THE 'JANUARY EFFECT' RESULTS IN THE ATHENS STOCK EXCHANGE (ASE)

John Mylonakis[1]
Email: imylonakis@vodafone.net.gr

Dikaos Tserkezos[2]
Email: dtsek@aias.gr
University of Crete, Department of Economics Sciences, Crete, Greece

ABSTRACT

This paper examines the so-called 'January effect' in the Athens Stock Exchange (ASE) for the period January 1985 to December 2001. This period is considered as one of the most significant in the economic and financial history of the country. In contrast with other studies, significantly higher returns are documented in January and low returns in November over the sample period. According to the research results, the mean daily returns in January have fallen by almost 25% over a ten-year period, pointing to a weakening January effect. Lastly, we apply our findings to an Athens Stock Exchange investment scenario, in which investors 'buy' and 'sell' a portfolio of stocks, based on the General Index.

Key words: January effect, Stock exchange investments, Stocks returns
JEL Classification: G15, C32

I. INTRODUCTION

In recent years, a number of anomalies have been observed in stock returns, with calendar anomalies receiving the most attention. One of the main calendar anomalies is the so-called 'January effect'.

Calendar anomalies are of particular interest because they appear to disprove the Efficient Market Hypothesis. In addition, as these anomalies are relatively easy to exploit, they should have weakened over time. Furthermore, previous studies have focused mainly on documenting individual calendar anomalies, ignoring their role in applied investment analysis in the Athens Stock Exchange (ASE).

The January effect refers to the phenomenon in which January stock returns are, on average, higher than in other months. In the US market, Rozeff and Kinney (1976) first documented that stock returns were consistently higher in January on the New

[1] Other contact details: 10 Nikiforou str. Glyfada, Athens, 166 75, Greece
[2] Other contact details: Assistant Professor, University of Crete, Department of Economics Sciences, Rethymno, 74100, Crete, Greece

York Stock Exchange (NYSE) over the period 1904-74. Rogalski and Tinic (1986) supported this finding for the equally-weighted index of NYSE and American Stock Exchange (AMEX) stocks during the period 1963-82. The January effect has been found to exist in other countries as well.

II. THE JANUARY EFFECT

In a study of the stock markets in 17 major industrialized countries over the period 1959-79, using monthly Capital International Perspective indices, Gultekin and Gultekin (1983) found that seasonality in prices (defined as significant differences in month-to-month mean returns) was present in 12 countries. The 12 countries were Australia, Belgium, Canada, Denmark, Germany, Japan, Netherlands, Norway, Spain, Sweden, Switzerland and the United Kingdom. Further, they reported that 'seasonality', when present, appeared to be caused by disproportionately large January returns in most countries and April returns in the United Kingdom.

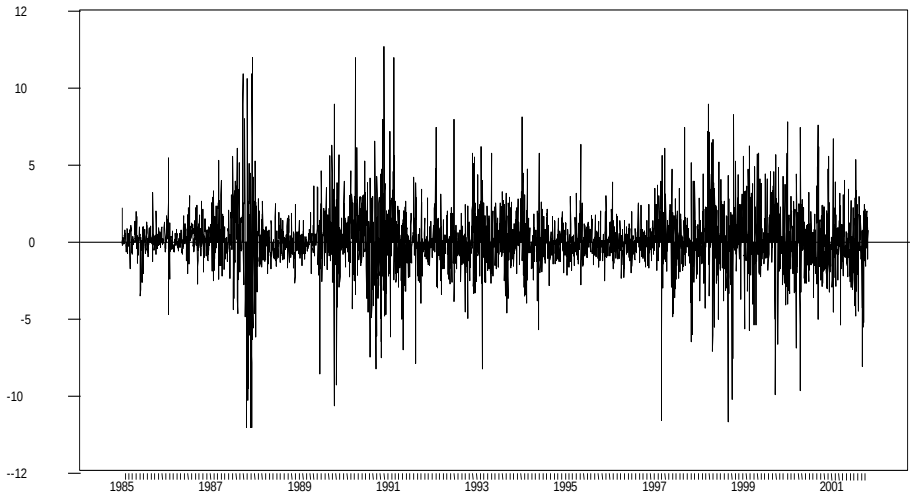
Aggarwal and Rivoli (1989) tested for the January effect in Hong Kong, Malaysia, the Philippines and Singapore over the period 1976-88 and documented the presence of the January effect in all these countries except the Philippines.

