Journal of Business Finance & Accounting, 33(7) & (8), 961–978, September/October 2006, 0306-686X
doi: 10.1111/j.1468-5957.2006.00620.x

The Free Cash Flow Anomaly Revisited: Finnish Evidence

Annukka Jokipii and Sami Vähämaa*

Abstract: This paper examines the performance of an investment strategy based on free cash flows using financial statement data of Finnish companies during the period 1992-2002. The analysis in this paper is motivated by the so-called free cash flow anomaly previously documented e.g. in Hackel, Livnat and Rai (2000). Using annual financial statement information, we identify large-capitalization companies with positive free cash flows, low free cash flow multiples, and low financial leverage. Since a portfolio of these companies is found to consistently outperform the market index, our results suggest that the free cash flow anomaly also exists in the Finnish stock market.

Keywords: free cash flow, anomaly, stock returns, investment strategy, portfolio management

1. INTRODUCTION

Previous studies have identified many anomalies in cross-sections of average stock returns (see Hawawini and Keim, 1995, for a survey). An extensive literature shows that stock returns are related to variables such as firm size (Banz, 1981), financial leverage (Bhandari, 1988), and earnings-to-price (Basu, 1983) and book-to-market-equity ratios (Fama and French, 1992). Yet another, although somewhat less well-known, asset pricing anomaly has been documented in Hackel, Livnat and Rai (1994 and 2000) and Hackel and Livnat (1995). These studies demonstrate that an investment strategy based on free cash flows can consistently outperform the market portfolio and several other benchmarks. Moreover, the empirical findings provided in Hackel et al. (2000) indicate that this free cash flow anomaly is not related to any of the previously documented cross-sectional anomalies. The basic approach underlying Hackel et al. (1994 and 2000) and Hackel and Livnat (1995) is not, however, completely novel. Several authors have previously shown that financial statements contain useful information beyond the bottom line earnings figure for explaining future stock returns (see e.g., Lipe, 1986;

* The authors are both from the Department of Accounting and Finance, University of Vaasa, Finland. They would like to thank an anonymous referee, Erkki K. Laitinen, Jiri Novak, and participants at the 2005 European Accounting Association Conference for valuable comments and suggestions. They also gratefully acknowledge Joshua Livnat for his encouraging comments on a very first draft of this paper. (Paper received March 2005, revised version accepted January 2006. Online publication August 2006)

Address for correspondence: Sami Vähämaa, Department of Accounting and Finance, University of Vaasa, P.O. Box 700, FIN-65101 Vaasa, Finland.
e-mail: sami@uwasa.fi

Ou and Penman, 1989; and Ball, 1992). Furthermore, previous studies also demonstrate that cash flows contain incremental information over earnings for explaining the cross-sectional variation in stock returns (see e.g., Livnat and Zarowin, 1990; Ali, 1994; and Kallunki et al., 1998).

This paper re-examines the free cash flow investment anomaly documented by Hackel et al. (1994 and 2000) and Hackel and Livnat (1995) in a different market setting. In this paper, annual financial statement data of Finnish companies are used to identify large-capitalization companies with positive free cash flows, low free cash flow multiples, and low financial leverage. The use of data from the small and thinly traded Finnish stock market provides an expedient setting to examine whether the empirical findings documented in Hackel et al. (1994 and 2000) and Hackel and Livnat (1995) can be generalized. Furthermore, the accounting principles and financial reporting standards used in Finland also differ from those applied in the US. Most importantly, the Finnish accounting rules provide extensive opportunities for earnings management (see e.g., Booth et al., 1996). As noted by Hackel et al. (1994), the free cash flow investment strategy exploits the finding that instead of focusing on cash flows of a company, investors tend to be earnings-oriented. Since the reported accounting earnings in Finland are typically subject to earning management to a larger extent than in most other countries (Booth et al., 1996; and Kallunki et al., 1998), the free cash flow investment strategy may, *a priori*, be considered particularly attractive in the Finnish stock market. On the other hand, due to the small number of publicly traded companies, it may be difficult to reliably identify the consistent free cash flow generators among the companies, and hence the free cash flow investment strategy may not necessarily be successful in Finland.

