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## Emerging Issues In Evaluating Market Efficiency: Part 1

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Law360, New York (July 18, 2012, 4:45 PM ET) -- Typically in securities litigation, market efficiency is evaluated by analyzing the five Cammer factors: trading volume, analyst coverage, market makers, S-3 eligibility, and empirical evidence of stock price reactions. Because an event study determines whether a company's stock reacts appropriately to the release of new information, experts and courts have traditionally utilized event studies to analyze the empirical factor, (i.e. whether it fulfills the fifth Cammer factor).

Increasingly, experts have begun to supplement, or in some cases replace, event study analysis with serial correlation analysis to empirically evaluate market efficiency. However, serial correlation analyses are not necessarily germane to the determination of market efficiency in securities litigation cases.

The relationship between the presence of serial correlation and market efficiency is often misunderstood. The fraud-on-the-market doctrine requires that experts consider whether the market for a security is efficient with respect to the relevant, case-related information so that reliance on the integrity of the stock price implies reliance on the alleged misrepresentations or omissions. Typically, this is accomplished empirically with an event study, not a serial correlation analysis. The academic literature is clear in that periods of serial correlation are not incompatible with efficiency of the market. Moreover, experts often overlook certain issues that may affect the potential inferences drawn from serial correlation analyses.

### Serial Correlation and Market Efficiency

Serial correlation, also known as autocorrelation, is a phenomenon where security price returns are related, either positively or negatively, to past returns. If a security exhibits positive serial correlation, a price increase is more likely to be followed by a price increase, and a price decline is more likely to be followed by a price decline. Negative serial correlation means a price increase is more likely followed by a price decline. By contrast, a random walk is a sequence of successive price movements where there is no serial correlation.

First, it is a generally accepted and articulated principle in the finance literature that serial correlation in daily stock returns and deviations from the random walk model are not necessarily proof of market inefficiency. For example, Lo and MacKinlay [1988] state that "the rejection of the random walk model does not necessarily imply the inefficiency of stock-price formation," and that "Of course, these results [of significant serial correlation] do not necessarily imply that the stock market is inefficient or that prices are not rational assessments of 'fundamental' values."<sup>[1]</sup>

Further, Leroy (1973) and Lucas (1978) show that rational expectations equilibrium prices need not even form a martingale sequence, of which the random walk is a special case.<sup>[2]</sup> <sup>[3]</sup> Lucas states that "the outcomes of tests as to whether actual price series have the Martingale property do not in themselves shed light on the generally posed issue of market 'efficiency.'" More recently, Timmermann and Granger (2004) show that "[p]redictability of returns thus need not violate the [Efficient Market Hypothesis]"<sup>[4]</sup>. In addition, other

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academics, for example Roll (1984) and Kaul and Nimalendran (1990), agree that serial correlation does not necessarily indicate inefficiency.[5] [6]

Moreover, Eugene Fama, author of the seminal papers laying the foundation of financial market efficiency, states in his 1991 article that “We should also acknowledge that the apparent predictability of returns may be spurious, the result of data-dredging and chance sample-specific conditions.”[7] In his 1998 article, Fama also states that “We shall find, however, that the long-term return anomalies are sensitive to methodology. They tend to become marginal or disappear when exposed to different models for expected (normal) returns or when different statistical approaches are used to measure them. Thus, even viewed one-by-one, most long-term return anomalies can reasonably be attributed to chance.”[8]

Second, it is important to note that large stock indices, representative of the entire stock market, exhibit an economically small but statistically significant propensity to fluctuate in a manner inconsistent with the random walk model. In addition, according to academic finance literature, stocks generally tend to be negatively serially correlated in the short-run (“reversal”) and positively serially correlated in the long-run (“momentum”). If one were to accept the premise that deviations from the random walk model make a security market inefficient, then one would have to conclude that almost all publicly traded stocks and even large indices are inefficient as well — a proposition at odds with the finance literature and legal precedent.

