model.

sample and for the pure sample. The subsequent discussion focuses on the results for the pure sample.

Panel A of Table 2 reports the daily AARs around the two event dates for the additions to the FTSE/ATHEX 20 Index. The abnormal return is 0.91% (1.64%) on event day 0 for the announcement day (effective day) and is statistically significant at 5% level (1% level). Panel B and Panel C of Table 2 report AARs for the FTSE/ATHEX Mid 40 Index and FTSE/ATHEX SmallCap80 Index respectively. The results confirm abnormal returns around that announcement and effective day but they are statistically significant only at the 10% level. The positive market reaction to index additions is consistent with the international evidence and suggests that index additions have positive value consequences.

Table 2 goes here

The structure of Table 3 is similar to the structure of Table 2. Firms deleted from the FTSE/ATHEX indices experience the opposite price effects. Table 3 reports the abnormal return for these deleted stocks. The average abnormal returns are significantly negative around announcement days for the FTSE/ATHEX 20 index, while there is not very clear indication for the other two indices.

Table 3 goes here

The cumulative average abnormal returns for pure additions and deletions around the FTSE/ATHEX 20 Index effective day are plotted in Figure 1 for the (-20, +20) window. It shows that the price increase for index additions prior to the index effective day and fully reversed after the effective day. The price reversal after addition strongly suggests the existence of temporary price effects, caused by index-fund trading associated with index composition changes. In contrast, the persistence of the abnormal returns suggests that the price effect of deletions to the index is permanent-evidence inconsistent with the price pressure hypothesis. Figure 2 and 3

indicate for both additions and deletions the excess returns are fully reversed. These findings are similar to those in Biktimirov et al. (2004) and Shankar and Miller (2006). These results are consistent with the price pressure and long-term downward sloping demand curve hypotheses, but inconsistent with the market efficiency.

Figure 1, 2 & 3 goes here

6. Conclusions

This paper investigates the price reaction associated with changes in the FTSE/ATHEX indices between September 1997 and October 2005. In summary, additions to the indices result in an overall significant positive abnormal return reaction on the announcement and the effective day. In contrast, deletions to the indices result in an overall significant negative abnormal return reaction on the announcement and the effective day. Consistent with other international studies, I find evidence of positive price reaction around announcement and effective day of changes of indices additions and negative price reaction around announcement and effective day of changes of indices deletions. According to the price pressure hypothesis, I do not find permanent increase in the price of added firms in the FTSE/ATHEX 20 index, but permanent decline for deleted firms. The results of the other two indices support the price pressure hypothesis.

The findings of this study expand the international evidence about the value consequences of index changes. The changes in the FTSE/ATHEX Indices, in the absence of information about the stock's future prospects have interesting implications of the explanations for the increase in stock value associated with index changes.

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Figure 1. Cumulative Average Abnormal Returns for Pure Additions and Deletions Around the FTSE/ATHEX 20 Index Effective Day

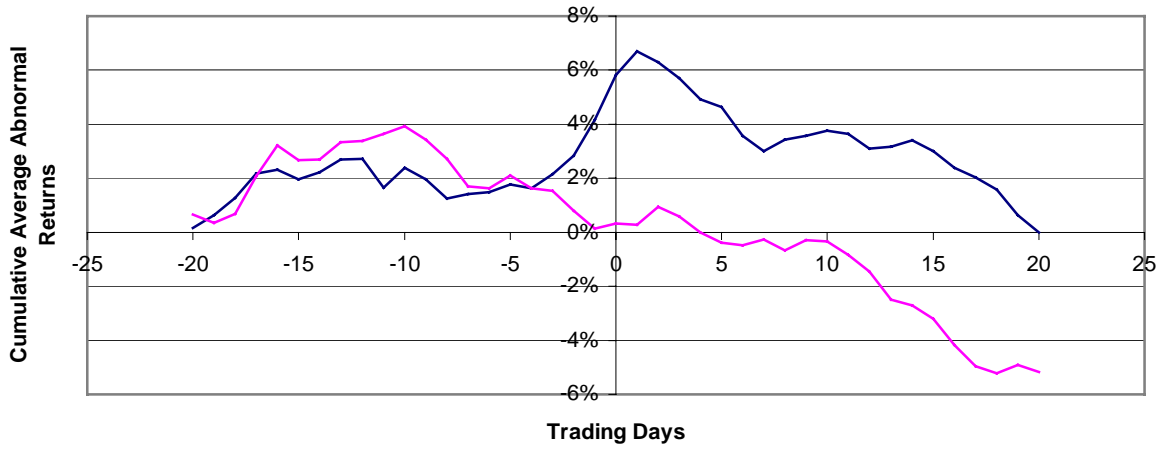


Figure 2. Cumulative Average Abnormal Returns for Pure Additions and Deletions Around the FTSE/ATHEX Mid 40 Index Effective Day