Besides providing a backtest of the free cash flow anomaly with Finnish data, this paper also extends Hackel et al. (1994 and 2000) and Hackel and Livnat (1995) in several respects. First, we considerably simplify the portfolio selection rules applied by Hackel et al. (1994 and 2000) and Hackel and Livnat (1995). In this study, four simplistic portfolio selection criteria are used to identify large-capitalization companies with positive free cash flows, low free cash flow multiples, and relatively low financial leverage. Second, in order to ascertain whether the portfolio selection criteria may be even further simplified, we also analyze the incremental contribution of individual selection criteria on the performance of the free cash flow investment strategy. Furthermore, because the relative performance of different investment strategies is likely to be affected by market conditions, the performance of the free cash flow strategy is examined separately in bull and bear markets. Fourth, as Fama and French (1996) show that most of the previously documented cross-sectional anomalies may be explained by a three-factor asset pricing model, we apply the Fama-French methodology to examine the existence of the free cash flow anomaly. Finally, given that long-term stock returns tend to be non-Gaussian, the conventional test statistics applied in Hackel et al. (1994 and 2000) and Hackel and Livnat (1995) may lead to spurious inference. Therefore, to avoid problems caused by non-Gaussian return distributions, we apply recent bootstrapping techniques for statistical inference.

In brief, the empirical findings reported in this paper demonstrate that a portfolio of large-capitalization companies with positive free cash flows, low free cash flow multiples, and low financial leverage can consistently outperform the market portfolio. On average, the 12-month buy-and-hold return for the free cash flow portfolio exceeds the corresponding return for the market index by about 11.8%. Moreover, the cumulative

return for the free cash flow portfolio during the 11-year sample period is 614%, compared with the corresponding return for the market index of 144%. Even after taking into account the systematic risk and other known risk factors, the companies in the free cash flow portfolio still provide superior returns in comparison to the market index. These results are surprisingly similar to the empirical findings reported in Hackel et al. (1994 and 2000) and Hackel and Livnat (1995), and thereby confirm that investors can earn abnormal returns with investment strategies based on free cash flows. However, our results also demonstrate that most of the benefits of the free cash flow strategy may be captured simply by investing in companies with positive free cash flows. The performance of the strategy may then be fine-tuned by imposing additional selection criteria. Finally, our empirical findings suggest that the free cash flow investment strategy is particularly attractive in declining markets.

The remainder of this paper is organized as follows. Section 2 describes the data used in the empirical analysis. The portfolio formation rules applied to select the companies into the free cash flow portfolio are described in Section 3. The empirical findings and robustness checks on the performance of the free cash flow investment strategy are reported in Section 4. Finally, Section 5 provides concluding remarks.

2. DATA

The empirical analysis in this paper is performed using annual financial statement data of all publicly traded Finnish companies during the period 1992-2002. The financial statement data are obtained from the Thomson Financial Worldscope. In addition, monthly stock market data of publicly traded Finnish companies covering the period from June 1990 to May 2004 are used in the analysis. The HEX Portfolio Index is used as a benchmark portfolio. The HEX Portfolio Index reflects the price developments of stocks on the Main List of the Helsinki Stock Exchange. In this index, the weight of a company is limited to 10% of the total market capitalization of the index.[1] The stock market data for the years 1990-2000 are provided by the Helsinki Stock Exchange (HSE) and the data for the latter part of the sample period are collected from the Thomson Financial Datastream.

There are significant differences between the US and Finnish stock markets. Most importantly, the Finnish stock market is a very small market and consists mainly of relatively thinly traded stocks. The number of publicly traded companies listed on the HSE was only 139 at the end of 2004. Therefore, in comparison to the US stock markets of more than 12,000 firms, the Finnish stock market may be considered extremely small. It is also worth noting that the HSE has been very technology-oriented since the late 1990s and has one decidedly dominant company, Nokia Oyj, which accounts for more than 65% of the market capitalization of the HSE (see Junttila, 2003).

