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The Finnish Stock Market: A Survey of Some Empirical Evidence and its Practical Relevance

ABSTRACT

This paper reviews some of the main results of the 88 refereed journal articles authored or co-authored by the researchers of the University of Vaasa that empirically investigate the behavior of the Finnish stock market. The studies are divided into three main categories: market microstructure; asset pricing models and fundamentals; and the predictability of stock returns. Several institutional characteristics and results that are specific to the Finnish stock market are reported. Also the practical relevance of the empirical findings are discussed from the perspectives of researchers, corporate financial managers and investors.

Key words: *Finnish stock markets; stock prices; microstructure, fundamentals, anomalies*

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1. INTRODUCTION

It is a common belief among market participants that small security markets, such as the Helsinki Stock Exchange (HSE), behave more inefficiently than the major markets. This is, for instance, because of considerable information asymmetries between informed and uninformed traders, often less restrictive trading rules, and less developed institutions for investment analysis in small markets. For international investors small markets are interesting, because they may provide considerable diversification benefits. Although some recent studies find that the co-movements between Finnish and global markets may have increased in recent years,[1] the diversification benefits are still apparent.[2] It seems that foreign investors have recently recognized these benefits in Scandinavian markets, because foreign investors' holdings in small Scandinavian markets have considerably increased in the 1990s.[3]

This study provides a review of the empirical evidence on the behavior of the Finnish stock market. By this way, the paper updates the first extensive survey on early Finnish stock market research by Martikainen, Yli-Olli and Gunasekaran (1991a). The review includes the empirical research that has been carried out at the University of Vaasa, which is the most active research institution in terms of internationally published studies on the Finnish stock market. The list of references includes studies in which at least one reseacher from the University of Vaasa participates as an author or co-author. These studies include, among others, 77 articles in refereed international journals, 11 articles in Finnish journals and numerous other publications including, for instance, 6 doctoral dissertations.[4] The main focus of the paper is on the Helsinki Stock Exchange (HSE), but also the Finnish Options Market (FOM) is included when investigating the relationships between stock and derivatives markets.[5] Updating the review of Martikainen, Yli-Olli and Gunasekaran (1991a) is interesting, not only because of the tremendous changes in the Finnish stock market is the 1990s, but also because of the dramatically increased empirical evidence regarding the Finnish stock market in the current decade.

1 See e.g., Booth, Martikainen and Puttonen (1993) and Bos et al. (1995).
2 See Booth and Martikainen (1997), who review the diversification benefits from a Scandinavian perspective.
3 Up to 1993 two broad classes of shares existed in the Finnish stock market: unrestricted and restricted shares. The restricted stocks could be purchased only by domestic investors, while the unrestricted shares could be bought by both domestic and overseas investors. Booth, Chowdhury and Martikainen (1994) report empirical evidence supporting the hypothesis that foreign investors were willing to pay a premium for the unrestricted stocks because of the diversification benefits they offered. Consistent with these findings, Martikainen, Perttunen et al. (1994b) show that the underlying factors for restricted and unrestricted stocks were different. As noted by Booth, Kallunki et al. (1997b), the abolition of foreign ownership restrictions and the consequent increase of foreign ownership led to considerably improved liquidity and decreased bid-ask spreads in the HSE.
4 Most of the empirical research carried out at the University of Vaasa uses Finnish data. Examples of empirical studies that are using solely non-Finnish data include Luoma et al. (1994), Martikainen, Perttunen and Gunasekaran (1994), Booth, Chowdhury and Martikainen (1996), Booth, Chowdhury et al. (1997) and Martikainen (1997a,c,d).
5 HSE and FOM decided to merge their activities in July 1997.

The rest of this paper is organized as follows. Section 2 provides a general description of the Finnish markets, focusing especially on trading mechanisms and some issues of market microstructure. The third section discusses risk measurement problems, asset pricing models and fundamental variables explaining stock prices in Finland. The fundamental variables of interest are earnings, dividends, macroeconomic variables and international relationships. The fourth section reviews the results concerning the predictability of Finnish stock returns, in terms of their time-series dependence, seasonality and cross-sectional predictability. The fifth section discusses the main empirical results from the viewpoint of decision makers. Finally, the sixth section concludes the paper by providing an outlook for the future.

2. TRADING MECHANISMS AND SOME ISSUES OF MARKET MICROSTRUCTURE

2.1. Trading Mechanisms in the Helsinki Stock Exchange

Deregulation of capital movements and the innovation of new financial products have led to sharper competition between both financial institutions and different national market places.[6] To meet the international requirements, the Security Market Act went into effect in 1989 to improve investor protection in Finland. Another major change that took place almost at the same time was the implementation of the entirely new trading and information system HETI (Helsinki Stock Exchange Automated Trading and Information Systems), which replaced the old "calling out" system, in which trades were auctioned issue by issue in the same order every day. In the new system trading starts with an opening call in order to fix opening prices for the day (pre-trading). The unmatched orders from the pre-trading form the basis for the continuous (free) trading session, where trades are either round-lot or odd-lot trades. This is followed by the after-hours (batch) trading that continues in the next morning before the next day's pre-trading. In after-hours trades, the price limits set in the continuous trading session must be followed so that the trades have to be carried out inside the maximum price range bounded by the closing bid-ask spread.