Lee (1992) replicated the work of Aggarwal and Rivoli (1989) for Hong Kong, Japan, Korea, Taiwan and Singapore over the period 1970-89. He found that all countries in his sample, except Korea, had significantly higher than average returns in January.

In the case of Greece, although there some studies that have examined the anomalies of the Athens Stock Exchange (ASE), there are only a few which analyse the January effect. Coutts, Kaplanidis and Roberts (2000) analyse the January effect in four ASE indexes (General, Bank, Leasing and Insurance) and conclude that in January, although the mean returns are positive for three of the four indexes, they were not the highest, nor were they persistent. In the work of Mills, Siriopoulos, Markelos and Harizanis (2000), there is no significant evidence for the existence of the January effect in the ASE General Index. Instead, they found significantly higher than average returns in January and February (some type of monthly effect) when analysing the sixty constituent stocks of the ASE General Index. On the basis of these results, there is significant evidence of the January effect for the sixty component stocks of the General Index. Some 35% of these stocks have significantly higher returns in January and February (23% and 12% respectively) while 16% have significantly lower returns in April. The majority of the stocks demonstrate some type of monthly effect (67% have higher monthly returns and 49% lower monthly returns).

The scope of this paper is to test the January effect in the Athens Stock Exchange (ASE) using a longer and more recent period of analysis. Further, the paper attempts to apply these findings to an Athens Stock Exchange (ASE) investment scenario, in which investors 'buy' and 'sell' a portfolio of stocks, based on the General Index.

Figure 1: Daily returns of the Athens Stock Exchange (ASE) General Index



III. TESTING FOR THE JANUARY EFFECT

Standard methodology was used to test whether seasonality of returns is present during the period 1985-2001. A t-test was used to test whether the returns of each month of the year were significantly different from zero. The parametric one-way analysis of variance (ANOVA) and the non-parametric Kruskall-Wallis (KW) statistic were performed to examine the hypothesis that mean returns are equal from January to September. The Kruskall-Wallis test is a non-parametric test to compare three or more unpaired groups. It is also called Kruskall-Wallis one-way analysis of variance by ranks. The key result is a P value that answers this question: If the populations really have the same median, what is the chance that random sampling would result in medians as far apart (or more so) as you observed in this experiment. If the P value is small, you can reject the idea that the differences are all a coincidence. This doesn't mean that every group differs from every other group, only that at least one group differs from the others (Daniel, 1978).

A significant F-value from ANOVA and a significant Kruskall-Wallis value imply that at least one month has returns that are significantly different from the other months, suggesting that returns exhibit seasonality. The Levene test was conducted to test the hypothesis that variances were equal across all 12 months. The Levene test used here is a modified version due to Brown and Forsythe (1974). A significant Levene statistic means that risk fluctuates from month to month.

Table 1 presents statistics when the ASE General Index is split into sub-samples based on calendar months. Mean daily returns are significantly positive for January and February, thus implying that there is a 'turn-of-the-year' effect. Furthermore, July and December have positive and statistically significant mean returns. According to the results of Table 1, we are not able to assert the existence of the January effect in the Athens Stock Exchange, since the mean return of February is higher than the mean return of January.

Table 1, also, presents estimates of various statistics (sample means, sample standard deviations, t-statistics and their significance) of the ASE General Index for different time periods. All these statistics were computed in the standard fashion assuming that the returns generating process is a sequence of identically and independently distributed random variables drawn from a distribution with constant variance.

