Trading volume and autocorrelation: Empirical evidence from the Stockholm Stock Exchange

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Abstract

In accordance with studies for other markets, Swedish index returns exhibit high autocorrelation, (a) after days of above average performance of the stock market, (b) after low absolute returns, (c) when trading volume is low, and (d) following Fridays. Contrary to the non-synchronous trading and the transaction cost hypotheses, all results extend to individual stock returns. It is concluded that autocorrelation patterns are related to the trading patterns of individual investors, and not the cross-security information processing of the market. In particular, the observed autocorrelation structure corresponds to feedback trading. © 2000 Elsevier Science B.V. All rights reserved.

JEL classification: G14

Keywords: Return autocorrelation; Trading volume; Feedback trading

1. Introduction

It has been well documented that high frequency stock index returns are positively autocorrelated. Several theoretical explanations have been put forward, most prominently non-synchronous trading, transaction costs,
time-varying expected returns and feedback trading. Several empirical papers test the predictions of the various models on data.

So far, the empirical tests are inconclusive; Atchison et al. (1987) reject non-synchronous trading, Mech (1993) and Ogden (1997) favour trading costs or information frictions while Boudoukh et al. (1994) argue that special patterns of non-trading may explain the observed levels of autocorrelation.

This paper introduces a new element to the analysis: the return autocorrelation of individual stocks. As all theoretical models of index return autocorrelation include assumptions about the (absence of) autocorrelation of individual stock returns, it is possible to draw conclusions on the likely origin of index return autocorrelation based on the autocorrelation of individual stock returns. To the best of the author’s knowledge, this possibility has so far not been used in the literature on index return autocorrelation.

The empirical study uses data from the Stockholm Stock Exchange (SSE), a market not widely studied in this context, thus reducing data-snooping biases. The small number of traded stocks makes it easier to have full control over the creation of index returns. In addition, SSE is a limit order market, eliminating specialist trading strategies as the source of observed autocorrelation. The properties of index return autocorrelation are similar to those found for other stock markets. It is thus likely that the key empirical results will carry over to other markets.

Index return autocorrelation on the SSE is high, and depends on (among other things) realised return, volatility, trading volume and day-of-the-week. The same patterns are found for individual stock returns. This is inconsistent with popular explanations of index return autocorrelation and therefore it is concluded that the observed autocorrelation patterns are best explained as the result of trading strategies such as feedback trading.

## 2. Some earlier empirical evidence

Table 1 gives a sample from the rich earlier empirical evidence of autocorrelation in daily stock returns. Index return autocorrelation is predominantly positive, regardless of country or sample period.\(^1\)

The evidence of autocorrelation in individual stock returns is less consistent. US studies report average autocorrelations close to zero (e.g. Atchison et al., 1987). Later work shows that the level of autocorrelation is increasing in firm

\(^1\) Empirical evidence is given by, e.g., Koutmos (1997). Positive index return autocorrelation is also observed for other return frequencies, from intraday to monthly returns. See, for example, Stoll and Whaley (1990) for intraday returns and Lo and MacKinlay (1990) for weekly and monthly returns.
size and significantly positive for larger stocks (Chan, 1993; Sias and Starks, 1997). Säfvenblad (1997a) reports similar results for French stocks.

In less liquid markets, positive return autocorrelation for stocks has been documented in several markets, including Austria (Huber, 1997), Finland (Berglund and Liljeblom, 1988), Israel (Ronen, 1998), Malaysia and Singapore (Laurence, 1986).

3. Data

The sample consists of daily returns and trading volume for 62 major stocks traded on the SSE over the period 1980–1995. The stocks were selected from all traded stocks based on sample length (more than ten years) and trading volume (highest), including all listed share classes of each company. The sample covers approximately 90% of total trading volume on the exchange. Data series were collected from Findata. Details on individual stocks are available in Säfvenblad (1997b).