The upstairs market (prearranged trades) in the HSE refers to the market for buyers and sellers who negotiate off the exchange floor. The downstairs market refers to the exchange floor where trades are anonymously executed (batch and continuous). Brokers/dealers on the upstairs market may use the price information provided from the downstairs market to set the price schedule, and vice versa. According to the rules set by the Financial Supervision Author-

6 Booth, Glascock et al. (1994) provide a description of the liberalization of Finnish financial markets and Kallunki and Martikainen (1997a) provide an example of how it affected stock prices through firms' changing capital structure.

ity brokers are not allowed to make an upstairs trade that is not the "best" price for a customer. A typical approach by brokers is to execute upstairs trades within or at the downstairs market's inside spread.

In 1993–95 about 74 percent of the trading took place in the continuous trading session and 26 percent in the after-hours market, the proportion of pre-trading being very small.[7] At the same time, the upstairs trades represented almost half of the total number of stocks traded in the HSE in the continuous trading session. Much of the trading in the upstairs market takes place as internalized trades, where the brokerage house is the same on both sides of the transaction. Booth, Kallunki et al. (1997a) report that about 97.5 percent of the trades were internalized in the upstairs market of the HSE during the continuous trading sessions in 1993–95. The respective figure for the after-hours trading session was 73.1 percent. They also find that the largest brokerage houses are most likely to internalize their trades, obviously because of their good customer contacts and large inventory. Given the different types of trading mechanisms in upstairs and downstairs trades, it can be assumed that their price effects are different. Indeed, Booth, Lin et al. (1997) find that upstairs trades tend to have lower information content and lower price impacts than downstairs trades. The evidence is consistent with the hypothesis that the upstairs market is better in pricing uninformed liquidity trades. It also seems that the permanent price effects of individual trades are significantly larger for large than for small trades suggesting that the Finnish market cannot accommodate large trades without price pressure. The findings suggest that the economic benefits of upstairs trades depend on price discovery occurring in the downstairs market, implying that the interdependency between liquidity trading and price discovery is one of rationales for the co-existence of upstairs and downstairs markets.

These empirical findings indicate that much of the trading in the HSE takes place as inhouse trades, the same broker acting in both sides of the transaction. It appears that the downstairs market is more responsible for price discovery than the upstairs market. This suggests that researchers should, when investigating price discovery using short return intervals, such as intraday returns, pay attention to the role of the individual trades, i.e. through which market mechanism the trade has taken place. The finding that the Finnish stock market may not be able to accommodate large trades without price pressure is of great interest particularly to large investors.

2.2. Clustering of Stock Prices

Since the beginning of 1996, the Rules and Regulations of the Helsinki Stock Exchange specify that the minimum price variation, i.e. the tick size, is FIM 10 for stocks at or above FIM 1,000,

7 See Booth, Kallunki et al. (1997a).

10 pennies for stocks under FIM 1,000 and at or above FIM 10, and one penni for stocks under FIM 10. However, the minimum ticks are not used very commonly in the HSE. Booth, Kallunki et al. (1997a), for instance, find that on trades between FIM 60.00–60.90, about 72 percent of the trades were made at FIM 60.00 and 18 percent at FIM 60.50 in 1993–95. They also report that infrequent trading is an important determinant of price clustering in the HSE. Moreover, they suggest that the level of price clustering is positively correlated with the standard deviation of returns and market price per share, and negatively related to the size of the trade.

The high level of observed discreteness in Finnish stock prices has important implications for empirical research using data measured at short return intervals (such as transaction data) in small markets. The discreteness increases the variance of observed returns and induces negative autocorrelation to return series. The methods correcting the discreteness in measuring variance and serial covariance may thus be of great importance when transaction data is used in Finland. Moreover, from the perspective of the market place, the results indicate that it is unlikely to get traders to use more precise bid and ask prices by decreasing the rules for minimum tick size in the HSE. Therefore, this would probably not be sufficient to lower the internationally high bid-ask spreads in the Finnish stock market.[8]

2.3. Relationship between Stock and Derivatives Markets

Considerable empirical evidence suggests that derivatives prices lead the underlying cash index prices in all major markets. This appears to be the case also in Finland. While the lead-lag effect in the U.S. market seems to be only a few minutes, the respective figure in Finland may be as long as 1–2 days.[9] There are several plausible reasons for this lead-lag effect. These include lower transaction costs on derivatives and less restrictive rules on short selling.[10] Moreover, it has been suggested that the infrequent trading of the component stocks in the cash index might explain the effect. The Finnish results suggest, however, that the effect is visible for both frequently and infrequently traded stocks, suggesting that the effect is not due only to nonsynchronous trading.[11] It may also be possible to predict the levels and volatilities of Finnish index prices by using derivatives market information.[12]