Finally, serial correlation and deviations from the random walk model are not incompatible with a market that efficiently incorporates new information into security prices. The type of small price oscillations detected in such tests of serial correlation are not what the courts had in mind when they turned to modern financial research for guidance as to whether or not material misrepresentations are efficiently reflected in stock prices. A stock can exhibit serial correlation and still efficiently incorporate new material information and fraudulent misinformation.

For example, though there may be some statistically significant though economically minor predictability in successive stock prices, a company’s stock price may still efficiently reflect the impact of a major accounting fraud and subsequent disclosure of the fraud. Therefore, an event study focusing on information releases related to the fraud, rather than a statistical test of serial correlation, best indicates whether the fraud-on-the-market principle is operative.

## **Potential Issues with Serial Correlation Analyses**

There are several issues with serial correlation analyses that experts must be aware of when drawing inferences from these analyses. It is important for experts and the courts to consider the following four issues when analyzing serial correlation: 1) the effect of corrective disclosures, 2) serially correlated news, 3) profitability of trading strategies, and 4) pre-class period return predictability.

### ***The Effect of Corrective Disclosures***

Generally, the end of a class period coincides with a corrective disclosure, and in an efficient market, this elicits a large stock price decline. An extraordinarily large stock price movement can skew the results of a serial correlation test. For example, if the security price fell the day before a corrective disclosure due to information leakage, a separate news item, or random chance, then statistical analysis could show positive serial correlation on account of the large drop caused by the disclosure.

In order to evaluate market efficiency, an analyst testing for serial correlation should check

the results for robustness when the final few days of the class period are excluded. If no statistically significant serial correlation was present earlier in the class period, then the appearance of serial correlation accompanying the corrective disclosure would likely not have been predictable or exploitable, and therefore is not evidence of market inefficiency.

### ***Serially Correlated News***

The essence of market efficiency is that security prices should respond to the release of material, valuation-relevant news. Thus, if the company in question releases news in a serially correlated fashion (good news followed by more good news, or bad news followed by more bad news), then this will cause serial correlation in security returns precisely because the market is efficient. Often, serial correlation in security returns can be explained by serially correlated news.

### ***Profitability of Trading Strategies***

While in some circumstances serial correlation may indicate a degree of predictability in security price returns, the finding of statistically significant serial correlation does not necessarily indicate that a trading strategy based on serial correlation would have yielded abnormal profits. That is, the serial correlation may not be exploitable or economically meaningful.

Statistical serial correlation tests generally do not account for trading costs. If a trading strategy based on serial correlation is not profitable, then such serial correlation does not indicate market inefficiency. That is, the serial correlation would not have been caused by the market ignoring available information, but rather by the minor price discrepancies being too small to exploit.

It should also be noted that investing based on serial correlation is never an arbitrage opportunity that guarantees profits. An investor who observes what he believes to be persistent and profitable serial correlation and invests accordingly could find that the anomaly disappears shortly thereafter, causing losses. Therefore, the anomaly may persist as investors judge the risks too high relative to the potential gain. The existence of serial correlation here does not imply that the market has ignored available material information in the pricing of the subject security.

### ***Pre-class Period Return Predictability***

Even if a profitable trading strategy based on serial correlation was identified during the class period, it would not be sufficient to conclude market inefficiency. If the anomaly existed only during the class period, but not prior to the class period, it may have existed during that period because investors did not yet have sufficient data to identify a persistent and profitable anomaly, and then trade accordingly.

### **Conclusion**

The presence of serial correlation, properly analyzed, does not necessarily impact a security's ability to appropriately assimilate new information into its price. As long as information, when it is released, is incorporated into the price of a security, then misrepresentations and omissions, too, are incorporated. As a result, investors who relied on the integrity of the security's price would necessarily have relied on the misrepresentations and omissions, satisfying the reliance condition for class certification.

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