Table 1. Descriptive statistics concerning seasonality in the ASE General Index

Daily Return	**Mean**	**Standard Deviation**	**t-statistic**	**Significance**	**Observations**
January	0.25923	0.45194	2.22154	0.0433	180
February	0.32259	0.51717	2.49505	0.0247	192
March	0.15175	0.56951	1.06585	0.3033	192
April	0.13981	0.62714	0.89175	0.3866	192
May	0.04872	0.42824	0.4551	0.6556	192
June	0.04937	0.57344	0.34434	0.7354	192
July	0.22294	0.35367	2.52141	0.0235	192
August	0.08635	0.51274	0.6736	0.5108	192
September	0.12764	0.81854	0.62375	0.5422	192
October	-0.08265	0.30171	-1.09571	0.2905	192
November	-0.14812	0.45946	-1.24853	0.2323	180
December	0.11169	0.21127	2.04745	0.0599	180
All Months	0.11062	0.49785	3.15847	0.00115	2020

F-value: 1.05 (0.404) KW-value: 14.57 (0.203) Levene: 1.54 (0.131)

Table 2 presents the results of applying the regression model (2) in order to test the January effect in the ASE General Index.

$$R_t = \beta_1 + \sum_{j=2}^{12} \beta_j DUM_{jt} + \varepsilon_t \qquad (2)$$

$$\varepsilon_t \sim NID\left(0, \sigma_\varepsilon^2\right) \qquad (3)$$

where: R_t is the daily return in day t and DUM_{jt} (j= 2, 3,…,12) is a dummy variable, which is set equal to one if the day is in month i and to zero otherwise.

The intercept β_1 indicates the mean daily return in January while the coefficient β_i represents the difference between the mean daily return in January and each individual month. If the mean return is the same for each month, then the estimate β_2 through β_{12} would be close to zero and the F- statistic would be insignificant.

In order to investigate the presence and persistence of the January effect, the entire sample was split into two subperiods. The first subperiod covers the months between 1985 and 1992, while the second covers the months from 1993 to 2001.

The results of Table 2 provide only partial confirmation of the existence of the January effect in the Athens Stock Exchange. The mean returns in January are significantly positive only for the first subsample (1985-1992). At the same time, February exhibits higher mean returns than January although this return is not statistically significant. The F statistic in Table 2 suggests rejection of the null hypothesis of equal b's in every case. According to the results of Table 2, it is very difficult to show that seasonality and the January effect are present in the ASE General Index.

The above results conflict to some extent with the findings of Coutts, Kaplanidis and Roberts (2000), whose results indicate that seasonality and the January effect are present in the ASE Indices.

A test of autocorrelation of time series data of the daily returns used in this analysis showed no significant autocorrelation of returns. In most cases, the DW statistic was close to 2. Therefore, another requirement of the regression analysis of no autocorrelation is, also, fulfilled. The marginal significance level of this test statistic is the probability that a value as large or larger would occur by chance.