Besides the differences between the stock markets, the accounting principles and financial reporting standards used in Finland during our sample period have also differed from those applied in the US.[2] Moreover, there are important differences in the objectives of financial reporting between Finland and the US. Whereas the

1 A single company, Nokia Oyj, accounts for a vast proportion of the market capitalization of the HEX All-Share Index. Hence, instead of reflecting general market developments, the HEX All-Share Index tends to follow Nokia.

2 Booth et al. (1996 and 1997), Kallunki et al. (1998) and Kallunki and Martikainen (2003) provide reviews of Finnish accounting rules and income statements.

objective of financial reporting in the US is to produce information that is useful for making economic decisions, the Finnish accounting system endeavors to determine distributable profits, which include not only dividends to shareholders but also interest payments and taxes. Consequently, income statements have a major role in the Finnish accounting system. Another distinct feature of financial reporting in Finland is that the Finnish accounting rules provide extensive opportunities for earnings management, and thus the reported accounting earnings tend to be subject to earnings management to a larger extent than in most other countries (see e.g., Booth et al., 1996; and Kallunki et al., 1998). Due to these aspects, the use of Finnish data provides an expedient setting to examine whether the empirical findings documented in Hackel et al. (1994 and 2000) and Hackel and Livnat (1995) can be generalized.

3. PORTFOLIO SELECTION

Hackel et al. (1994 and 2000) and Hackel and Livnat (1995) show that a portfolio of companies with consistent free cash flows, low financial leverage and low free cash flow multiples substantially outperforms the market index and several other benchmarks. They select the companies for the portfolio based on six to seven selection criteria.[3] Considering the limitations of the Finnish data, we are forced to simplify and modify the selection criteria. In particular, in order to ensure that the number of companies included in the free cash flow portfolio is sufficiently large, only the four key criteria of Hackel et al. (1994 and 2000) and Hackel and Livnat (1995) are adopted in the portfolio selection.

In this paper, the companies included in the free cash flow portfolio are identified based on the following selection criteria:

(I) Free Cash Flow > € 0

(II) $5 < \dfrac{\text{Market Value}}{\text{Free Cash Flow}} < 30$

(III) $\dfrac{\text{Total Debt}}{\text{Free Cash Flow}} < 10$

(IV) Market Value > € 70 million.

As a result of applying these four selection criteria, a portfolio of large-capitalization companies with positive free cash flows, low free cash flow multiples, and low financial leverage is constructed. Free cash flow is usually defined as all cash generated by operations that can be distributed back to shareholders without affecting the current level of growth. Hence, it can be thought of as the after-tax cash flow that would be available to the company's shareholders if the company had no debt. In this paper, we follow the conventional definition of free cash flow, and estimate it as the net cash flow from operating activities minus capital expenditures. The net cash flow from operating activities, in turn, is defined as the sum of net income, all non-cash charges and credits

3 Most importantly, Hackel et al. (1994 and 2000) and Hackel and Livnat (1995) require that free cash flows are positive and have increased in most recent years. Furthermore, they require that the companies have low financial leverage and are priced at a reasonable level relative to the free cash flows they produce. Finally, Hackel and Livnat (1995) and Hackel et al. (2000) select only companies with large market capitalization.

(e.g., depreciation, amortization of intangibles, and deferred taxes), extraordinary items, and net change in working capital. It should be noted that, in contrast to Hackel et al. (1994 and 2000), we do not assume positive four-year average free cash flows, and moreover, we do not assume any growth in free cash flows. However, our requirement of positive free cash flow in only the most recent year is consistent with Hackel and Livnat (1995).