The long lead-lag effect between cash and derivatives markets has interesting implications for investors. It may be useful for investors to follow the behavior of derivatives markets

8 See Booth, Kallunki et al. (1997b) for an analysis of Finnish bid-ask spreads over time.
9 See e.g. Puttonen (1993), who, because of the current unavailability of transaction data, uses daily data for this purpose.
10 See Puttonen and Martikainen (1991) for the impact of short selling restrictions on the pricing of Finnish stock index futures. Nowadays the restrictions are abolished, but short selling is still costly.
11 See Martikainen, Perttunen and Puttonen (1995a).
12 See Martikainen and Puttonen (1994a), who employ GARCH models for this purpose.

when making their investment decisions in the stock market. They may also want to follow options trading volume to support their decision making. While the volumes of futures and stocks as such seem not to be valuable in predicting stock returns per se[13], the index options' call and put volumes can be used to predict Finnish cash prices.[14] This finding may also be used as a basis for profitable trading strategies.

3. ASSET PRICING MODELS AND FUNDAMENTAL VARIABLES EXPLAINING STOCK PRICES

3.1. Measuring Risk

Most of the work focusing on measuring risk in the Finnish stock market investigates second or higher moments of returns, market model betas or Arbitrage Pricing Theory (APT) systematic risk components. As an exception, Martikainen (1995) describes the results of the investigation on extreme price behavior of the FOX index for 1988–95.[15] The use of extreme value statistics permits the extrapolation of the empirical observations to theoretical extremes. These extrapolated results are capable of yielding information on extreme events that have not yet occurred. The results suggest that a daily price change of at least 13 percent that took place during the October Crash in 1987 happens on average once in every 13 years. This suggests that although large price changes are not common, they are not impossible in the HSE even in the future.

3.1.1. Measuring Betas

There are various reasons why beta estimates measuring the asset sensitivity to the stock market are biased and dependent on the return interval. To illustrate, infrequent trading may cause downward bias in betas estimated on short return intervals. Because of thin trading, the "true" covariance between the returns of the asset and the market portfolio is underestimated. Since the beta coefficient embodies this covariance in its numerator, downward bias is obvious. Moreover, if the degree of serial correlation is not the same across stocks[16], betas may be sensitive to the return interval because for buy-and-hold returns the covariance of an asset's return with the market and the variance of the market return do not increase proportionately.

13 See e.g., Martikainen, Puttonen et al. (1994) and Östermark, Martikainen and Aaltonen (1995). They find that returns per se, i.e. r_t, are not predictable, while their absolute values, i.e. $|r_t|$, are at least to some extent.
14 See Martikainen and Puttonen (1995, 1996b,c).
15 See also Booth, Broussard et al. (1997) for similar results on stock index futures prices.
16 This finding is empirically supported with respect to Finnish data by Martikainen and Perttunen (1995), who report that the serial correlation is related to trading frequency and/or firm size.

Several studies suggest that the beta estimates should be corrected for nonsynchronous trading when daily data is employed.[17] One procedure for this is to accommodate price adjustment delays following the approach presented by Cohen, Hawawini, Maier, Schwartz and Whitcomb in 1983. Kallunki and Martikainen (1997c) report that the employment of this approach while taking into account price adjustment delays of three days improves the estimated covariances as much as 360–490 percent for the most infrequently traded Finnish stocks in 1990–93. The respective figure for the most frequently traded stocks is about 100 percent.

Martikainen and Perttunen (1995) use return intervals from one week up to six months when measuring betas. All 24 continuously listed stocks for the period 1970–90 are analyzed. The stocks are classified into three equally-weighted portfolios based on the average market value of equity during the period. The average market value is measured by using the consumer price index deflated annual equity figures. Returns on individual stocks are measured by logarithmic price index differences adjusted for cash dividends, stock dividends and right issues assuming that all proceeds from a given stock are reinvested in the same stock with no transaction costs. When no trade has occurred, the true price has been proxied by the bid quotation.[18] A value-weighted market index is used when measuring market returns. The results show clear return interval effects on betas, especially for the portfolio of small firms. While the beta of the portfolio of small stocks for the daily return interval is about 0.56, it increases to 0.84 when the return interval of two months is used. For longer return intervals similar remarkable changes do not continue. In general, the results cast serious doubt on the use of betas based on short return intervals in Finland. Even betas based on monthly return intervals seem to be clearly underestimated for small stocks.[19]

The misestimation of betas has several interesting implications for both practitioners and researchers. Martikainen (1995) discusses some of these in the context of mutual fund investors.[20] He presents the betas for mutual funds using daily, weekly and monthly return intervals.[21] The biggest difference in these betas is reported for Odin, whose betas are 0.177 and 0.744, for daily and monthly return intervals, respectively. In general, the estimated abnormal

17 See e.g., Luoma, Martikainen and Perttunen (1993a, 1993b, 1996) and Luoma et al. (1994). They provide and analyze numerous ways to take into account the estimation bias caused by infrequent trading using daily data.