Table 2. Regression analysis for the January effect

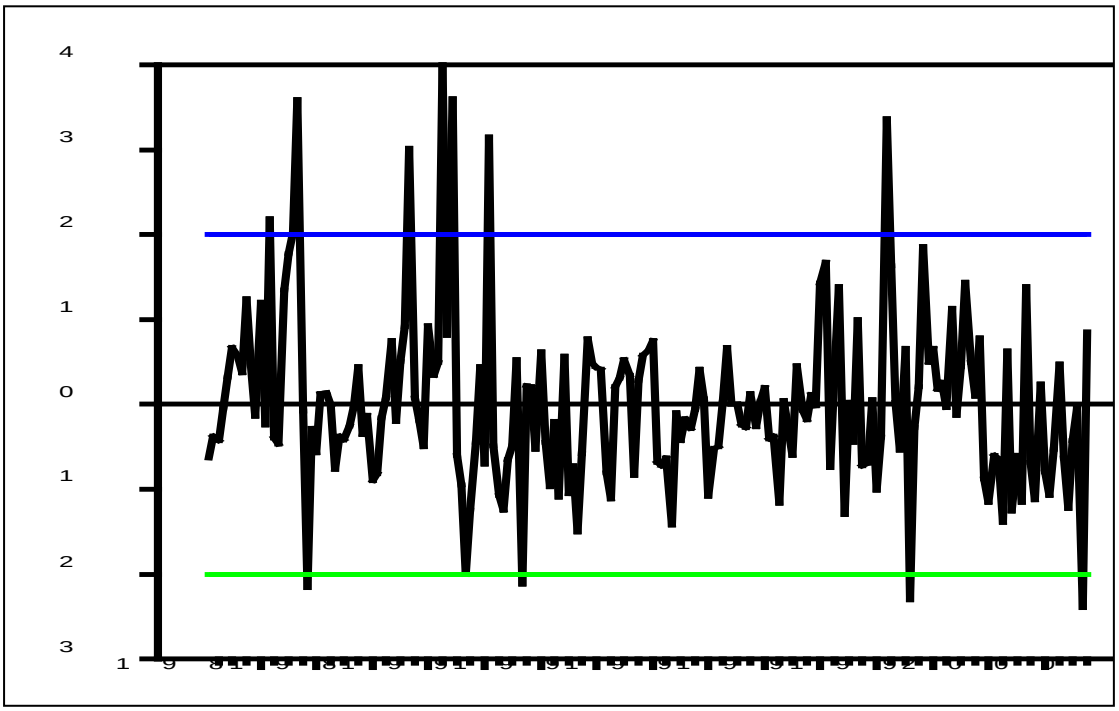
	1985-1992	***1993-2001***	***1985-2001***
January	0.2592	0.3302	0.1971
t-statistic	1.9665	1.5252	1.2479
February	0.0634	0.1046	0.0132
t-statistic	0.3453	0.3529	0.0592
March	-0.1075	-0.1795	-0.0443
t-statistic	-0.5857	-0.6054	-0.1985
April	-0.1194	-0.1467	-0.101
t-statistic	-0.6508	-0.4948	-0.4522
May	-0.2105	-0.395	-0.0349
t-statistic	-1.1473	-1.3323	-0.1562
June	-0.2099	0.0155	-0.4441
t-statistic	-1.1438	0.0523	-1.9882
July	-0.0363	-0.0508	-0.0307
t-statistic	-0.1978	-0.1713	-0.1374
August	-0.1729	-0.093	-0.2617
t-statistic	-0.9422	-0.3136	-1.1714
September	-0.1316	-0.1789	-0.0931
t-statistic	-0.7172	-0.6035	-0.4169
October	-0.3419	-0.3905	-0.3022
t-statistic	-1.8632	-1.317	-1.3527
November	-0.4073	-0.546	-0.268
t-statistic	-2.1851	-1.8415	-1.1589
December	-0.1475	-0.2187	-0.0456
t-statistic	-0.7914	-0.7377	-0.204

F-statistic F(11,83)=0.8569 F(11,83)=0.883 F(11,167)=1.0563
Significance 0.5848 0.584 0.3994

IV. A FURTHER SUGGESTION FOR TESTING FOR THE JANUARY EFFECT

The data used in the above analysis were not adjusted for the possible presence of outliers. A close look at the data of Figure 2, as well as, various ASE publications warns us of some abnormal returns. The causes of these include special events such as major changes in ASE practices and rules as well as government regulations and policies. These abnormal returns affect our results and our data must be adjusted. In Figure 2, outliers are identified using the studentized residuals of equation (2) and the full set of data.

Figure 2. Detection of outliers using the studentized residuals of equation (2) and the full set of data



In order to test for the presence of these abnormal returns we used studentized residuals, the time behaviour of which is presented in Figure 2. On the basis of the estimated residuals of equation (2), the studentized (Neter et al., 1983) residuals were estimated using the following formula:

$$e_t^* = \frac{\hat{e}_t}{s\sqrt{1-h_{tt}}} \qquad (4)$$

where:

$$[h_{tt}] = H = x(x'x)^{-1}x' \qquad (5)$$

is the leverage of the t[th] observation, with

$$0 < h_{tt} < 1 \qquad (6)$$

$$\sum_{j=1}^{T} h_{ij} = N \qquad (7)$$

and $$s = \sqrt{\frac{\sum_{t=1}^{T} \left(R_t - \hat{R}_t\right)^2}{T - N}} \qquad (8)$$

the matrix x is a Tx12 matrix of independent variables as defined in (2).