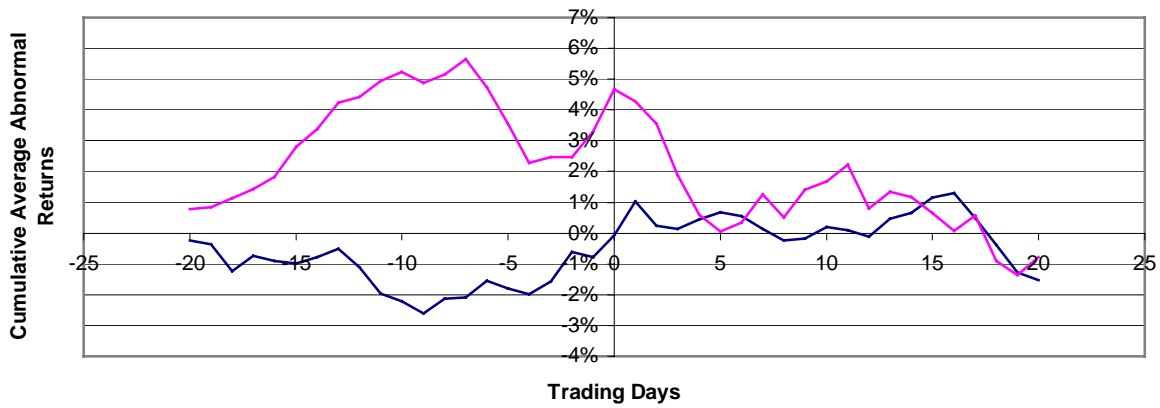


Figure 3. Cumulative Average Abnormal Returns for Pure Additions and Deletions Around the FTSE/ATHEX SmallCap 80 Index Effective Day

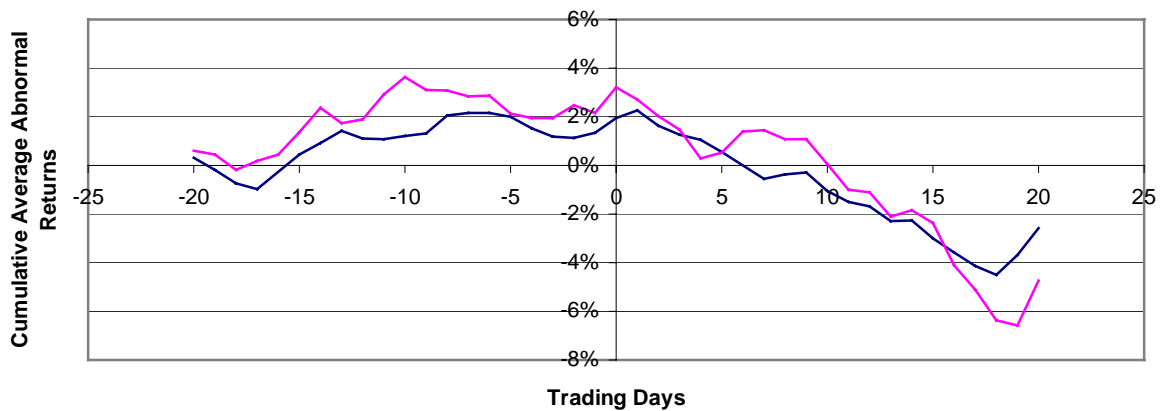


Table 1

This table presents the constructions of the samples for index additions and deletions between September 1997 and October 2005 for the FTSE/ATHEX 20 Index, from December 1999 to October 2005 for the FTSE/ATHEX Mid 40 Index and from June 2001 to October 2005 for the FTSE/ATHEX SmallCap 80 Index.

	FTSE/ATHEX 20 Index	FTSE/ATHEX Mid 40 Index	FTSE/ATHEX SmallCap 80 Index
Panel A: Sample Additions			
All additions	28	51	100
Less downward shifts ¹	---	-12	-11
Complete sample	28	39	89
Less than 1 day between AD and ED ²	-9	-14	-36
Pure sample	19	25	53
Panel B: Sample Deletions			
All deletions	28	51	100
Less upward shifts ³	---	-15	-21
Less mergers/acquisitions, Suspended and delisted	-6	-9	-4
Complete sample	22	27	75
Less than 1 day between AD and ED ²	-3	-3	-23
Pure sample	19	24	52

Notes:

¹ Downward shifts are stocks that were shifted from the FTSE/ATHEX 20 Index to the FTSE/ATHEX Mid 40 Index and from the FTSE/ATHEX Mid 40 Index to the FTSE/ATHEX SmallCap 80 Index.