Stocks are split into three groups, Large, Medium and Small, according to average trading volume. For each of these groups, results are reported for the average of individual stocks as well as for an equally weighted index. Results are also reported for All, the average of all stocks and a corresponding index. For individual stocks, non-trading and ex-dividend days (annual) have been omitted and only closing traded prices are used. For index returns, non-trading

<table>
<thead>
<tr>
<th>Source</th>
<th>Series</th>
<th>Sample period</th>
<th>Index returns</th>
<th>Stock returns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atchison et al. (1987)</td>
<td>CRSP</td>
<td>1978–81</td>
<td>0.17**</td>
<td>0.02</td>
</tr>
<tr>
<td>Berglund and Liljeblom (1988)</td>
<td>Helsinki</td>
<td>1977–82</td>
<td>0.49**</td>
<td>0.32**</td>
</tr>
<tr>
<td>Chan (1993)</td>
<td>Smallest NYSE decile</td>
<td>1980–89</td>
<td>–0.09**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Largest NYSE decile</td>
<td>1980–89</td>
<td>0.05</td>
<td></td>
</tr>
<tr>
<td>Lo and MacKinlay (1990)</td>
<td>CRSP small stocks</td>
<td>1962–87</td>
<td>0.35</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CRSP large stocks</td>
<td>1962–87</td>
<td>0.35**</td>
<td></td>
</tr>
<tr>
<td>Ronen (1998)</td>
<td>Tel Aviv</td>
<td>1987</td>
<td></td>
<td>0.15**</td>
</tr>
<tr>
<td>Säfvenblad (1997b)</td>
<td>Paris small stocks</td>
<td>1991–95</td>
<td>0.04*</td>
<td>–0.12**</td>
</tr>
<tr>
<td></td>
<td>Paris large stocks</td>
<td>1991–95</td>
<td>0.16**</td>
<td>0.07**</td>
</tr>
<tr>
<td>Comparison: this paper</td>
<td>Stockholm small stocks</td>
<td>1980–95</td>
<td>0.24**</td>
<td>0.08**</td>
</tr>
<tr>
<td></td>
<td>Stockholm large stocks</td>
<td>1980–95</td>
<td>0.30*</td>
<td>0.15**</td>
</tr>
</tbody>
</table>

*Estimates and significance levels as reported in cited articles. Where significance levels were not reported, they were calculated using asymptotic standard errors.

**Significantly different from zero at the 0.05 level.

***Significantly different from zero at the 0.01 level.
days are filled in with the closing bid quote and dividends are reinvested without transaction costs.  

4. Possible explanations of return autocorrelation

Swedish index returns are strongly positively correlated. Table 2 reports an index return autocorrelation of 0.345 for the *All* portfolio. For individual stocks, autocorrelation is significantly positive and much higher than reported in studies on US data. As for French and US stocks, autocorrelation is increasing in trading volume; the average autocorrelation for the stocks in *Small* is 0.084, and 0.153 for the stocks in *Large*.

This result indicates that Swedish stock returns are generally positively autocorrelated, but that larger bid–ask spreads induce negative return autocorrelation for smaller stocks. The positive autocorrelation is incompatible with most models of price formation, including non-synchronous trading, time-varying expected returns and transaction costs. Models of limit order markets, such as that of Kyle (1989), can only accommodate *negative* return autocorrelation for individual securities. This result thus provides support for the feedback trading hypothesis.

4.1. Non-synchronous trading

The most prominent explanation of index return autocorrelation is non-synchronous trading (Fischer, 1966; Scholes and Willams, 1977). In a pure non-synchronous trading model, it is assumed that stock returns are continuous processes sampled whenever the stocks are traded. As all stocks do not trade simultaneously (synchronously), there will be some outdated stock prices whenever a stock index is compiled. This measurement delay will result in positive return autocorrelation. Lo and MacKinlay (1990) show that the autocorrelation in daily index returns will be roughly equal to the average daily non-trading of component stocks.  

Non-synchronous trading adds to the measured index return autocorrelation, but the extant literature suggests that non-synchronous trading can explain only parts of the observed autocorrelation. This conclusion is reached by Atchison et al. (1987), Lo and MacKinlay

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2 Filling in the individual stock price series with bid quotes will introduce negative return autocorrelation in the index return series (Berglund and Liljeblom, 1988). This problem is relatively minor for the index series, and filling in the index series with bid quotes does not change any of the conclusions of the paper.