After cleaning the outliers, the results, in similar fashion to the results of Table 1 and 2, are presented in Tables 3 and 4 respectively. The mean, skewness and kurtosis of the close-to-close returns of the ASE General Index before and after the adjustment and cleaning process are the following:

Before adjustment	**After adjustment**
Mean: 0.110628	Mean: 0.075309
Skewness: 1.02406	Skewness: 0.32578
Kurtosis: 2.9415	Kurtosis: 0.2100
Jarque-Bera: 108.8	Jarque-Bera: 3.71

Table 3. Descriptive statistics concerning seasonality in the ASE General Index

Daily					
Return	**Mean**	**SD**	**t-stat**	**Significance**	**Observations**
January	0.25923	0.45194	2.22154	0.0433	180
February	0.22133	0.33285	2.57534	0.022	180
March	-0.04033	0.21164	-0.71301	0.4884	168
April	0.01336	0.38375	0.13481	0.8947	180
May	0.04872	0.42824	0.4551	0.6556	192
June	-0.06537	0.35586	-0.71147	0.4885	180
July	0.22294	0.35367	2.52141	0.0235	192
August	0.09566	0.36102	0.99146	0.3396	168
September	0.12821	0.39753	1.06964	0.3099	132
October	-0.08265	0.30171	-1.09571	0.2905	192
November	-0.07284	0.36851	-0.73954	0.4727	168
December	0.11169	0.21127	2.04745	0.0599	180
All Months	0.07530	0.35486	2.91756	0.0039	1980

F-value: 1.88 (0.044) KW-value: 18.23 (0.076) Levene: 1.67(0.085)

Table 4. Regression analysis for the January effect

	1985-1992	**1993-2001**	**1985-2001**
January	0.3059	0.2281	0.2592
t-statistic	1.847	2.0274	2.6989
February	-0.1208	-0.095	-0.0379
t-statistic	-0.5158	-0.5792	-0.279
March	-0.0982	-0.3276	-0.2996
t-statistic	-0.4352	-1.9978	-2.1669
April	-0.3328	-0.3007	-0.2459
t-statistic	-1.4207	-1.8334	-1.81
May	-0.4019	-0.0668	-0.2105
t-statistic	-1.7806	-0.4199	-1.5745
June	-0.174	-0.425	-0.3246
t-statistic	-0.7428	-2.6713	-2.3896
July	-0.0559	-0.0262	-0.0363
t-statistic	-0.2476	-0.165	-0.2715
August	-0.0717	-0.1308	-0.098
t-statistic	-0.3175	-0.7973	-0.7214
September	-0.3644	-0.0299	-0.2862
t-statistic	-1.27	-0.1823	-2.0303
October	-0.3832	-0.315	-0.3419
t-statistic	-1.6974	-1.9796	-2.5571
November	-0.5724	-0.2727	-0.3821
t-statistic	-2.5355	-1.6628	-2.4021
December	-0.2398	-0.0544	-0.1475
t-statistic	-1.0623	-0.3419	-1.0862

F-statistic: F(11,75)=2.52 F(11,73)=1.97 F(11,149)=2.013
Significance:0.011 0.04 0.030

