

ANOTHER FORM OF THE “DAY OF THE WEEK” EFFECT. EVIDENCE FROM THE ATHENS STOCK EXCHANGE

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Abstract

We study the proportions of advancing, declining and remaining unchanged issues in the Greek Stock Market for a period of 10 years and we show that there is a weak form of “Day of The Week” effect for these proportions. In the sequence, we use methods and tools from Information Theory to gauge the power of this effect to the projection of the proportions.

JEL Classification: G10, G14.

Key words: Efficiency, Information, Market, Greece, Stock, Seasonality, Effect.

1. Introduction

Empirical studies from actual stock market data have shown that the average daily returns and volatility of stocks are not the same for all the days of week. This "anomaly" of the efficient market hypothesis is known as the "Day of The Week Effect" (see for example Gibbons and Hess (1981), Kiyamaz. and Berument (2003)). This effect (hereafter referred to as "DOW" effect) is noticeable in almost all kind of markets be they developed or emerging. Amongst the trading days of a week, the Monday and Friday stand out in particular for their average returns and produce what is known as "The Weekend Effect". More precisely, western markets (like USA, UK, Canada) exhibit significant positive returns on Fridays and significant negative returns on Mondays. Other markets (Like Japan, Australia) exhibit significant negative returns on Tuesdays. The most known explanation for the negative performance on Mondays is that the most unfavorable news appears during the weekends. Also, the negative performance on Tuesdays for some markets is attributed to the lag of influence from the negative news of USA by one day. Academic studies exploring the "Weekend Effect" include Abraham and Ikenberry (1994), Board and Sutcliffe (1988), Cross (1973), French (1980), Jaffe and Westerfield (1985), Keim and Stambaugh (1984), Lakonishok and Levi (1982), Lakonishok and Maberly (1990), Miller (1962), and Wang, Yumming, Erickson (1997).

For the case of the Greek Stock Market, almost all academic surveys on this concept report a DOW effect for the Athens Stock Exchange though their results are mixed. For example, Lyroudi, Subeniotis and Komisopoulos (2002) report that the DOW effect is strongly observed from January 2, 1997 to December 30, 1999 in the Greek Stock Market but it has a different form than the one observed in the other developed capital markets since the negative returns occur on Thursdays instead of Mondays or Tuesdays. Mills, Siriopoulos, Markellos and Harizanis (2000) studied separately the General Index of the Athens Stock Exchange and the stocks this index is based upon and though they found a strong DOW effect in both cases, the results were different between the index and its stocks. Other research papers on the DOW effect for the Greek Stock Market include Alexakis and Xanthakis (1995), Kenourgios, Samitas and Papathanasiou (2005), Lyroudi, Noulas and Komisopoulos (2002).

It is natural to question whether the proportions of advancing, declining and remaining unchanged issues in a stock market (hereafter referred to as "ADU fractions") for a day is affected by the position of this day in the week. In other words, it is natural to question whether some kind of DOW effect is not only present on the average returns but also on the ADU fractions. The ADU fractions has been studied by academics and it is shown that there is strong evidence that many markets exhibit at least a short memory for these

proportions independently from the days of the week (see for example: Theil and Leenders (1965), Fama (1965), Philippatos and Nawrocki (1973), Hai Hong (1978), Siligardos E. Giorgos (2007)). Thus, it is also natural to ask whether the power of this “memory” is greater than the power of a possible DOW effect.

In the present paper we answer the abovementioned questions for the Greek Stock Market. We study a recent 10 year period from the Athens Stock Exchange and we show that there is indeed some kind of a DOW effect for the ADU fractions. In the sequence, we use tools from Information Theory to gauge the efficiency of this effect in predicting the ADU fractions.

2. Data and Basic Results

The data employed in the present paper consists of ADU fractions from June 29, 1995 to June 29, 2005 for the Athens Stock Exchange (ASE). The ADU fractions were created taking into account all stocks listed in ASE in the best possible realistic fashion. That is, data for stocks that were delisted during the period of the study were also taken into account but only up to the date these stocks was delisted. There were 2497 trading days from June 29, 1995 to June 29, 2006 from which 476 were Mondays, 507 were Tuesdays, 509 were Wednesdays, 505 were Thursdays and 500 were Fridays. Table 1 and Figures 1 through 4 present the first results of our study.