² The subsample in which the announcement day (AD) and the effective date of change (ED) are not separated by at least one clear trading day (i.e., the effective date is not two or more days after the announcement).

³ Upward shifts are stocks that were shifted from the FTSE/ATHEX Mid 40 Index to the FTSE/ATHEX 20 Index and from the FTSE/ATHEX SmallCap 80 Index to the FTSE/ATHEX Mid 40 Index.

Table 2

This table presents the daily average abnormal returns (AAR) and t-statistics for the daily AARs of index additions between September 1997 and October 2005 for the FTSE/ATHEX 20 Index, from December 1999 to October 2005 for the FTSE/ATHEX Mid 40 Index and from June 2001 to October 2005 for the FTSE/ATHEX SmallCap 80 Index.

Days	Announcement Day						Days	Effective Day					
	Complete Sample			Pure Sample				Complete Sample			Pure Sample		
	AAR	t _{ts}	t _{cs}	AAR	t _{ts}	t _{cs}		AAR	t _{ts}	t _{cs}	AAR	t _{ts}	t _{cs}
Panel A: Additions to the FTSE/ATHEX 20 Index													
-5	-0.29%	-0.74	-1.25	-0.32%	-0.69	-0.96	-5	0.08%	0.20	0.26	0.27%	0.54	0.62
-4	-0.18%	-0.46	-0.68	0.03%	0.07	0.11	-4	-0.23%	-0.59	-0.77	-0.13%	-0.27	-0.39
-3	0.50%	1.26	1.23	0.24%	0.53	0.66	-3	0.61%	1.55	1.43	0.52%	1.06	1.20
-2	-0.39%	-0.99	-1.23	-0.63%	-1.36	-1.65*	-2	0.39%	0.99	0.60	0.69%	1.40	0.76
-1	1.06%	2.68***	2.68***	1.46%	3.17***	2.72***	-1	0.91%	2.33**	1.61	1.33%	2.69***	1.64
0	1.48%	3.75***	2.62***	0.91%	1.99**	1.69*	0	2.13%	5.43***	3.56***	1.64%	3.31***	2.45**
1	0.74%	1.87*	1.04	0.67%	1.45	1.03	1	1.00%	2.55**	1.49	0.89%	1.79*	1.58
2	0.56%	1.41	1.41	0.26%	0.56	0.54	2	0.20%	0.51	0.59	-0.40%	-0.82	-1.14
3	-0.06%	-0.15	-0.17	0.15%	0.32	0.47	3	-0.70%	-1.77*	-1.79*	-0.60%	-1.22	-1.27
4	-0.17%	-0.44	-0.54	0.03%	0.06	0.063	4	-0.74%	-1.90	-2.45	-0.79%	-1.60	-2.05**
5	-0.59%	-1.50	-1.86*	-0.77%	-1.67*	-1.90*	5	-0.19%	-0.50	-0.64	-0.27%	-0.55	-0.74
Panel B: Additions to the FTSE/ATHEX Mid 40 Index													
-5	0.03%	0.08	0.10	-0.26%	-0.51	-0.75	-5	-0.03%	-0.09	-0.09	-0.26%	-0.56	-0.59
-4	0.42%	1.19	1.28	0.21%	0.41	0.53	-4	0.17%	0.52	0.49	-0.18%	-0.40	-0.42
-3	0.42%	1.19	1.09	0.01%	0.02	0.05	-3	0.69%	2.06**	1.68*	0.42%	0.90	1.27
-2	-0.43%	-1.21	-1.49	-0.49%	-0.95	-1.31	-2	0.47%	1.41	0.82	0.95%	2.05*	1.12
-1	-0.46%	-1.29	-1.69*	-0.13%	-0.25	-0.38	-1	-0.43%	-1.29	-1.23	-0.17%	-0.37	-0.36
0	0.72%	2.03**	2.61***	0.68%	1.32	1.82*	0	0.73%	2.19**	1.99**	0.70%	1.51	1.33
1	0.36%	1.02	1.13	0.30%	0.58	0.78	1	0.89%	2.66***	2.20**	1.12%	2.39**	2.09**
2	-0.03%	-0.08	-0.15	-0.11%	-0.22	-0.44	2	-0.50%	-1.49	-1.56	-0.80%	-1.72*	-1.71*
3	-0.28%	-0.78	-0.88	-0.23%	-0.44	-0.52	3	-0.15%	-0.44	-0.20	-0.10%	-0.21	-0.09
4	-0.28%	-0.80	-0.94	-0.54%	-1.05	-1.82	4	0.24%	0.72	0.74	0.32%	0.68	0.87
5	0.19%	0.52	0.55	-0.04%	-0.08	-0.10	5	0.35%	1.06	0.94	0.22%	0.46	0.48
Panel C: Additions to the FTSE/ATHEX SmallCap 80 Index													
-5	0.30%	0.83	1.15	0.31%	0.56	0.87	-5	0.03%	0.08	0.13	-0.16%	-0.30	-0.66
-4	0.28%	0.77	1.14	0.39%	0.71	1.20	-4	-0.22%	-0.62	-1.02	-0.48%	-0.89	-1.92*
-3	0.36%	0.97	1.48	0.05%	0.09	0.18	-3	0.13%	0.38	0.54	-0.33%	-0.60	-1.16
-2	0.15%	0.42	0.56	0.61%	1.10	1.85*	-2	-0.26%	-0.73	-1.03	-0.05%	-0.09	-0.17
-1	-0.33%	-0.87	-1.23	-0.38%	-0.68	-0.94	-1	0.05%	0.15	0.27	0.21%	0.39	0.75
0	0.66%	1.78*	2.31**	0.78%	1.42	1.94*	0	0.57%	1.60	2.21**	0.59%	1.07	1.68*
1	-0.05%	-0.14	-0.23	-0.15%	-0.26	-0.45	1	0.20%	0.56	1.02	0.32%	0.60	1.16
2	-0.29%	-0.77	-0.99	-0.82%	-1.48	-1.97	2	-0.18%	-0.52	-0.69	-0.635	-1.15	-1.66*
3	0.04%	0.11	0.16	0.10%	0.19	0.30	3	-0.23%	-0.66	-1.19	-0.36%	-0.65	-1.49
4	0.03%	0.08	0.16	-0.12%	-0.23	-0.49	4	0.00%	0.01	0.02	-0.23%	-0.43	-0.82
5	0.04%	0.11	0.15	-0.02%	-0.04	-0.07	5	-0.28%	-0.77	-0.87	-0.49%	-0.90	-1.11