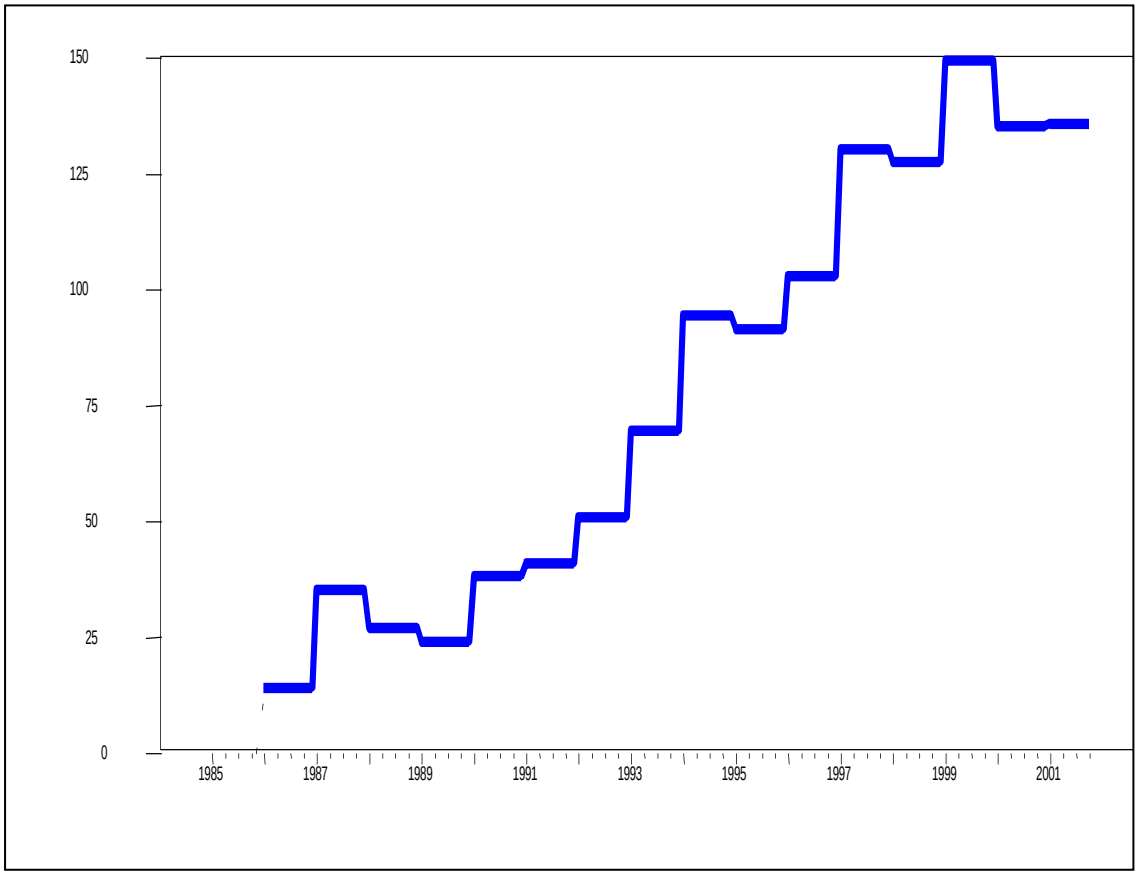
The results of Table 3 and 4 are quite different from the results of Table 1 and Table 2. They confirm the existence of the January effect in the ASE General Index. More specifically, Table 4 shows that the mean daily return in January is significantly higher than the returns in the other months in the overall period 1985-2001. The same holds for the first and the second subperiod. In the entire sample period, the mean return in January is significantly higher than in other months. In the second subsample we have a decrease of the January mean return, and this decrease is not a small one. The mean daily return in January fell by almost 25% from the first to the second subperiod, pointing to a weakening January effect. Note that the p-values of the F-statistic show an increase from the first to the second subperiod. Table 4 shows, also, that the F-statistic exhibits an increase from the first to the second subperiod.

V. INVESTMENT STRATEGIES AND THE JANUARY EFFECT

The existence of the January effect in the Athens Stock Exchange implies that investors who are already committed to trading should be timing their trades to take advantage of them. More specifically, an investor to implement an active trading strategy in order to exploit the January effect can use the higher returns in January and low returns in November. He could probably do so by buying the ASE General Index portfolio in November and selling it in January. In Table 5 (Appendix) an analytical presentation is made of this investment strategy.