The selection criterion of a low free cash flow multiple is applied to ensure that the current stock price of the company is at a reasonable level relative to its free cash flows. The free cash flow multiple is estimated by the ratio of market value of equity to the free cash flow measure in the previous year. Hackel et al. (1994 and 2000) require that the free cash flow multiple is between 5 and 20, whereas Hackel and Livnat (1995) use an upper bound of 30. According to Hackel et al. (2000), the rationale for selecting an upper bound of 20 is that the median multiple of S&P 500 companies is around 25. In Finland, the median free cash flow multiples are typically relatively low, or even negative, because many companies have negative free cash flows. However, the median free cash flow multiples of companies with positive free cash flows were around 60-70 during the sample period. Initially, we adopted directly the upper bound of 20 used in Hackel et al. (1994 and 2000), but unfortunately the number of companies fulfilling this selection criterion was insufficient. Therefore, consistent with Hackel and Livnat (1995), an upper bound of 30 is applied in this paper. This upper bound for the free cash flow multiple is considered appropriate to ensure that the companies are priced at a reasonable level relative to the free cash flows they produce.

The criterion of a low debt multiple is applied to avoid selection of highly leveraged companies with an unfavorable debt capacity for the free cash flow portfolio. The debt multiple is estimated by the ratio of total debt to free cash flow. This criterion is adopted directly from Hackel et al. (1994 and 2000) and Hackel and Livnat (1995). Finally, the selection criterion of a market value of at least € 70 million is assumed to ensure that the portfolio consists of relatively large companies that are sufficiently traded. The market capitalization of a median company in the HSE during our sample period was about €96 million. Initially, we experimented with a lower bound of € 100 million, which would have been reasonably close to the median value, and also quite similar to the criterion applied in Hackel et al. (2000). However, this lower bound for market capitalization appeared to be too strict, as the number of companies fulfilling the criterion at the beginning of the sample period was too small. Consequently, to ensure that the free cash flow portfolio contains a reasonable number of companies, we were forced to loosen the lower bound of the selection criterion to € 70 million.

The free cash flow portfolio is formed at the beginning of June each year. On June 1, we calculate the free cash flows and estimate the free cash flow and debt multiples using the annual financial statements for the previous year and the current market values of the companies in order to identify the companies to be included in the free cash flow portfolio. In Finland, companies typically release their financial statements in February or March.[4] Therefore, we have at least two months to analyze the financial statement

4 The Finnish legislation requires publicly traded companies to publish their financial statements within three months of the end of the fiscal year-end. About 98% of the companies listed on the HSE have a December fiscal year-end, and thus these companies are required to release their financial statements before the end of March. The financial statements of the remaining 2% of the companies are published during the autumn, thus leaving us about 5 to 9 months to analyze these data before the portfolio formation date.

data before the portfolio formation date. After applying the portfolio selection criteria, we assume equal investments in each stock included in the portfolio, and a one-year buy-and-hold investment strategy.[5]

The number of companies fulfilling the selection criteria is relatively low in any year. On average, the free cash flow portfolio includes only 12 companies, and the number of companies ranged from 3 in 1992 to 16 in 2002.[6] However, the number of companies included in the portfolio may be considered quite large relative to the number of all publicly traded Finnish firms, as the portfolio includes, on average, about 10% of all companies listed on the HSE. This should be contrasted with the average portfolio size of 63 companies in Hackel et al. (2000), corresponding to less than 1% of all publicly traded companies in the US. Indisputably, the large amount of listed companies in the US enables Hackel et al. (2000) to apply much stricter criteria in portfolio selection, and thus enables them to identify the consistent cash flow generators among the companies more reliably. In any case, due to the low absolute number of companies included in the portfolio, the free cash flow investment strategy is likely to be more relevant for foreign investors who wish to hold some Finnish stocks than for Finnish investors who wish to have a well-diversified portfolio.