18 See Kallunki (1997b) and Kallunki and Martikainen (1997c) on the impact of different return calculation methods due to non-existing data on Finnish return characteristics.

19 Kallunki (1996a) reports that the misestimation of betas may explain at least some of the estimated price adjustment delays in the Finnish stock market. Accounting-based risk measures may eliminate some of the observed delay (see Kallunki, 1997c and Kallunki and Martikainen, 1997d).

20 See Kytonen, Martikainen and Yli-Olli (1994) for a description of other problems in the Finnish mutual fund industry.

21 See also Martikainen and Perttunen (1991) and Martikainen (1991b) for additional evidence on return interval effects on Finnish betas.

returns for mutual funds are overestimated when daily or weekly return intervals are used to estimate betas. Moreover, the differences between betas based on daily and monthly return intervals vary considerably across mutual funds, obviously because some funds invest in small stocks more than the others.

3.1.2. Measuring APT Risk Components

Similar to market model betas, there exist serious problems due to nonsynchronous trading for the estimated systematic risk componens of the APT. When using the factor analytic approach commonly applied in the literature, it appears that the factors produced by daily, weekly and monthly return intervals significantly differ from each other.[22] An exception is the first factor, which is identified as the market index for securities. It also appears that systematic risk components on the first factor are underestimated because of infrequent trading.[23]

When investigating the APT risk components using pre-specified macroeconomic components, it appears that the values of asset sensitivities for common price factors, such as unexpected inflation, interest rates and gross domestic product, are rather unstable over time. Moreover, the estimated factors are not necessarily the same when different estimation methods are employed.[24]

3.2. Asset Pricing Models

Similar to the results in most major markets, the explanatory power of the various versions of the main asset pricing models, the Capital Asset Pricing Model (CAPM) and APT, remain low in Finland. Moreover, the estimated risk premia are often negative or statistically insignificant. Malkamaki (1993) reports that the estimation results are slightly more encouraging when time-varying betas are used instead of traditional ordinary least squares market model betas, but the estimated risk premia still remain insignificant. Moreover, Martikainen, Virtanen and Yli-Olli (1993a, 1993b) suggest that the explanatory power of the CAPM on Finnish asset returns is only modestly improved when its multi-market version including Swedish and U.S. returns is employed.

Several tests of the APT suggests that there exist more than one common factor in Finnish stock returns. This is evident in tests where the underlying factors are estimated using explorative factor analysis on stock returns or using pre-specified macroeconomic variables

22 See Martikainen, Perttunen et al. (1994a), and also Kallunki and Martikainen (1997c) for the use of daily data on estimating APT systematic risk components in Finland.
23 See Martikainen, Perttunen at al. (1996) and Kallunki and Martikainen (1997c).
24 See Martikainen and Yli-Olli (1991) and Martikainen, Yli-Olli and Gunasekaran (1991b).

to define the underlying factors of the APT.[25] In general, the results suggest that two or three common factors can be found from monthly stock returns. However, similar to the results based on the CAPM, the explanatory power of the APT remains weak and considerable instabilities are observed in the estimated parameter values. Moreover, several anomalies discussed below are discovered even after employing APT systematic risk components to control for systematic risk.

There are various plausible reasons why the asset pricing models appear not to capture much of the cross-sectional variation of stock returns in Finland. The two most common of these presented in the literature are the serious risk estimation problems and some form of market inefficiency in Finland. It remains to be seen whether the structural changes and increased trading volumes lead the asset pricing models to work better in the Finnish stock market. Given the evidence from international markets, this is not likely to happen in the near future. Therefore, researchers may want to try to develop more complicated asset pricing models in the future. Meanwhile, practitioners may exploit inductive models, in addition to the theoretical ones, to define the cost of capital and expected returns, for instance.

3.3. Earnings Explaining Stock Prices

Surveys of Finnish investors indicate that Finnish investors regard published financial statements as useful sources of information to support their decision making.[26] Since Finnish accounting rules have provided the firms with exceptionally large opportunities to smooth income intentionally, practitioners as well as researchers typically adjust reported earnings to describe better the "economic reality".[27] Studies usually report correlations that are far below unity between reported earnings and the earnings adjusted according to the recommendations of the Corporate Committee for Financial Analysis.[28] Moreover, the reported earnings of Finnish firms are typically close to zero and have low variability over time. This is because taxation is based on the reported earnings figures and the tax rate has been higher than in many other western countries. As a result, Finnish firms have incentives to systematically reduce reported earnings figures to avoid taxes. Therefore, the reported earnings as such have little information content for investors.[29] Also, Finnish investors seem to, at least to some extent, be