The investment strategy consists in creating a portfolio on 1-1-1985 with initial capital of GRD 100, with which we buy or sell stocks depending on whether it is the month of November or January. The capital is invested in the ASE General Index, a fact which is – at least theoretically – practicable/feasible. Alternatively, we may consider that we are investing in high marketability stocks so that we approximate the 'basket' of shares that constitute the ASE General Index. We could, also, consider that we are buying a Mutual Fund that is linked to the General Index. The calculations take also into consideration the commissions which we pay to our brokerage firm for executing the transactions. A commission is estimated equal to 0.67%. However interest lost is not calculate on account of our money remaining outside the market.

Figure 3. Profitability of the ASE General Index based on the January effect strategy



If an investor had applied this investment strategy between January 1985 and December 2001, he could have increased his initial investment by 140%, including the cost of commissions of the brokerage firms which carried out the transactions of the January effect investment strategy. In Figure 3 we present a profitability chart for the ASE General Index investment strategy based on the January effect.

I. CONCLUDING REMARKS

This paper examined stock returns in the Athens Stock Exchange (ASE). Using 15 years of data up to 2001, it has documented the presence of the 'January effect' in the overall period and the two seven-year subperiods. At the same time, results showed that the strength of the 'January effect' had diminished considerably in recent years, confirming that the Athens Stock Exchange has crossed the line from an emerging to a mature stock market. Return seasonality had often attributed to tax-loss selling, which portended that returns will be higher in the first month of the tax year (Reinganum, 1983). The scope of this paper was not to explain the reasons of the 'January effect' phenomenon vis-à-vis the Athens Stock Exchange (ASE) General Index, but simply to confirm the presence of this phenomenon in the ASE General Index.

Although in the case of Greece, there were some studies that examined the anomalies of the Athens Stock Exchange (ASE), there were only a few which analysed the January effect. The research of this study did not find different conclusions with some of the previous studies carried out in the Athens Stock Exchange (ASE) that there was significant evidence of the 'January effect'. On the other hand, the results of this study were proved quite opposite indeed to an other study carried out in the Athens Stock Exchange (ASE) which concluded that sample stock prices were not the highest, nor were they persistent in January.

The existence of these anomalies in the Athens Stock Exchange (ASE) suggests that investors who were already committed to trading should have timed their trades to take advantage of the 'January effect'. Given that the 'January effect' has weakened over time, as evidenced by the subperiod results, investors should exercise caution in their investment choices.

Overall, the results of this paper coincided with the cited past international literature which confirmed the phenomenon of significantly higher than average returns in January in the sample Stock Exchanges in many countries in the word. On the other hand, the statistical documentation of the 'January effect' does not necessarily mean that investment strategies based on this phenomenon are certain to be profitable in the future.

APPENDIX

Table 5. Buying and selling ASE General Index stocks based on the 'January effect' strategy