Descriptive statistics of the selection criteria for the free cash flow portfolio are reported in Table 1. The table reports median market values (in euro millions) and the free cash flow and debt multiples for the companies selected in the free cash flow portfolio and the corresponding medians for all publicly traded companies on the Helsinki Stock Exchange. The median market values of the companies in the free cash flow portfolio range from about €150 million in 1992 to about €970 million in 2000. As can be seen from the table, the median company in the free cash flow portfolio is always substantially larger than the market median. On average, the market value of the median company in the free cash flow portfolio is about four times higher than the market value of the median company on the HSE. Hence, the companies in the constructed portfolio may definitely not be considered small-capitalization firms.

Table 1 also shows that the median free cash flow multiple of the companies in the free cash flow portfolio is much higher than the median market multiple. Since a considerable number of companies listed on the HSE had negative free cash flows during the sample period, the reported median market free cash flow multiples are extremely low. It may also be noted from Table 1 that the median free cash flow multiple for the free cash flow portfolio appears to be relatively stable throughout the research period. This is in sharp contrast to the highly volatile median free cash flow multiple of the market portfolio. Like the free cash flow multiples, the median market debt multiples reported in Table 1 are also very low because many companies on the HSE had negative free cash flows during the sample period. Consequently, the median debt multiple of the companies in the free cash flow portfolio clearly exceeds the median market debt multiple.

Table 1 also reports the median free cash flow per share and the median dividend per share for the companies in the free cash flow portfolio and the corresponding

5 For instance, on June 1, 2003, we use data from the 2002 financial statements to construct the free cash flow portfolio, and then assume a 12-month buy-and-hold strategy from June 1, 2003 to May 31, 2004.

6 Although the number of companies included in the free cash flow portfolio is relatively low, the companies are still well spread across different industries. Hence, the performance of the free cash flow investment strategy should not be affected by industry specific risk factors.

Table 1
Descriptive Statistics

	Market Value		*FCF Multiple*		*Debt Multiple*		*FCFPS*		*DPS*		*P/E*		*Beta*
Year	*FCF*	*HSE*	*FCF*	*HSE*	*FCF*	*HSE*	*FCF*	*HSE*	*FCF*	*HSE*	*FCF*	*HSE*	*FCF*
1992	153.56	41.96	14.94	−1.18	2.69	−3.58	0.41	−0.27	0.21	0.04	13.06	−0.36	0.60
1993	291.13	73.33	14.57	5.01	7.22	1.80	1.52	0.11	0.29	0.10	15.27	12.84	0.70
1994	163.48	100.24	13.33	6.69	3.66	3.55	0.47	0.27	0.09	0.17	10.97	10.26	0.74
1995	283.23	84.60	14.99	2.67	2.82	0.46	0.85	0.10	0.32	0.25	9.17	9.13	0.77
1996	236.47	116.22	16.69	12.30	2.93	1.51	1.21	0.16	0.50	0.25	10.60	12.04	0.68
1997	324.60	125.30	20.62	8.74	5.03	1.23	0.92	0.08	0.48	0.34	12.13	12.80	0.71
1998	302.91	121.60	16.38	−1.02	4.01	−0.06	0.81	−0.01	0.62	0.29	13.90	13.34	0.63
1999	808.65	164.74	16.05	6.29	6.04	0.46	1.30	0.03	0.59	0.25	13.06	15.40	0.53
2000	966.91	91.26	12.69	−3.63	5.18	−0.75	0.88	0.01	0.53	0.22	10.20	10.37	0.44
2001	352.46	85.01	12.05	−1.79	2.97	−0.06	0.55	−0.01	0.34	0.22	14.28	10.16	0.56
2002	354.52	54.68	11.72	−0.89	4.43	−0.02	0.56	0.01	0.73	0.22	12.69	9.82	0.65

Notes:
The table reports medians of the portfolio selection criteria for the companies selected for the free cash flow portfolio (FCF) and the corresponding medians for all publicly traded companies on the Helsinki Stock Exchange (HSE). The free cash flow multiple (FCF Multiple) is the ratio of market value of equity to free cash flow. The debt multiple is the ratio of total debt to free cash flow. The table also reports the median free cash flow per share (FCFPS) and the median dividend per share (DPS) for the companies in the free cash flow portfolio and the corresponding market medians. The market values are reported in euro millions and the per share items in euros. Beta is estimated using the market model with monthly returns for the previous 36 months. The HEX Portfolio Index is used as a proxy for the market return.