		Mondays	Tuesdays	Wednesdays	Thursdays	Fridays	All Days
Proportion of Declining Stocks	Mean	45.913%	45.474%	42.601%	41.886%	39.871%	43.124%
	St. Dev	0.245874302	0.22441295	0.222196321	0.214346	0.207318187	0.224100769
	CV	53.552%	49.349%	52.158%	51.174%	51.997%	51.966%
Proportion of Advancing Stocks	Mean	37.105%	36.469%	39.119%	39.716%	41.498%	38.794%
	St. Dev	0.240455239	0.21440607	0.219428745	0.21714097	0.211485449	0.221342215
	CV	64.805%	58.791%	56.092%	54.674%	50.963%	57.056%
Proportion of Unchanged Stocks	Mean	16.983%	18.057%	18.280%	18.398%	18.631%	18.082%
	St. Dev	0.114930686	0.1165197	0.117609745	0.11182024	0.117702989	0.11588419
	CV	67.675%	64.530%	64.338%	60.777%	63.175%	64.090%

Table 1

The Mean, the Standard Deviation and the Coefficient of Variation for each day of the week and for each proportion is presented in rows. The “All Days” column presents the corresponding results when all data (2497 trading days) are taken into account without discriminating between the days of the week.

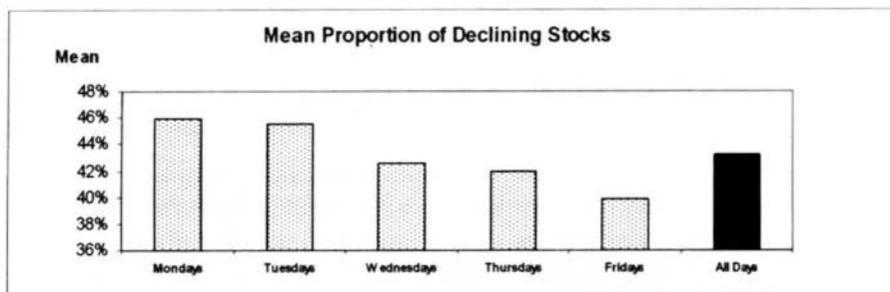


Figure 1

The average mean proportion of declining stocks is higher for Mondays and Tuesdays than the other days of the week as well as the mean proportion of declining stocks for all days. Fridays exhibit the lowest mean proportion for declining stocks.

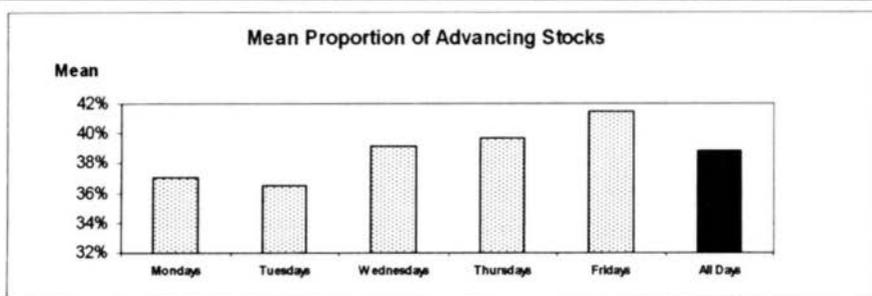


Figure 2

The average mean proportion of advancing stocks is lower for Mondays and Tuesdays than the other days of the week as well as the mean proportion of advancing stocks for all days. Fridays exhibit the highest mean proportion for advancing stocks.