Date	Transaction	ASE General Index Close	Change (%)in ASE General Index	Current Equity	Accumulated Commissions %	Accumulated Net Profit %
1985:11	BUY	56.1	0	99.33	0.67	
1986:01	SELL	72.4	29.1	127.38	1.52	27.38
1986:11	BUY	94.8		126.52	2.37	26.52
1987:01	SELL	107.6	13.6	142.71	3.32	42.71
1987:11	BUY	274.2		141.75	4.27	41.75
1988:01	SELL	264	-3.7	135.58	5.18	35.58
1988:11	BUY	276.1		134.67	6.08	34.67
1989:01	SELL	267.6	-3.1	129.63	6.95	29.63
1989:11	BUY	443.2		128.76	7.81	28.76
1990:01	SELL	460.7	3.9	132.94	8.71	32.94
1990:11	BUY	752.1		132.05	9.59	32.05
1991:01	SELL	872.2	16	152.1	10.61	52.1
1991:11	BUY	808.2		151.08	11.62	51.08
1992:01	SELL	799	-1.1	148.36	12.62	48.36
1992:11	BUY	558.8		147.37	13.6	47.37
1993:01	SELL	667.7	19.5	174.9	14.77	74.9
1993:11	BUY	812.8		173.73	15.94	73.73
1994:01	SELL	990.2	21.8	210.22	17.35	110.22
1994:11	BUY	804.4		208.82	18.75	108.82
1995:01	SELL	803.9	-0.1	207.3	20.13	107.3
1995:11	BUY	852.4		205.91	21.51	105.91
1996:01	SELL	901.1	5.7	216.22	22.96	116.22
1996:11	BUY	878.4		214.77	24.4	114.77
1997:01	SELL	954.5	8.7	231.83	25.96	131.83
1997:11	BUY	1331		230.27	27.5	130.27
1998:01	SELL	1446.8	8.7	248.63	29.16	148.63
1998:11	BUY	2337.4		246.96	30.82	146.96
1999:01	SELL	2936.2	25.6	308.15	32.88	208.15
1999:11	BUY	5625.5		306.09	34.93	206.09
2000:01	SELL	5218.2	-7.2	282.02	36.82	182.02
2000:11	BUY	3493.6		280.13	38.7	180.13
2001:01	SELL	3165	-9.4	252.09	40.39	152.09
2001:11	BUY	2765.6		250.4	42.07	150.4
2002:01	SELL	2670.8	-3.4	240.19	43.68	140.19

Source: Authors' estimates

REFERENCES

Aggarwal, R. and Rivoli, P., (1989). Seasonal and day-of-the-week effects in four emerging stock markets, Financial Review, No 24, pp. 541 – 50.
Brown, M. and Forsythe, A., (1974). Robust tests for equality of variances, Journal of the American Statistical Association, No 69, pp. 264-67.
Coutts, J., Kaplanidis C., and Robert, J., (2000). Security price anomalies in an emerging market: the case of the Athens Stock Exchange, Applied Financial Economics, No 10, pp. 561-571.
Daniel, W., (1978). Applied Non-Parametric Statistics, Boston MA: Houghton Mifflin.
Fama, E., (1970). Efficient capital markets: a review of theory and empirical work, Journal of Finance, No 25, pp. 383 – 417.
Gultekin, M. N. and Gultekin, N. B., (1983). Stock market seasonality: international evidence, Journal of Financial Economics, No 12, pp. 469 – 481.
Lee, I. (1992). Stock market seasonality: some evidence from the Pacific Basin countries, Journal of Banking and Finance, No19, pp. 199 – 210.
Mills, T. C. and Coutts, J. A., (1995). Calendar effects in the London stock exchange FT – SE Indices, The European Journal of Finance, No 1, pp. 79-93.
Mills, T. C., Siriopoulos, C., Markelos, R. and Harizanis, D., (2000). Seasonality in the Athens Stock Exchange, Applied Financial Economics, No 10, pp. 137-142.
Neter, J., Wasserman, W. and Kunter, M.H., (1983). Applied linear regression models, Homewood: Richard D. Irwing, Inc.
Pettengill, G. N., (1989). Holiday closings and security returns, Journal of Financial Research, No 12, pp. 57 – 67.
Philips-Patrick, F. J and Schneeweiss, T., (1988). The weekend effect for stock market index and stock index futures, Journal of Futures Markets, No 8, pp. 115-121.
Rogalski, R. J. and Tinic, S. M., (19866). The January size effect: anomaly or risk mismeasurement, Financial Analysis Journal, November – December, pp. 63 – 70.
Rogalski, R., (1984). New findings regarding day of the week returns over trading and non–trading periods: a note, Journal of Finance, No 39, pp. 1600-1614.
Rozeff, M. S. and Kinney, Jr. W. R., (1976). Capital markets seasonality: the case of stock returns, Journal of Financial Economics, No 3, pp. 379 – 402.
Reinganum, M. R., (1983). The anomalous stock market behavior of small firms in January: empirical tests for year-end tax effects, Journal of Financial Economics, No12, pp. 89-104.