3 Boudoukh et al. (1994) show that higher autocorrelation may be obtained if non-trading is concentrated to, e.g., high volatility stocks. There are no indications of such trading patterns in the Swedish sample.
The same conclusion holds for the Swedish data. Measured autocorrelation is significantly higher than that predicted by the level of non-trading. The autocorrelation of the Small portfolio is seemingly in accordance with the non-trading probabilities of component stocks (non-trading 24.6%, autocorrelation 0.238), but if the index is created without filling in bid-quotes for non-trading days, autocorrelation rises to 0.386. For the portfolio Large the discrepancy between non-trading and autocorrelation is quite large; autocorrelation is 0.301 while non-trading is 5.7%, much too low to credibly explain the observed index return autocorrelation.4

4.2. Time-varying expected returns

According to the hypothesis of time-varying expected returns, the observed autocorrelation can be attributed to systematically varying risk premia (for

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Table 2
First autocorrelation of stock returns^a

<table>
<thead>
<tr>
<th>Sample</th>
<th>Index returns</th>
<th>Stock returns</th>
<th>Number of stocks</th>
<th>Non-trading (%)^b</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\hat{\beta}_1$</td>
<td>$T^d$</td>
<td>$\hat{\beta}_1$</td>
<td>$T^i$</td>
</tr>
<tr>
<td>Large</td>
<td>0.301**</td>
<td>3671</td>
<td>0.153**</td>
<td>2659</td>
</tr>
<tr>
<td></td>
<td>(0.024)</td>
<td></td>
<td>(0.036)</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>0.302**</td>
<td>3672</td>
<td>0.096**</td>
<td>2419</td>
</tr>
<tr>
<td></td>
<td>(0.025)</td>
<td></td>
<td>(0.025)</td>
<td></td>
</tr>
<tr>
<td>Small</td>
<td>0.238**</td>
<td>3691</td>
<td>0.084**</td>
<td>1710</td>
</tr>
<tr>
<td></td>
<td>(0.027)</td>
<td></td>
<td>(0.027)</td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>0.345**</td>
<td>3677</td>
<td>0.110**</td>
<td>2245</td>
</tr>
<tr>
<td></td>
<td>(0.024)</td>
<td></td>
<td>(0.017)</td>
<td></td>
</tr>
</tbody>
</table>

^aRegression model: $r_t = \beta_0 + \beta_1 r_{t-1} + \epsilon_t$. Regressions use least squares estimation with asymptotic White standard errors (in parentheses). Sample period 1 January 1980–31 December 1995. The reported number of observations also apply to Table 3.

^bAverage daily non-trading.

^cRegression estimates from least squares estimation with asymptotic White standard errors (in parentheses).

^dNumber of daily observations.

^eAverage of individual regression estimates. Sample standard error of mean in parentheses.

^fAverage number of daily observations.

**Significantly different from zero at the 0.05 level.


The same conclusion holds for the Swedish data. Measured autocorrelation is significantly higher than that predicted by the level of non-trading. The autocorrelation of the Small portfolio is seemingly in accordance with the non-trading probabilities of component stocks (non-trading 24.6%, autocorrelation 0.238), but if the index is created without filling in bid-quotes for non-trading days, autocorrelation rises to 0.386. For the portfolio Large the discrepancy between non-trading and autocorrelation is quite large; autocorrelation is 0.301 while non-trading is 5.7%, much too low to credibly explain the observed index return autocorrelation.4

4 That the portfolio Large has higher return autocorrelation than the portfolio Small contrasts findings of Boudoukh et al. (1994) and McQueen et al. (1996), who find significantly higher autocorrelation for portfolios of smaller US stocks. There is positive cross-autocorrelation between portfolio returns, therefore the portfolio All has higher return autocorrelation than the sub-portfolios.
example Campbell et al., 1993; Conrad, 1988). Time-varying expected returns could account for the similarity between autocorrelation in stock returns and stock index returns. However, as concluded by Ogden (1997), Sias and Starks (1997), and McQueen et al. (1996), the model cannot credibly explain the observed levels of autocorrelation in daily returns. The high autocorrelation will, for example, imply highly negative risk premia after days of negative stock returns.

4.3. Transaction costs

Cohen et al. (1980), Mech (1993) and Ogden (1997) argue that transaction and information costs can lead market makers to base their quotes on a limited information set, for example only the “own” order flow. Quotes will be inefficient, but the market makers’ losses are limited by the spread which reduces the possible profits other market participants can make from arbitrage. Transaction costs can result in autocorrelated index returns. However, the hypothesis does not address the issue of autocorrelation in individual stock returns.