25 See e.g., Yli-Olli, Virtanen and Martikainen (1990), Martikainen, Yli-Olli and Gunasekaran (1991b), Yli-Olli and Virtanen (1992) and Booth, Martikainen et al. (1993).
26 See e.g. Havunen and Yli-Olli (1985).
27 See Booth, Kallunki and Martikainen (1996a), Kallunki and Martikainen (1997e) and Kallunki, Martikainen and Martikainen (1997) for the impact of income smoothing on the relationship between stock returns and accounting earnings.
28 See Martikainen, Ankelo and Ruuhela (1990), who compare the ability of earnings adjusted for alternative depreciation methods to explain stock returns.
29 See Martikainen, Ankelo and Ruuhela (1990), and Booth, Kallunki and Martikainen (1997), among others.

able to capture the temporary components of earnings that are not important in generating firms' future cash flows.[30]

Similar to extensive U.S. results, most of the earnings information is already reflected in stock prices before the annual earnings figures are released.[31] This is naturally because of auxiliary sources of information, such as interim reports and corporate earnings forecasts.[32] This is consistent with the hypothesis that stock prices adjust more rapidly to new information than accounting earnings that are based on the historical valuation of assets. As a matter of fact, Finnish stock returns appear to lead accounting earnings, on average, by at least one calendar year.[33] A detailed analysis in this respect is provided by Kallunki and Martikainen (1997d), who study how accounting earnings are associated with stock prices on a monthly basis by using a window of several years around earnings announcements.

Much of the recent international research on the relationship between stock returns and accounting earnings study the earnings response coefficients (ERCs), which are typically measured as the slope coefficient between stock returns and appropriately scaled unexpected earnings. Similar to earlier U.S. findings, it appears that the time-series variation of ERCs can be explained by macroeconomic factors, especially interest rates being negatively related to ERCs.[34] This is consistent with the hypothesis that earnings reflect investors' future cash flow expectations that are discounted to the current period of time.[35]

While most of the research on the relationship between accounting data and stock prices focuses on accounting earnings or cash flows, there is also evidence that non-earnings data may convey relevant information. Martikainen (1990) reports that profitability, operating leverage, financial leverage and growth are all associated with stock returns and systematic risk in the long run.[36] When investigating their incremental significance, financial leverage appears to have the most information content.[37] The relationship between stock returns and most financial ratios seems to vary across the years, however.[38]

30 Martikainen, Kallunki and Perttunen (1997) discover that accounting losses are less significantly associated with returns than profits, supporting the earlier U.S. findings of their temporary nature by Martikainen (1997a). Martikainen (1997b) divides losses into temporary and permanent losses and finds significant differences in their information content.

31 See, for instance, Martikainen, Rothovius and Yli-Olli (1993), who also compare the relative and incremental information content of cash flows and dividends in this context.

32 Booth, Brockman et al. (1997) study the analysts' forecast errors for annual earnings figures in Finland.

33 See Martikainen and Puttonen (1993).

34 See Martikainen, Yli-Olli and Gunasekaran (1993).

35 See e.g., Yli-Olli (1978, 1981), Laitinen (1991) and Suvas (1994a,b) for theoretical earnings- based valuation models.

36 See also Martikainen (1989, 1991a, 1992, 1993).

37 The importance of financial leverage explaining stock returns in Finland is highlighted by Yli- Olli (1982), Martikainen and Yli-Olli (1990) and Kallunki and Martikainen (1997a), among others.

38 See Salmi, Virtanen and Yli-Olli (1997).

In general, the results suggest that investors should follow the earnings figures of Finnish firms. Because of the peculiar Finnish accounting practices, it is important to adjust the reported earnings correctly and pay attention to their temporary components. Also non-earnings accounting figures may be useful in this context. The interest should be, however, mostly in earnings expectations rather than their past behavior.

3.4. Macroeconomic Variables

It is generally accepted by practitioners and researchers that stock prices are influenced by a number of different macroeconomic factors. However, it is not easy to argue theoretically that the relation between the stock market and certain macroeconomic variables would be entirely in one direction. Moreover, as reported already by Virtanen and Yli-Olli (1987), lagged stock market returns seem to outperform exogeneous macroeconomic variables in predicting Finnish asset returns. Regarding the exogeneous variables in their model, the surrogate of the aggregated future cash flows measured as the anticipated order stock in Finnish industrial firms appeared to have most incremental explanatory power. In more recent studies, Martikainen and Yli-Olli (1991) and Martikainen Yli-Olli and Gunasekaran (1991) suggest that the relationship between macroeconomic variables and stock returns appears to be rather unstable by nature.

To sum up, empirical results from the Finnish stock market seem to suggest that the relation between macroeconomic variables and stock returns is rather sample-specific and time-variant. Further empirical evidence on macroeconomic issues on stock markets is, therefore, obviously needed. Especially, how the stock market reacts to specific unexpected macroecomic news would be of great interest.