market medians. The median free cash flow per share of the companies in the free cash flow portfolio is substantially higher than the median of the market portfolio. Interestingly, the median free cash flow per share for all companies on the HSE was negative in 1992, 1998 and 2001. The median dividend per share figures reported in Table 1 show that the companies in the free cash flow portfolio paid about twice the amount of dividends of the median market firm.[7] This is an important feature to note, given that dividends were tax free income to investors in Finland during the sample period. It can also be noted from Table 1 that the median P/E ratio of the free cash flow portfolio is not substantially different from the market median, except in 1992. Finally, Table 1 reports beta coefficients for the free cash flow portfolio. The reported betas are estimated using the market model with monthly returns for the previous 36 months and using the HEX Portfolio Index as a proxy for the market return. The betas have ranged from 0.44 to 0.77 during the sample period, and hence the companies in the free cash flow portfolio may be considered to have relatively low systematic risk. These low betas are in contrast to the close to unity betas reported in Hackel et al. (1994 and 2000).

4. RESULTS

(i) The Empirical Setup

The buy-and-hold returns for the free cash flow portfolio are calculated as the equally weighted average of returns for the individual stocks included in the portfolio. The performance of the free cash flow investment strategy in comparison to the HEX Portfolio Index is analyzed based on three different measures of abnormal returns (AR_1, AR_2, and AR_3). The first measure, AR_1, is the conventional market adjusted return, defined as:

$$AR_1 = R_{FCF} - R_M, \tag{1}$$

where R_{FCF} denotes the return on the free cash flow portfolio and R_M is the return on the HEX Portfolio Index. The second measure of abnormal performance, AR_2, is the market model adjusted return, calculated as:

$$AR_2 = R_{FCF} - \alpha - \beta R_M. \tag{2}$$

This measure of abnormal performance takes into account the systematic risk of the companies included in the free cash flow portfolio. Finally, the third measure employed

7 The median dividend yield for the free cash flow portfolio also exceeds the market median, thereby suggesting that the companies included in the portfolio may be classified as value stocks. Capaul et al. (1993) and Fama and French (1998), among others, have documented that value stocks significantly outperform growth stocks. Hence, the performance of the free cash flow strategy might simply be another manifestation of the value stock premium. However, the P/E ratios reported in Table 1 provide no evidence that the free cash flow portfolio would consist of value stocks, as the median P/E ratios for the portfolio are not systematically lower than the market medians. In any case, we employ the Fama-French (1993) three-factor model in the empirical analysis in order to ascertain that our results are not driven by the value premium. As shown by Fama and French (1996), this three-factor model is able to explain the outperformance of value stocks.

in the empirical analysis, $AR_{3,}$ is the Fama-French (1993) three-factor model adjusted return, defined as:

$$AR_3 = R_{FCF} - R_F - \beta\,(R_M - R_F) - \varphi SMB - \eta HML, \quad (3)$$

where R_f is the risk-free interest rate, SMB is the difference between the return on a portfolio of small stocks and the return on a portfolio of large stocks, and HML is the difference between the return on a portfolio of high book-to-market stocks and the return on a portfolio of low book-to-market stocks. Fama and French (1996) show that this three-factor asset pricing model can explain most cross-sectional anomalies documented in the finance literature.

The parameters for the market model and for the Fama-French three-factor model are estimated for each period using monthly stock returns for the previous 36-month period. In order to test whether the calculated abnormal returns are statistically significant, we apply conventional *t*-tests and bootstrapping with 10,000 resamplings.