The transaction cost argument has not been analysed theoretically for the auction market setting. However, there are two reasons to believe that transaction costs are less likely to cause autocorrelated index returns in an auction market. First, traders are not only passive price takers, they are also de facto market makers (whenever they submit limit orders). The spread “earned” when submitting limit orders will balance the spread “paid” when submitting market orders, reducing average transaction costs. Second, there are no specialists with predetermined single-stock trading strategies. All market participants have similar access to information and can submit market and limit orders for all stocks. 5

4.4. Feedback trading

In the non-synchronous trading model, prices are explicitly modelled as efficient, and returns on individual stocks are therefore not serially correlated. The most common type of trading model leading to such prices is a competitive rational expectations equilibrium, REE (Hellwig, 1980; Kyle, 1985). In the case of a non-competitive REE market, prices will exhibit “bid–ask bounce”, resulting in negative return autocorrelation (Kyle, 1989). The negative return

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5 Short term price inefficiencies arise even in a frictionless auction market. If securities trade exactly simultaneously, information revealed in the price will be used to update prices of other securities. Depending on assumptions, this can result in both positive and negative index return autocorrelation (Säfvenblad, 1997a).
autocorrelation imposes transaction costs on non-informational trades, increasing returns to liquidity provision. Although trade-to-trade returns are negatively autocorrelated, so-called “feedback trading” can introduce positive autocorrelation in returns measured over longer intervals (Sentana and Wadhwani, 1992).

Feedback trading includes several well-known trading strategies, such as profit taking, herding, contrarian investment and dynamic portfolio reallocation. If the structure of feedback trading is consistent across stocks, similar autocorrelation patterns will result in both stock and index returns. In the case of positive feedback trading, traders buy after price increases (similar to herding), while in the case of negative feedback trading, traders sell after price increases (similar to profit taking). Positive feedback trading results in negative return autocorrelation while negative feedback trading results in positive return autocorrelation. The autocorrelation observed in the Swedish market could thus be the result of negative feedback trading.

5. Further empirical evidence

5.1. Autocorrelation conditional on past returns

An observed regularity in index return autocorrelation is that autocorrelation tends to be high following on positive returns. This has been documented for index returns from the US (Sentana and Wadhwani, 1992), Australia, Belgium, Germany and Japan (Koutmos, 1997) and France (Säfvenblad, 1997b). The asymmetry is also present in the Swedish sample. For the portfolio All autocorrelation is 0.330 following a day of high returns, but only 0.118 following a day of low returns (Panel a, Table 3). The pattern is similar for individual stocks, with an average autocorrelation of 0.126 following high returns and −0.015 following low returns. These observations are consistent with asymmetric feedback trading; profit taking following on prices increases, but not on price declines. Since net stock holdings are positive, there will be more “winners” after a day of good stock market performance and most profit

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6 That individual investors engage in feedback trading is documented by e.g. Sias and Starks (1997), Gompers and Metrick (1998) and Odean (1998).

7 The following example gives the intuition. After a day of strong market performance, a number of traders are left with positive positions and profits that they wish to close before the trading day ends. This selling, negative feedback trading, will lead to a price pressure that will lead closing prices to be biased downward relative to public information. This bias will be recovered the following day, resulting in positive expected returns conditional on positive returns, that is, positive return autocorrelation.

8 Koutmos (1997) rejects asymmetry for Italy and the UK.
taking should be expected after such days. As a result, autocorrelation in measured returns would tend to be more positive after price increases. Such trading patterns have been documented empirically by Odean (1998), and can also be motivated by the predictions of prospect theory (Kahneman and Tversky, 1979).