3.5. International Relationships

The economically, although often statistically significant, low relationships between Finnish and international markets are observed in several studies.[39] To illustrate, Booth et al. (1997) investigate the dynamic interaction in daily value-weighted returns of the most frequently traded stocks in Scandinavian stock markets in 1988–94. They discover strong linear dependencies in returns, possibly because of time-varying risk premia, market inefficiency or infrequent trading (see below). The volatility behavior represents the often observed phenomenon of volatility clustering. The results indicate that the price and volatility spillovers between these markets

39 See e.g., Virtanen and Yli-Olli (1987), Yli-Olli, Virtanen and Martikainen (1990), Malkamäki, Martikainen and Perttunen (1991), Martikainen and Puttonen (1991), Booth, Martikainen et al. (1993), Malkamäki et al. (1993), Booth, Martikainen and Puttonen (1993), Martikainen, Virtanen and Yli-Olli (1993a,b), Puttonen (1993), Malkamäki (1993), Martikainen and Puttonen (1994b), Knif, Pynnönen and Luoma (1995, 1996), Bos et al. (1995), Pynnönen, Knif and Luoma (1996), Booth and Martikainen (1997), Booth, Martikainen and Tse (1997) and Pynnönen and Knif (1997).

remain low, though in some cases statistically significant. Sweden appears to be the leading market. Moreover, there exists a high level of asymmetry between good and bad news, volatilities responding more strongly to market retreats than to market advances. Of the Scandinavian markets, the Finnish market appears to be the least dependent on other markets.

It appears that the relationships between non-Scandinavian markets and Finland are even lower than those of the Scandinavian and Finnish markets. The observed relationships are somewhat stronger when futures market data is analyzed.[40] Also, when the analysis is performed on an industry level, the observed international relationships are slightly stronger.[41] It remains to be seen whether the increased foreign ownership strengthens the international relationships between national market places in the future.

4. PREDICTABILITY OF FINNISH STOCK RETURNS

4.1. Time-Series Dependence of Returns

Numerous studies suggest that the most important characteristics found in the time-series properties of returns in major markets can be found also in Finnish stock market returns. Most notably, Finnish asset returns do not follow the normal distribution, being skewed and leptokurtic. There is also significant autocorrelation both in derivatives and stock returns, today's returns being forecastable by yesterday's returns. Finnish returns also exhibit autoregressive conditional heteroskedastic (ARCH) and generalized ARCH (GARCH) effects.

Virtanen and Yli-Olli (1987) use ARIMA methodology to (i) analyze to what extent, and in which form the monthly and quarterly Finnish stock market prices are predictable, (ii) to compare the forecasting results based on the univariate time-series analysis and multivariate econometric models with each other, and (iii) to develop composite stock price forecasting models. Both theoretically and statistically satisfactory models to forecast Finnish asset returns are developed.[42] Booth et al. (1992) continue the stochastic modeling by exploiting various non- linear models. It appears that GARCH and ARCH effects are clearly observable in Finnish data.[43] It also seems that the time-series predictability is further improved by including index futures in the analysis.[44]

40 See Martikainen and Puttonen (1991), Booth, Martikainen and Puttonen (1993) and Martikainen and Puttonen (1994b), who compare the results of Granger causality and cointegration tests between the different Finnish market places and major stock markets.

41 See Bos et al. (1995), who report that there are some statistically significant relationships between Finnish and U.S. industry returns, while the market index returns are not significantly related to each other.

42 See also Yli-Olli and Virtanen (1987).

43 See also Booth, Martikainen, Sarkar et al. (1994) for the evidence on some other non-linear models explaining Finnish asset returns.

44 See Martikainen and Puttonen (1994a).

It is important to notice that the time-series dependence and predictability of asset returns do not necessarily indicate market inefficiency of any form. The strong linear and non-linear dependencies may also be due to, for instance, time-varying risk-premia and infrequent trading. Therefore, the observed results are not necessarily indicating excess risk-adjusted profits in the Finnish stock market.

4.2. Seasonal Anomalies

Several studies suggest that asset returns exhibit seasonal patterns in all major stock markets. Most of them are observed also in Finland.[45] Martikainen and Puttonen (1996a) investigate the day-of-the-week (DOW) effect suggesting low returns in the beginning of the week in the Finnish stock and stock index derivatives markets during 1988–90. In the cash market, significant negative Tuesdays and Wednesdays are observed. Meanwhile, negative Mondays are strong in index derivatives markets. The authors hypothesize that the increase in self-initiated sell orders by small investors during the weekend causes negative Mondays in large markets. They also suggest that the increased selling pressure may be reflected in thin cash markets with a lag because of infrequent trading. This is also supported by the observation that if the cash market returns are adjusted for the lagged derivatives returns, the Tuesday and Wednesday effects disappear in the cash markets.[46]

Martikainen, Perttunen and Puttonen (1995b) investigate the turn-of-the-month (TOM) effect indicating high returns at the TOM in the Finnish stock, stock index options and stock index futures markets.[47] While the results on individual days suggest that the most significant return for cash markets is found on the last trading day of the month, the futures and put-call parity implied returns suggest the effect to be most significant one day earlier. For all markets, the effect is found to be significant: the average daily returns during the 10 days around the TOM are higher than in the rest of the month. A similar effect is also found in the implied volatilities, as well as in the call-put ratios in the options market. This suggests that investors may have more positive expectations at the TOM than in the rest of the month. Booth, Kallunki and Martikainen (1996b) report that this is mainly because of the trading behavior of large traders. They also observe that the TOM effect is strongest for the most frequently traded stocks.