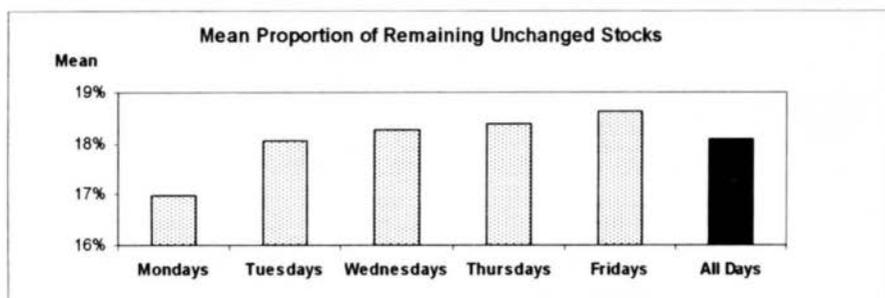
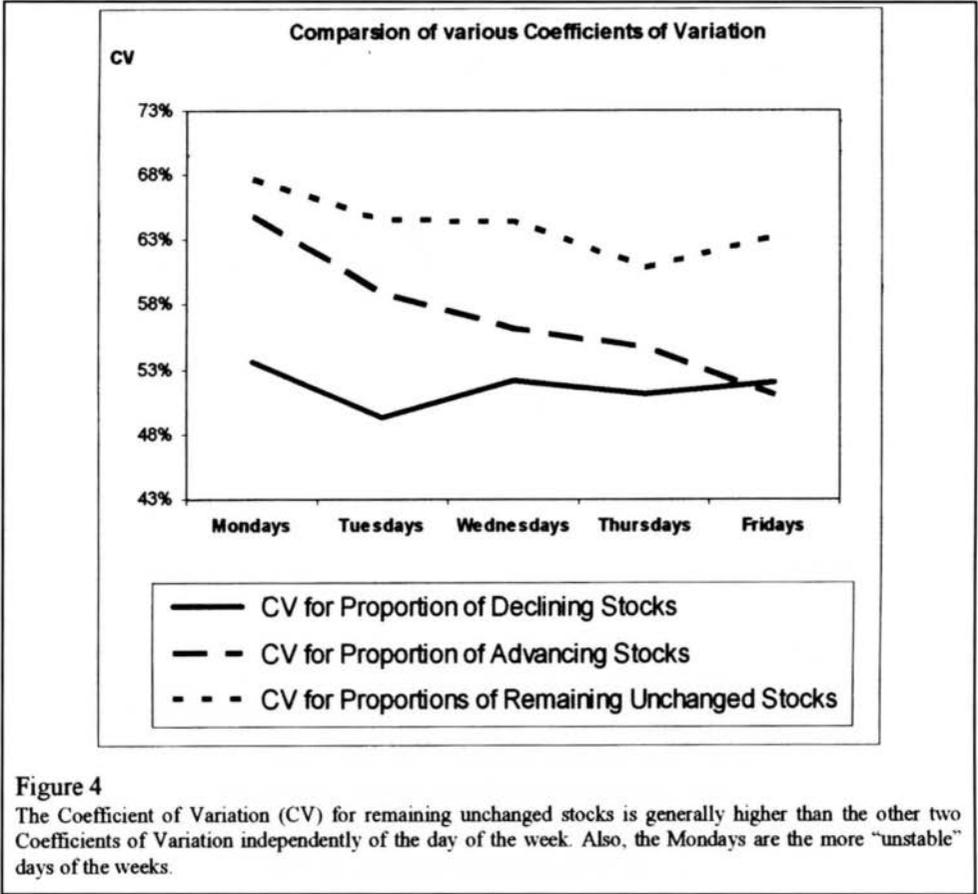


Figure 3

The average mean proportion of remaining unchanged stocks is lower for Mondays than the other days of the week as well as the mean proportion of remaining unchanged stocks for all days. Fridays exhibit the highest mean proportion for remaining unchanged stocks.



It is apparent from our results that there is some kind of DOW effect for the ADU fractions specially for Mondays and Fridays. Mondays appear to be connected to more mixed trading behavior since the Coefficients of Variations for the ADU fractions are higher during these days. Moreover, Mondays are connected to negative trading psychology since they exhibit greater mean proportion of the declining stocks than the other days of the week. On the other hand, Fridays seems to be connected to more positive trading psychology since they exhibit the highest mean proportion of advancing stocks and the lowest mean proportion of declining stocks than the other days of the week. One more interesting result from our study has to do with Tuesdays. Tuesdays seem to incorporate Mondays' characteristics with respect to mixed behavior and tendency to negative psychology. A closer look at the table and figures reveals that Tuesdays act like a transition phase between the negative psychology of Mondays to a more stable trading environment of Wednesdays and Thursdays.