### Table 3
Autocorrelation conditional on preceding day’s return, trading volume and day-of-the-week \(a\)

<table>
<thead>
<tr>
<th></th>
<th>Index returns (\hat{\beta}_{1}^{b})</th>
<th>Stock returns (\hat{\beta}_{1}^{c})</th>
<th>(\hat{\beta}_{2}^{b})</th>
<th>(\hat{\beta}_{2}^{c})</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>High</td>
<td>(-\hat{\beta}_{1}^{b})</td>
<td>(-\hat{\beta}_{1}^{c})</td>
</tr>
<tr>
<td><strong>Panel a: Following on low or high return</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large</td>
<td>0.083</td>
<td>0.319**</td>
<td>(-0.236**</td>
<td>0.021</td>
</tr>
<tr>
<td></td>
<td>(0.053)</td>
<td>(0.043)</td>
<td>(0.068)</td>
<td>(0.015)</td>
</tr>
<tr>
<td>Medium</td>
<td>0.052**</td>
<td>0.278**</td>
<td>(-0.226**</td>
<td>(-0.024)</td>
</tr>
<tr>
<td></td>
<td>(0.090)</td>
<td>(0.051)</td>
<td>(0.103)</td>
<td>(0.014)</td>
</tr>
<tr>
<td>Small</td>
<td>(-0.023)</td>
<td>0.249**</td>
<td>(-0.272</td>
<td>(-0.040)</td>
</tr>
<tr>
<td></td>
<td>(0.083)</td>
<td>(0.048)</td>
<td>(0.096)</td>
<td>(0.027)</td>
</tr>
<tr>
<td>All</td>
<td>0.118</td>
<td>0.330**</td>
<td>(-0.212*</td>
<td>(-0.015)</td>
</tr>
<tr>
<td></td>
<td>(0.077)</td>
<td>(0.046)</td>
<td>(0.090)</td>
<td>(0.011)</td>
</tr>
<tr>
<td><strong>Panel b: Following on low or high absolute return</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large</td>
<td>0.402**</td>
<td>0.193</td>
<td>0.209**</td>
<td>0.244**</td>
</tr>
<tr>
<td></td>
<td>(0.071)</td>
<td>(0.028)</td>
<td>(0.076)</td>
<td>(0.056)</td>
</tr>
<tr>
<td>Medium</td>
<td>0.341**</td>
<td>0.161**</td>
<td>0.180*</td>
<td>0.211**</td>
</tr>
<tr>
<td></td>
<td>(0.071)</td>
<td>(0.042)</td>
<td>(0.082)</td>
<td>(0.054)</td>
</tr>
<tr>
<td>Small</td>
<td>0.300*</td>
<td>0.106</td>
<td>0.194*</td>
<td>0.243**</td>
</tr>
<tr>
<td></td>
<td>(0.066)</td>
<td>(0.042)</td>
<td>(0.078)</td>
<td>(0.070)</td>
</tr>
<tr>
<td>All</td>
<td>0.543**</td>
<td>0.210</td>
<td>0.333**</td>
<td>0.233</td>
</tr>
<tr>
<td></td>
<td>(0.073)</td>
<td>(0.037)</td>
<td>(0.082)</td>
<td>(0.035)</td>
</tr>
<tr>
<td><strong>Panel c: Following on low or high market trading volume</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large</td>
<td>0.299**</td>
<td>0.119**</td>
<td>0.180</td>
<td>0.159**</td>
</tr>
<tr>
<td></td>
<td>(0.045)</td>
<td>(0.039)</td>
<td>(0.060)</td>
<td>(0.037)</td>
</tr>
<tr>
<td>Medium</td>
<td>0.291**</td>
<td>0.049</td>
<td>0.242**</td>
<td>0.074**</td>
</tr>
<tr>
<td></td>
<td>(0.054)</td>
<td>(0.063)</td>
<td>(0.083)</td>
<td>(0.023)</td>
</tr>
<tr>
<td>Small</td>
<td>0.161*</td>
<td>0.050</td>
<td>0.111</td>
<td>0.041</td>
</tr>
<tr>
<td></td>
<td>(0.078)</td>
<td>(0.060)</td>
<td>(0.098)</td>
<td>(0.023)</td>
</tr>
<tr>
<td>All</td>
<td>0.328**</td>
<td>0.118</td>
<td>0.210*</td>
<td>0.090**</td>
</tr>
<tr>
<td></td>
<td>(0.064)</td>
<td>(0.053)</td>
<td>(0.083)</td>
<td>(0.016)</td>
</tr>
</tbody>
</table>

\(a\) Regression model: \(r_{t} = \beta_{0} + (\beta_{1} D_{1,t-1} + \beta_{2} D_{2,t-1}) r_{t-1} + \epsilon_{t}, D_{1,t}, (D_{2,t})\) is a dummy variable for low (high) returns/absolute returns/market trading volume. Panel c: Trading volume uses logarithms of daily trading volume, detrended using a centred 20 trading day moving average.

\(b\) Regression estimates from least squares estimation with asymptotic White standard errors (in parentheses).

\(c\) Average of individual regression estimates. Reported significance levels test whether the mean is different from zero using the sample standard deviation (in parentheses).

\* Significantly different from zero at the 0.05 level.