45 As an exception, Martikainen (1996) reports that the so-called holiday effect is weak in Finland.

46 These results are supported by Kallunki and Martikainen (1997b), who, using intraday data, report that the DOW effect may indeed exist because of the increased selling pressure of small traders.

47 Martikainen, Perttunen and Ziemba (1994) find that the TOM effect exists for most of 24 different stock markets and 12 regions investigated. The effect is clearly observable in large markets, such as the U.S. and U.K., but less observable in smaller markets including Finland. They state that this may be because of three main reasons: (i) the short sample period 1988–1990 used, (ii) the small number of stocks and infrequent trading in the indices investigated, and (iii) measuring the TOM only between the last trading day of the month and the four first trading days of the month.

The Finnish turn-of-the-year (TOY) or monthly effect indicating high returns in January corresponds closely to those obtained for other exchanges around the world. A major difference in Finland, however, appears to be that the TOY effects and monthly seasonalities are similar for both small and large firms.[48]

4.3. Cross-Sectional Anomalies

4.3.1. Earnings Anomalies

The post-announcement drift of accounting earnings found in the U.S. stock market by several researchers suggests that, after the earnings are announced, the risk-adjusted returns of firms reporting positive earnings surprises seem to outperform the unexpected returns of those reporting negative earnings surprises. In Finland it appears that most of the return difference during the post-announcement period is due to the market reaction to the earnings surprises of the firms that do not have smooth income series.[49] Hence, at least a portion of the post-announcement drift in Finland can be explained by information processing costs. This hypothesis is supported by findings that the reaction of small investors is delayed around earnings announcements in Finland.[50] Alternatively, the drift may exist because of incorrectly measured abnormal returns.[51]

Several studies suggest that there exists a distinct positive relation between E/P ratios and average returns in excess of those predicted by the CAPM. To illustrate, Kauppi and Martikainen (1994) investigate the existence of the E/P anomaly in the Finnish stock market in 1975–90. All continuously listed stocks are included in the analysis. Three portfolios are created based on the E/P ratios and are rebalanced annually in the beginning of April. Only the portfolio which includes firms with high E/P ratios has both positive market- and sample-adjusted returns. The cumulative return difference between the extreme portfolios during the 15-year period is approximately 60 percent. Even after taking into account transaction costs, the return difference between portfolios is clearly above 50 percent. The difference cannot be explained by the difference in systematic risk between the extreme portfolios. The market model betas for the portfolios of high and low E/P ratio firms are 0.81 and 0.77, respectively. A similar effect is reported for the Cash Flow/Price-ratio.

The accounting-related instrumental risk variables including financial and operating leverage, growth and accounting betas can explain a substantial part of the differences in E/P ratios between firms. Therefore, the observed E/P anomaly may at least partly be because of

48 See Kauppi and Martikainen (1994).
49 See Booth, Kallunki and Martikainen (1996a).
50 See Booth, Kallunki and Martikainen (1996c).
51 See Kallunki (1996b), who suggests some accounting-based risk measures for this purpose.

the serious risk estimation problems using market-based data in Finland.[52] On the other hand, the anomaly may exist because the realized returns used in the cross-sectional asset pricing tests are noisy measures of the expected returns.[53] Moreover, consistent with U.S. results, it appears that the E/P-anomaly may be closely related to the size effect discussed below.[54]

4.3.2. Dividends

As noted by Yli-Olli (1982), Finnish firms have traditionally (especially in the 1970s and 1980s) aimed to pay out constant dividends. In fact, most of the dividend increases of listed companies have taken place through share issues, rather than increases in dividend per share. The steady dividend stream has been demanded especially by large institutional owners for various reasons. These include the problems of selling large blocks in the HSE because of thin trading and the need of financial institutional owners to fund their operations by cash dividends.

Martikainen, Rothovius and Yli-Olli (1993) investigate the individual and incremental significance of dividends paid in Finland in 1974–87. They find out that a simple trading strategy in which stocks that have increased dividends per share are bought and stocks that have decreased dividends are sold yields abnormal returns. They also report that dividends may be incrementally important with respect to earnings and cash flows when making portfolio strategies in Finland. It remains to be seen how the internalization of the ownership in listed Finnish firms changes the role of dividend policy and information content in dividends.

4.3.3. The Size Effect

In Finland the size effect, i.e. the smaller the market value of equity, the larger the expected rate of return on a stock, other things being equal, is reported in several studies. For instance, Kauppi and Martikainen (1994) test a simple trading strategy based on this anomaly using Finnish data for 1970–90. Three portfolios based on the market value of the last trading day of the previous year are created and rebalanced annually. The results suggest that a portfolio consisting of the largest firms has performed much worse than the market in general, having a cumulative market adjusted-return of –75 percent. On the other hand, a portfolio comprised of the smallest firms gained a market-adjusted return of 120 percent during the period. Differences in systematic risk cannot explain the effect since the portfolio of small stocks had a smaller beta (0.516) than the portfolio of large firms (0.984). The differences are clearly over and above transaction costs.