(ii) Performance of the Free Cash Flow Investment Strategy

Table 2 reports the 12-month buy-and-hold returns for the free cash flow portfolio and the corresponding returns for the HEX Portfolio Index. As can be seen from the table, the mean (median) annual return for the free cash flow portfolio is about 23.3% (22.5%), while the mean (median) return for the HEX Portfolio Index is considerably lower, being about 11.5% (12.0%). The reported minimum and maximum returns also indicate that the free cash flow portfolio outperforms the market index. Table 2 moreover shows that the annual return for the free cash flow portfolio has been negative in only three investment periods out of 11, whereas the return for the HEX Portfolio Index has been negative in five periods, also including the three negative periods for the free cash flow portfolio. Interestingly, it may also be noted from the market adjusted returns that the HEX Portfolio Index outperformed the free cash flow strategy in four consecutive years during the bull market at the end of the 1990s, and altogether in 5 out of 11 years. During these five years, the market index outperformed the free cash flow portfolio on average by 8.3%. However, during the remaining six years the free cash flow strategy outperformed the HEX Portfolio index by an impressive average of 28.6%. Consequently, the results as a whole advocate the usefulness of the free cash flow investment strategy in the Finnish stock market.

The market adjusted returns reported in Table 2 confirm the superior performance of the free cash flow portfolio. The mean annual market adjusted return is 11.8%. A bootstrapping exercise suggests that this market adjusted return is statistically significant. However, perhaps due to the extremely small number of observations, we are unable to reject the null of zero mean with the conventional *t*-test. In order to take into account the systematic risk of the companies in the free cash flow portfolio, we also calculate market model adjusted returns. The mean market model adjusted return is about 14.0%. Both the parametric and the non-parametric *p*-values indicate that the free cash flow portfolio statistically significantly outperforms the market index even after taking into account the systematic risk. Moreover, even after taking into account the Fama-French (1993) size and book-to-market factors, the free cash flow portfolio still appears to slightly outperform the HEX Portfolio Index, with a mean estimate of

Table 2
Annual Returns

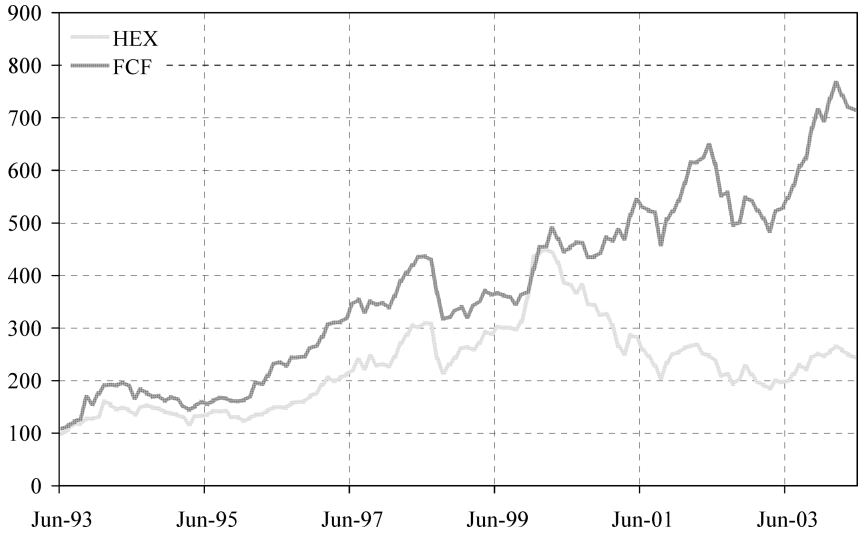
	FCF	*HEX*	AR_1	AR_2	AR_3
6/93–5/94	0.894	0.444	0.450	0.621	0.528
6/94–5/95	−0.154	−0.078	−0.076	−0.104	−0.058
6/95–5/96	0.446	0.120	0.325	0.351	0.274
6/96–5/97	0.380	0.418	−0.038	0.050	−0.032
6/97–5/98	0.361	0.424	−0.063	0.062	0.043
6/98–5/99	−0.165	−0.041	−0.124	−0.143	−0.121
6/99–5/00	0.225	0.341	−0.116	0.011	−0.002
6/00–5/01	0.221	−0.270	0.491	0.362	0.306
6/01–5/02	0.193	−0.122	0.314	0.233	0.063
6/02–5/03	−0.184	−0.207	0.023	−0.085	−0.049
6/03–5/04	0.351	0.239	0.112	0.180	0.021
Mean	0.233	0.115	0.118	0.140	0.088
Parametric *p*-value	(0.036)	(0.188)	(0.125)	(0.078)	(0.168)
Non-parametric *p*-value	(0.018)	(0.144)	(0.052)	(0.034)	(0.098)
Median	0.225	0.120	0.023	0.062	0.021
Minimum	−0.184	−0.270	−0.124	−0.143	−0.121
Maximum	0.894	0.444	0.491	0.621	0.528
No. of positive periods	8	6	6	8	6
No. of observations	11	11	11	11	11

