
The Pattern of Intraday Portfolio Management Decisions: A Case Study of Intraday Security Return Patterns

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This article examines causes of observed stock trading patterns that show high hourly returns and trading volume during early and late trading hours. Using time-stamped data from an institutional investor, we document high levels of portfolio managers' early-morning and late-afternoon decisions to trade that can result in the volume pattern and relatively higher proportions of buy decisions that could contribute to the return pattern. J BUSN RES 2000. 50.321-326. © 2000 Elsevier Science Inc. All rights reserved.

Investors who trade stocks are competing with professional traders and institutional investment managers, and to be competitive, investors must be aware of the influences that other traders have on market returns. Researchers have identified a number of regularities in common stock returns, and this article addresses the well-documented pattern of stock returns during the average trading day that shows a repeated occurrence of higher-than-expected returns at the open and close of the market and lower returns during the middle of the day. The hypotheses of the article is that the timing of institutional investors' decisions stimulates this pattern because managers tend to make the majority of their transaction decisions toward the end of the day. These late-day decisions affect end-of-day market returns and volume, and the beginning-of-day returns and volume are high because of the accumulation of orders from managers' decisions made after the market close the previous day plus decisions made before the opening of trading each day.

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Possible Causes of Intraday Return Patterns

The literature refers to the observed return regularity as the "U-shaped pattern of intraday returns." It has been identified in a number of studies including work by Harris (1986, 1989), Jain and Joh (1988), Wood, McNish, and Ord (1985), McNish and Wood (1990), and Smirlock and Starks (1986). A similar pattern (high early and late in the day, low during the middle hours) applies to trading volume (see, for example, Foster and Viswanathan, 1989; Jain and Joh, 1988; McNish and Wood, 1991; and Wood et al., 1985), return variance (see, for example, Admati and Pfleiderer, 1989a; Lockwood and Linn, 1990; and Wei, 1992), and bid-ask spreads (see, for example, Brock and Kleidon, 1992; McNish, and Wood, 1992; and Stoll and Whaley, 1990). The values for these variables during market opening and closing times are distinctly larger than the midday values.

Some of the attempts to explain these non-stationarities have relied on market microstructure models that allow patterns to develop based solely on the internal structure and operation of the market and in the absence of any external influences. Admati and Pfleiderer (1989b) develop an information-based model to explain trade clustering that can occur at any time during the trading day, and they discuss the role of the open and the close as special clustering points. They contend that market makers have adverse selection problems with informed traders that they attempt to alleviate through their interaction with nondiscretionary liquidity traders, discretionary liquidity traders, and informed traders, so they offer inducements for liquidity traders to transact at certain times during the day.

Brock and Kleidon (1992) maintain that market evidence is at odds with the Admati and Pfleiderer (1989b) information-based model. The Admati-Pfleiderer model partially relies on lower transaction costs to explain higher volume and returns at the opening and close of the day. However, Brock and Kleidon (1992), extending the inventory-based model of Garman (1976), show that spreads (transactions costs) should be higher at the open and the close. They present evidence of observed transaction costs as measured by the bid-ask spread often being higher at these times.

In addition to explanations based on market microstructure, the U-shaped trading pattern may be attributable to variables that are exogenous to the market structure as noted in Brock and Kleidon (1992). Primary exogenous considerations are variations in supply and demand from investors and the discontinuous nature of market trading. For example, Brock and Kleidon argue that much of the trading at the open and close is due to the fact that investors cannot trade as easily when major markets are closed. The incentive to transact at the opening and close may be related to the desire of portfolio managers to bring their portfolios to a particular target risk, a factor that is unrelated to the market microstructure. Another exogenous factor could be that market activity is responding to the release of information. Berry and Howe (1994) find distinct intraday patterns in the release of public information but conclude that they are only moderately related to trading volume and not significantly related to price variability. Other exogenous considerations relate to covering short positions overnight (see Miller, 1989) and the desire of portfolio managers of index funds to trade at the end of the day to reduce tracking errors. Mutual fund managers, judged by net asset value at the end of the day, also have some incentive to correlate their trading patterns with their benchmarks. Furthermore, brokers are often given orders which must be filled by the end of the day or canceled.

Whether the causes of intraday return patterns lie with external or internal (market microstructure) considerations, the fact remains that a predictive pattern is in place that challenges market efficiency, although it is doubtful that a trading strategy could exploit the patterns to the extent of producing superior after transactions-costs returns. Studies of the return phenomenon have typically dealt with transactions data from major exchanges such as the New York Stock Exchange, the American Stock Exchange, and the Toronto Stock Exchange. Since the data represent realized transactions, the observed U-shaped pattern of returns and volume includes both the external influence of investors and portfolio managers who order the execution of trades for portfolio rebalancing reasons and the internal influence of market makers and traders who attempt to minimize transaction costs and make trading profits. A shortcoming of the use of aggregated market transactions data is that the external influence from portfolio managers cannot be measured separately from the effects of traders and market makers.

Gerety and Mulherin (1992) attribute the U-shaped pattern in trading volume to short-term investors. These short-term investors, such as market makers and day traders, have relatively little ability to bear risk overnight and desire to exchange their positions with investors having a greater ability to bear risk overnight. Gerety and Mulherin (1992) reason that if investors are transferring risk of holding positions while the market is closed, then end-of-day volume should be directly related to overnight return variance. Using closing and opening-hour trading volume on the NYSE from 1933 to 1988, they find evidence to support their position and conclude that short-term traders are the cause of the U-shaped pattern in volume.

Gerety and Mulherin (1992) mention anecdotal discussion that attributes the U-shaped pattern to institutional investors. However, they observe a downward trend in last-hour volume over the last several decades and a concurrent increase in block trading (to represent institutional trades) and suggest that institutional traders do not cause the U-shaped pattern. However, the simple observation of a negative correlation between these two variables is not proof of a causal relationship. It is quite possible that both institutional investors and short-term traders are parties to the causes of the U-shaped pattern, especially if institutional investors represent the other side of the trades with short-term traders. It is our hypothesis in this article that a major part of the demand for opening and closing trades originates with institutional and other long-term investors, and short-term traders are willing to fill that demand.

While these previous studies have proposed and examined various causes of intraday trading patterns, none has been able to explain more than a small portion of the pattern. It is the intent of this article to further contribute to the evidence in this area by using a case study to illustrate the importance of the timing of transaction decisions by institutional portfolio managers and other long-term investors. These decisions quickly become orders that impact the market and contribute to the formation of the daily U-shaped patterns observed in this article. As these intraday decisions are transmitted to security traders, they are translated into intraday volume, variance, and price patterns.

Transactions data typically used in market studies identifies only the time of the transaction, not the time of the decision to transact. To overcome this problem, our sample tracks the times at which portfolio managers made their decisions. Conversations with the portfolio managers led to the conclusion that the portfolio managers were, for the most part, indifferent to the problems and issues related to the traders (endogenous factors). Their concerns were related to rebalancing their portfolios. The extent to which they weight their actions toward buying activities at market opening and market closing times in the absence of concerns about execution costs would tend to indicate the importance of the exogenous supply-demand variable in the pattern of intraday returns.

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