3. Gauging the efficiency of the DOW effect with the Theil-Leenders test

To gauge the predictive power of the DOW effect for the ADU fractions we use the Theil-Leenders test (Theil and Leenders (1965)) which is based on Information Theory. Let $q_{1,t}$, $q_{2,t}$ and $q_{3,t}$ be the proportions of advancing, declining and remaining constant issues respectively in day t and $p_{1,t}$, $p_{2,t}$, $p_{3,t}$ be their corresponding predicting values derived by a rule based upon the values of the fractions up to day $(t-1)$. The inaccuracy of the predictions is quantified by the *Information Inaccuracy measure* $I(q:p)$ which is defined by:

$$I(q : p)_t = \sum_{i=1}^3 q_{i,t} \log_2 \left(\frac{q_{i,t}}{p_{i,t}} \right)$$

The less the $I(q:p)_t$ is, the more accurate are the predictions for the period t . The *Average Information Inaccuracy* $\overline{I(q : p)}$ of the predictions is defined as the long arithmetic average of $I(q:p)_t$:

$$\overline{I(q : p)}_t = \frac{1}{T} \sum_{t=1}^T I(q : p)_t$$

where $t=0, 1, 2, \dots, T$ are the trading days for which the ADU fractions are available.

The simplest prediction scheme (prediction scheme 1) one can use for the ADU fractions is that the predictive fractions for tomorrow is the long arithmetic average of the fractions up to today. In other words, for the scheme 1 we take $p_{i,t} = \overline{q}_i = \sum_{x=0}^{t-1} q_{i,x}$. In this scheme there is not really a prediction but its average information inaccuracy will be used as milestone for gauging the prediction scheme 2. Scheme 2 is based upon the long averages of proportions dependent on each day of the week. More precisely, if:

$$w_t^k = \begin{cases} 1, & \text{if } k \text{ is 1 and day } t \text{ is Monday} \\ 1, & \text{if } k \text{ is 2 and day } t \text{ is Tuesday} \\ 1, & \text{if } k \text{ is 3 and day } t \text{ is Wednesday} \\ 1, & \text{if } k \text{ is 4 and day } t \text{ is Thursday} \\ 1, & \text{if } k \text{ is 5 and day } t \text{ is Friday} \\ 0, & \text{otherwise} \end{cases}$$

then the prediction scheme 2 uses
$$p_{i,t} = \sum_{k=1}^5 w_t^k \left(\frac{\sum_{x=0}^{t-1} w_x^k \cdot q_{i,x}}{\sum_{x=0}^{t-1} w_x^k} \right)$$
. If All_1 is

the average information inaccuracy of prediction scheme 1 and AII_2 is the average information inaccuracy of prediction scheme 2, then the prediction power of the DOW effect for the ADU fractions can be gauged by the average information inaccuracy percentage reduction (namely $AIRR$) from AII_1 to AII_2 .

We computed the prediction schemes and their information inaccuracies using the 2497 trading days of our data (from June 29, 1995 to June 29, 2006) but for a fair comparison we computed the AII_1 and AII_2 excluding the first 51 trading days. The average information inaccuracy percentage reduction from scheme 1 to scheme 2 was found to be:

$$AIRR = 1 - \frac{AII_1}{AII_2} = 0.001384554 \approx 0.14\% \text{ which is very low compared to}$$

reductions of average information inaccuracy derived by schemes following moving average rules. For example, previous work on the ADU fractions for the Athens Stock Exchange (see Siligardos E. Giorgos (2007)) has shown that a front weighted moving average scheme relying almost exclusively on 30 days reduces the average information inaccuracy for the ADU fractions by 24.6%.

A possible explanation for the lack of significant reduction of information inaccuracy derived by the prediction scheme 2 compared to the moving average prediction scheme is the fact that our sample includes the vast bullish market of 1999 and the severedecline that followed. During that period, the publicity of the stock market and the volume of transactions was so high that it was difficult to find inactive stocks, (see figure 5.)