The symbols *, **, and *** denote statistical significance at the 10%, 5% and 1% levels, respectively, using a 2-tail test.

Table 3

This table presents the daily average abnormal returns (AAR) and t-statistics for the daily AARs of index deletions between September 1997 and October 2005 for the FTSE/ATHEX 20 Index, from December 1999 to October 2005 for the FTSE/ATHEX Mid 40 Index and from June 2001 to October 2005 for the FTSE/ATHEX SmallCap 80 Index.

Days	Announcement Day						Effective Day						
	Complete Sample			Pure Sample			Complete Sample			Pure Sample			
	AAR	t _{ts}	t _{cs}	AAR	t _{ts}	t _{cs}	AAR	t _{ts}	t _{cs}	AAR	t _{ts}	t _{cs}	
Panel A: Deletions to the FTSE/ATHEX 20 Index													
-5	0.94%	1.55	1.17	1.20%	1.88*	1.13	-5	0.44%	0.62	0.98	0.49%	0.68	0.95
-4	0.01%	0.02	0.02	0.23%	0.36	0.36	-4	-0.55%	-0.79	-1.09	-0.49%	-0.68	-0.83
-3	-0.88%	-1.46	-1.77*	-1.00%	-1.57	-1.74*	-3	-0.10%	-0.15	-0.31	-0.08%	-0.12	-0.22
-2	-0.14%	-0.23	-0.31	-0.03%	-0.04	-0.05	-2	-0.72%	-1.03	-2.76***	-0.74%	-1.04	-2.49**
-1	-0.71%	-1.17	-1.52	-0.57%	-0.89	-1.08	-1	-0.70%	-1.00	-1.76*	-0.67%	-0.94	-1.56
0	-2.22%	-3.67***	-5.79***	-2.46%	-3.86***	-6.01***	0	0.07%	0.09	0.14	0.20%	0.28	0.38
1	-1.12%	-1.86*	-4.06***	-1.34%	-2.10**	-4.93***	1	0.05%	0.07	0.09	-0.06%	-0.08	-0.10
2	-0.16%	-0.27	-0.39	-0.33%	-0.51	-0.68	2	0.57%	0.82	1.09	0.67%	0.94	1.10
3	-0.06%	-0.09	-0.09	0.08%	0.13	0.11	3	-0.26%	-0.37	-0.46	-0.35%	-0.49	-0.52
4	-0.02%	-0.03	-0.06	-0.09%	-0.14	-0.24	4	-0.36%	-0.52	-0.90	-0.59%	-0.82	-1.36
5	-0.61%	-1.01	-1.25	-0.63%	-0.98	-1.14	5	-0.27%	-0.39	-0.86	-0.39%	-0.55	-1.34
Panel B: Deletions to the FTSE/ATHEX Mid 40 Index													
-5	-0.16%	-0.22	-0.32	-0.12%	-0.16	-0.23	-5	-1.11%	-1.46	-1.90*	-1.20%	-1.54	-1.98**
-4	0.73%	1.04	1.35	0.82%	1.14	1.46	-4	-1.28%	-1.68*	-2.32**	-1.27%	-1.64	-2.21**
