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Does the relationship between small and large portfolios' returns confirm the lead–lag effect? Evidence from the Athens Stock Exchange

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ABSTRACT

This paper investigates whether lead–lag patterns exist between small and large size portfolios constructed from stocks traded in the Athens Stock Exchange (ASE). We examine this relationship in both the short-run (by using the correlation-based approach of Lo and MacKinlay, 1990 and the generalised impulse response analysis by Pesaran and Shin, 1996, 1998) and the long-run by employing the cointegration-based methodology of Kanas and Kouretas (2005). Furthermore, upon identifying that cointegration exists we then use the estimated error correction models (ECMs) to obtain out-of-sample forecasts of small-firm portfolio returns and it is shown that these ECMs have superior forecasting performance relative to models without the error correction terms. Therefore, we were able to provide a richer exploration of the lead–lag relationships than the one obtained by standard autocorrelation and cross-correlation analysis and vector autoregression analysis. The main finding of our analysis is that a lead–lag effect between small and large size portfolios was established in both the short-run and the long-run for the Athens equity market.

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1. Introduction

Lo and MacKinlay (1990) established an important lead–lag relation between small and large size portfolio returns using weekly data from the NYSE. With the application of the cross-autocorrelation analysis they demonstrated that returns of larger capitalization stocks lead and those of smaller capitalization stocks follow. Lo and MacKinlay (1990) argue that when there is a difference in the speed of reaction to information among the stocks then a contrarian strategy may lead to profits even in the case where no stock overreacts to information. The implication of the existence of such relationship relates to the ability of investors to forecast the returns of small-firm portfolios based on the returns of large-firm portfolios and that contradicts the efficient market hypothesis. More specifically, this documented pattern implies that lagged returns of large capitalization portfolios are positively cross-correlated with contemporaneous returns of small capitalization portfolios. Substantial literature has been written discussing these findings in order to understand the complex mechanism of information transmission between large- and small-firm portfolio returns.[1,2]

Boudoukh et al. (1994), Badrinath et al. (1995) and Jegadeesh and Titman (1995) have questioned this evidence and they argued that it is not clear that there is a positive cross-correlation between lagged returns of large-firm portfolios with current returns of small-firm portfolios. Furthermore, Campbell et al. (1997) argued that this relation implies a rather complicated information transmission mechanism between large- and small-firm portfolio returns and therefore we are still far from having a complete understanding of their nature and sources.

Several explanations have been offered for the existence of this provoking relationship. Lo and MacKinlay (1990) related this evidence to the way that market news are transmitted through the stock prices. They argued that information shocks are first embodied in the large-size portfolios and then with a time lag to the small-size portfolios. Furthermore, Lo and MacKinlay (1990) have also argued that nonsynchronous trading, arising from thinly traded small capitalization stocks may be considered as a potential source of this pattern. Since most studies on the issue employed portfolios which are subject to thin trading effect more significantly than individual stock, the argument appears to be appealing. However, Lo and MacKinlay (1990) and Campbell et al. (1997) argued that non-synchronous trading cannot be the only reason since the size of the documented autocorrelation structure for the small size portfolios is too large to be solely explained by non-synchronous trading.[3]

Hiemstra and Jones (1994) claimed that the existence of structural breaks and nonlinearities may also account for this lead–lag effect. Badrinath et al. (1995) provided as a potential explanation of such a lead–lag relationship the level of institutional ownership of the firms. Merton (1987) considered the information set-up cost, a factor which is highly correlated with firm size, as another possible explanation for the presence of a lead–lag relationship. Finally, Boudoukh et al. (1994) and Jegadeesh and Titman (1995) contended that there is little evidence indicating that contrarian strategies can be applied when stock prices exhibit a delayed reaction to common factors.[4] Furthermore, they maintained that the major source of any potential contrarian profit that may result from trading strategies is stock price overreaction to firm-specific factors, while any lead–lag relationship has a very limited role.[5] Another explanation for contrarian profits is offered by Conrad and Kaul (1998) who argued

[1] Lo and MacKinlay (1988), Conrad and Kaul (1988, 1989), Conrad et al. (1991) and Conrad et al. (1994) are some of the studies that have provided evidence on stock return predictability. Boudoukh et al. (1994), Richardson and Peterson (1999) have also tested for a lead–lag relationship in the U.S. stock market, Mills and Jordanov (2000), Grieb and Reyes (2002) have conducted similar studies for the U.K. stock market. Finally, Kanas and Kouretas (2005) provided evidence of a lead–lag relationship in a long-run framework for the U.K. stock market.

[2] Toth and Kertesz (2006) analyse the temporal changes in the cross-correlations of returns using data from the NYSE and they show that the observed lead–lag effect between daily stock returns disappeared in less than 20 years.

[3] The non-synchronous trading problem refers to the case where trading takes place in every consecutive time interval but not necessarily at the close of the interval of measurement of the returns data. As a result, prices which are assumed to be independently distributed over time may be predictable.

[4] Contrarian investors are the investors who deliberately behave in opposite direction to the prevailing wisdom of other investors; for example, buying when others pessimistic and selling when they are optimistic.

[5] Conrad and Kaul (1988, 1989), Chan (1988), Jegadeesh (1990), Jegadeesh and Titman (1993) are other studies that discussed these issues.