\** Significantly different from zero at the 0.01 level.
5.2. Autocorrelation conditional on absolute returns

When volatility is high, index return autocorrelation can be expected to be low. The cost of pricing errors will be high, and, as trading volume tends to be high, non-trading is low. That autocorrelation is lower conditional on high volatility has been observed for most major stock markets (cf. Sentana and Wadhwani, 1992; Koutmos, 1997). Swedish index returns exhibit similar characteristics (panel b, Table 3). For All autocorrelation is 0.543 following a low volatility day but only 0.210 following a high volatility day.

The more interesting result is, however, that a similar pattern is obtained for individual stocks. Average autocorrelation for the stocks in All is 0.233 following a low volatility day and 0.052 following a high volatility day. This result cannot be explained by the transaction cost hypothesis. Interpreted within the feedback trading model, the results imply uninformed buying after large market rises and uninformed selling after large market declines.

5.3. Autocorrelation conditional on trading volume

In REE models, such as Admati and Pfleiderer (1988), trading volume is a measure of the amount of information revealed in trading. Therefore, prices realised in high trading volume tend to be better estimates of the underlying, or “true”, value of securities. In the same vein, Foster and Viswanathan (1993) show that trading volume is positively correlated with the precision of the informed trader’s signal, and the resulting price precision. Similarly, in the model of Campbell et al. (1993), high trading volume makes the aggregate risk aversion more easily observable. The same prediction is also made by the non-synchronous trading hypothesis. High trading volume reduces the non-synchronicity of prices and resulting index return autocorrelation.

The prediction is supported by the results in panel c of Table 3. Autocorrelation after high volume days is significantly lower for all investigated index series. For the portfolio All, autocorrelation is 0.328 following a low volume day, but only 0.118 following a high volume day. Again, a similar pattern is observed for individual stocks, in particular for the most liquid stocks. For the stocks in Large, average autocorrelation is 0.159 following a low volume day, but only 0.077 following a high volume day. These results are qualitatively similar to those reported by Campbell et al. (1993) for US data.

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9 Other sources of trading volume, such as portfolio rebalancing or liquidity trading, will generally only contribute small portions of total trading volume. Particularly, as non-informational demand “attracts” informed trading (Admati and Pfleiderer, 1988).

10 Following Campbell et al. (1993) the market trading volume is used.
5.4. Autocorrelation conditional on day-of-the-week

Several authors have documented that index return autocorrelation is particularly high between Friday and Monday returns.\(^{11}\) This effect is interesting since it is unrelated to the non-synchronous trading or transaction cost hypotheses of return autocorrelation. The upcoming weekend implies a period of non-trading, but this should not affect trading volume or transaction costs. The high Friday autocorrelation is confirmed for all four portfolios (Table 4). Autocorrelation for the All portfolio is 0.466 following a Friday compared to 0.175 following other days.\(^{12}\) The same pattern extends to individual stock returns, 54 out of the 62 stocks exhibit higher autocorrelation on Fridays, on average 0.130 compared to 0.039 for other days.

The results further strengthen the conclusion that the same factors drive autocorrelation in index returns and individual stock returns. In particular, the results strengthen the case for negative feedback trading as it is reasonable to believe that traders who follow a profit taking strategy want to close their positions before the weekend.

6. Conclusion

This paper relates the time series properties of index return autocorrelation to that of individual stocks. The data used is from a relatively small stock exchange, with a fairly high degree of non-trading. This may be the reason why Swedish index returns exhibit higher autocorrelation than, for example, US returns. Still, the return, volatility, trading volume and day-of-the-week dependence of autocorrelation is similar to that observed in US and other markets. This makes it more likely that the results carry over to other markets.

The four specifications studied in this paper yield similar results for both types of autocorrelation. Non-synchronous trading and transaction costs add to the observed level of index return autocorrelation but cannot address the autocorrelation properties of individual stock returns. Therefore these hypotheses are rejected.

The observed patterns of autocorrelation have sensible explanations within the feedback trading framework. Therefore, the paper supports feedback trading as the cause of index return autocorrelation. This suggests that future

\(^{11}\) See Boudoukh et al. (1994) for US data, Säfvenblad (1997b) for French data and Nordén (1992) for Swedish data.

\(^{12}\) The results in Table 4 are qualitatively similar when controls are made for trading volume, returns and volatility.
empirical work on return autocorrelation could focus on the trading and ownership patterns of investors groups.

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