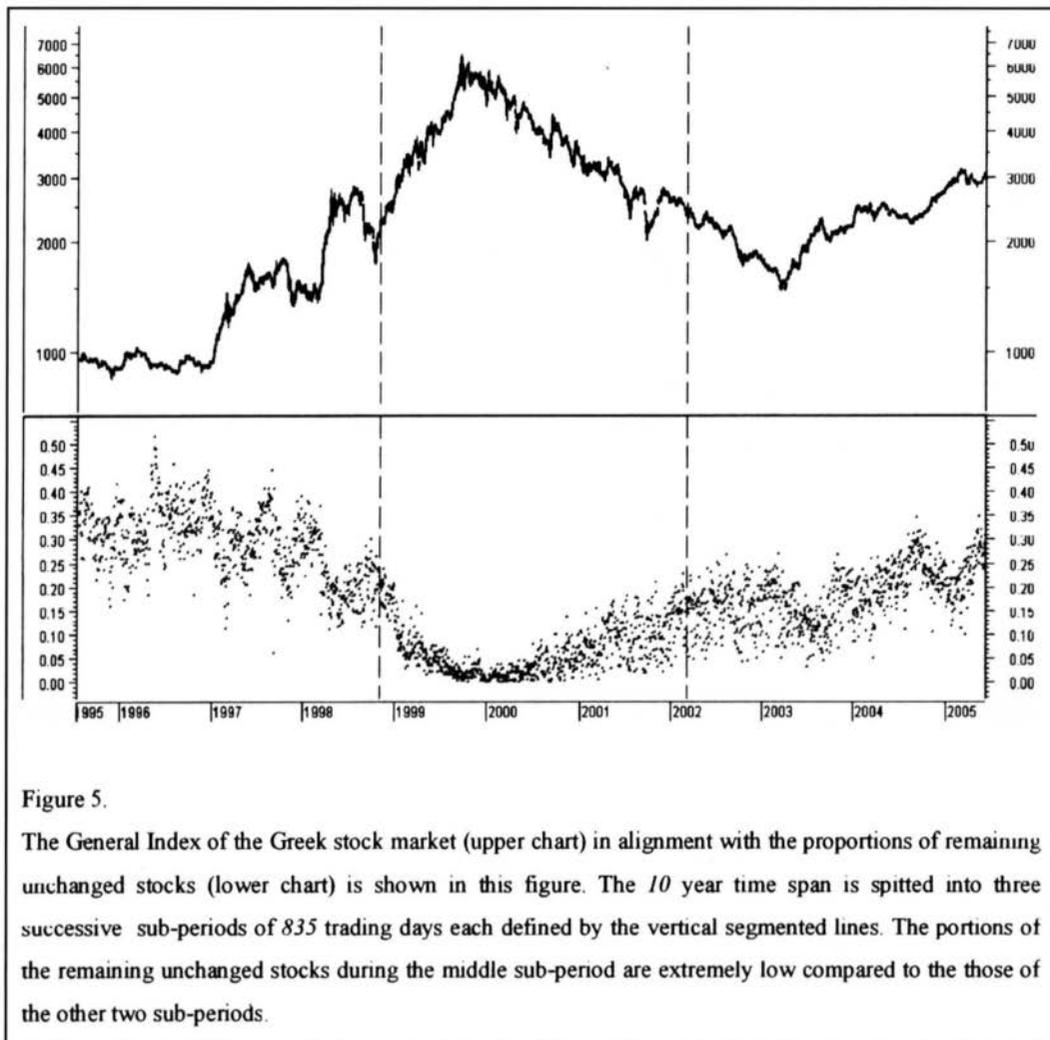


Figure 5.

The General Index of the Greek stock market (upper chart) in alignment with the proportions of remaining unchanged stocks (lower chart) is shown in this figure. The 10 year time span is spitted into three successive sub-periods of 835 trading days each defined by the vertical segmented lines. The portions of the remaining unchanged stocks during the middle sub-period are extremely low compared to the those of the other two sub-periods.

4. Conclusions

Our survey shows that the Greek stock market exhibits a “Day of Week” effect for the proportions of advancing, declining and remaining unchanged stocks. Our findings support the general results of previous works on this subject that Mondays are generally connected to negative trading psychology and Fridays are connected to positive trading psychology. Moreover, we find that Tuesdays are influenced by the negative psychology of Mondays. This “Day of Week” effect however seems useless when used alone for the purpose of projecting the future values of the above mentioned proportions for the Athens Stock Exchange compared to moving average projection schemes.

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