-3	-0.37%	-0.53	-0.77	-0.36%	-0.50	-0.71	-3	0.20%	0.26	0.42	0.19%	0.25	0.39
-2	0.60%	0.85	1.10	0.68%	0.94	1.19	-2	-0.15%	-0.20	-0.29	0.00%	-0.00	-0.00
-1	-0.79%	-1.12	-1.31	-0.82%	-1.14	-1.30	-1	0.76%	0.99	1.74*	0.84%	1.08	1.89*
0	0.82%	1.16	0.73	0.88%	1.22	0.75	0	1.28%	1.68*	1.86*	1.37%	1.75*	1.92*
1	0.69%	0.97	1.06	0.73%	1.01	1.08	1	-0.15%	-0.19	-0.27	-0.40%	-0.51	-0.79
2	-0.74%	-1.05	-2.25**	-0.84%	-1.17	-2.55**	2	-0.63%	-0.83	-1.92*	-0.72%	-0.93	-2.18**
3	-0.51%	-0.73	-1.03	-0.51%	-0.71	-0.98	3	-1.68%	-2.20**	-3.76***	-1.67%	-2.14**	-3.58***
4	0.25%	0.36	0.46	0.32%	0.45	0.57	4	-1.30%	-1.70*	-2.39**	-1.28%	-1.65	-2.26**
5	-0.33%	-0.47	-0.48	-0.43%	-0.59	-0.60	5	-0.43%	-0.57	-0.65	-0.54%	-0.69	-0.78
Panel C: Deletions to the FTSE/ATHEX SmallCap 80 Index													
-5	-0.26%	-0.47	-0.69	-0.29%	-0.43	-0.74	-5	-0.59%	-1.03	-1.48	-0.74%	-1.12	-1.69*
-4	-0.84%	-1.55	-1.62	0.20%	0.29	0.63	-4	-1.12%	-1.96*	-2.06**	-0.17%	-0.26	-0.44
-3	-0.53%	-0.97	-0.90	0.64%	0.95	1.35	-3	-1.01%	-1.77*	-1.88*	-0.01%	-0.02	-0.03
-2	1.22%	2.23**	1.84*	1.27%	1.88*	2.08**	-2	0.67%	1.17	1.13	0.53%	0.80	1.18
-1	0.46%	0.85	0.71	0.58%	0.85	0.96	-1	-0.20%	-0.34	-0.37	-0.31%	-0.47	-1.03
0	-2.00%	-3.67***	-3.37***	-0.34%	-0.50	-0.64	0	-1.00%	-1.74*	-1.59	1.03%	1.56	2.05**
1	-0.61%	-1.12	-1.35	0.10%	0.15	0.28	1	-1.04%	-1.82*	-2.43**	-0.49%	-0.75	-1.50
2	-0.47%	-0.85	-0.80	-0.57%	-0.85	-1.42	2	-0.55%	-0.97	-0.94	-0.69%	-1.05	-1.67*
3	-0.44%	-0.81	-1.00	-0.82%	-1.21	-1.93*	3	-0.24%	-0.43	-0.61	-0.55%	-0.83	-1.63
4	-0.31%	-0.57	-0.76	-0.34%	-0.51	-1.00	4	-0.92%	-1.62	-2.22**	-1.18%	-1.79*	-3.36***
5	-0.03%	-0.05	-0.07	0.25%	0.37	0.60	5	-0.04%	-0.08	-0.11	0.23%	0.35	0.51

The symbols *, **, and *** denote statistical significance at the 10%, 5% and 1% levels, respectively, using a 2-tail test.