52 See Martikainen and Gunasekaran (1994).
53 See Kallunki (1997a).
54 See Booth, Martikainen et al. (1994) for similar findings in U.S. and Finnish markets. Perttunen and Martikainen (1990) investigate the functional form and proportionality of Finnish E/P ratios.

Martikainen, Perttunen and Puttonen (1995c) report that yesterday's returns of large stocks can predict the returns of small stocks in Finland. However, they also find that the prices of small and large stocks are cointegrated. Cointegration indicates that the prices of large and small stocks have a common trend in the long run. The authors suggest that this observed cointegration may indicate that the measured co-movements of Finnish stocks are underestimated when short return intervals, such as daily returns, are used.[55]

5. IMPLICATIONS FOR DECISION MAKERS

5.1. Financial Managers

The results of the empirical financial market research have numerous implications for corporate financial managers. Various textbooks suggest that managers should employ asset pricing models, such as the CAPM or APT, to calculate the cost of capital for investments. However, various studies in Finland as well as in major markets report that the risk measurements based on asset pricing models do not capture the cross-sectional variation of asset returns equally well as several other variables, such as earnings, E/P ratios, book-to-market ratios, financial leverage or firm size. Therefore, financial managers may want to include these factors when calculating firms' cost of capital.

The empirical results may also have implications for firms' financial decisions. Assuming that the stock market is behaving efficiently, the market value of the firm reflects the present value of firm's expected future cash flows. However, similar to various studies abroad, several studies suggest that the assumption of market efficiency may not hold in Finland. This has direct implications for the financing decisions of the firm. In an inefficient market, a firm's stock is either under- or overpriced with respect to its future cash flow expectations. Assuming that the managers know more of the current status of the firm than the market, managers may want to issue either debt or equity. If the firm's stock is under/(over)valued, managers should favor debt (equity) over equity (debt) financing.

5.2. Investors

Investors interested in Finnish stocks should pay attention to some issues that are characteristic to the Finnish market. Most notably, thin trading and poor liquidity cause several problems for investors. Because of liquidity problems, the market may not accommodate large trades without price pressure. Thin trading causes also problems, for instance, when calculating the risk and abnormal returns for individual securities or mutual funds. Moreover, market indices

55 See also Martikainen, Perttunen et al. (1994b) for the cointegration of Finnish dual class shares.

consisting of even the most frequently traded Finnish stocks are biased because of infrequent trading. Poor liquidity, of course, also leads to high bid-ask spreads in the HSE.

Despite the low trading volume, the Finnish stock market research suggests that there are several fundamentals, such as earnings, dividends, macroeconomic factors, financial leverage, operating leverage and growth, that are important determinants of stock prices in Finland. Moreover, there seem to exist systematic patterns in asset returns that may be used to support portfolio decisions when estimating risks and expected returns on securities.

There may also be possibilities for profitable trading strategies, because asset returns seem to be partly predictable both over time (time-series dependence, seasonalities) and cross-sectionally (E/P anomaly, firm size, dividends). However, as discussed above, there are various plausible explanations for these phenomena. Therefore, the results do not necessarily indicate that investors would gain abnormal risk-adjusted returns using these trading strategies.

Finally, the Finnish market returns seem to be only weakly correlated with returns in major markets. Consequently, international diversification may be a very useful for Finnish investors. For this purpose, mutual funds investing in international markets may be especially attractive.

6. CONCLUDING REMARKS

This paper reviews Finnish stock market research carried out at the University of Vaasa and discusses its practical implications for researchers, investors and financial managers. There are several changes that have recently occurred or are about to happen that may affect the price behavior of the Finnish stock market. Most notably, the foreign ownership has increased considerably in Finland, largely due to the abolition of foreign ownership restrictions in 1993. Moreover, with the Economic and Monetary Union's (EMU) elimination of much of the currency risk, probably by the end of this century, portfolio diversification for international investors and intra-European capital raising will be easier. These effects will be reinforced by the likely harmonization of accounting standards throughout Europe. It can be presumed that the international ownership will strengthen the relationship of the Finnish stock market to major markets in the near future and consequently considerably change the behavior of the HSE.

Another interesting recent development is the EU directive on investment services, which permits brokerage firms in one country to conduct business on another country's exchange. This may encourage Scandinavian as well as non-Scandinavian brokers to have seats in more than one Scandinavian exchange. For instance, Sweden is currently actively courting foreign brokers. The same brokers operating in different stock exchanges may further increase the similarities in excess returns in different countries. This may also further improve the information

dissemination across markets. It is an interesting task for researchers working with Finnish data to investigate how these changes will affect the HSE. ■

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