Notes:
The table reports 12-month buy-and-hold returns for the free cash flow portfolio (FCF) and for the HEX Portfolio Index (HEX). The buy-and-hold returns are calculated as the equally weighted average of returns for the individual stocks in the portfolio. AR_1 is the market adjusted return, calculated as $R_{FCF} - R_M$, where R_{FCF} denotes the return on the free cash flow portfolio and R_M is the return on the HEX Portfolio Index. AR_2 is the market model adjusted return, calculated as $R_{FCF} - \alpha - \beta R_M$. AR_3 is the Fama-French (1993) adjusted return, calculated as $R_{FCF} - R_f - \beta(R_M - R_f) - \varphi\text{SMB} - \eta\text{HML}$, where R_f is the risk-free return, SMB is the difference between the return on a portfolio of small stocks and the return on a portfolio of large stocks, and HML is the difference between the return on a portfolio of high book-to-market stocks and the return on a portfolio of low book-to-market stocks. The parameters for the market model and for the Fama-French three-factor model are estimated with monthly returns for the previous 36 months. The parametric *p*-value for the null hypothesis of zero mean is based on a conventional *t*-test. The non-parametric *p*-value is obtained via bootstrapping with 10,000 resamplings.

8.8%. This mean Fama-French adjusted return, however, is statistically significant only at the 0.10 level.

Figure 1 plots the cumulative returns for the free cash flow portfolio and for the HEX Portfolio Index from June 1993 to May 2004. The figure evidently demonstrates that the free cash flow portfolio substantially outperformed the HEX Portfolio Index during the sample period. The cumulative 11-year return for the free cash flow portfolio is about 614% while the corresponding return for the HEX Portfolio Index is 144%. It may also be noted from Figure 1 that the HEX Portfolio Index clearly outperformed the free cash flow portfolio during the exceptionally optimistic growth period from spring 1999 until spring 2000. However, after the global stock market correction started in March 2000, the free cash flow portfolio continued to provide positive returns, and hence the gap between the cumulative returns plotted in Figure 1 widens significantly during the latter part of the sample period. From June 2000 to May 2004, the returns for the free cash flow portfolio are consistently higher than the returns for the market index.

Figure 1
Cumulative Returns on the Free Cash Flow Portfolio (FCF) and the HEX Portfolio Index (HEX)



As a result, the cumulative four-year return for the free cash flow portfolio of about 61% substantially exceeds the corresponding cumulative return for the HEX Portfolio Index of −37%.

Table 3 reports summary statistics of the monthly returns for the free cash flow portfolio and for the HEX Portfolio Index. The table shows that the mean (median) monthly return for the free cash flow portfolio is about 1.7% (1.8%), while the mean (median) monthly return for the HEX Portfolio Index is 0.9% (0.4%). As can be noted from the table, the mean monthly return of the market index is statistically insignificant. The outperformance of the free cash flow portfolio is also obvious in the reported minimum and maximum returns. Moreover, Table 3 demonstrates that the return for the free cash flow portfolio was positive for 83 months out of 132, while the return for the HEX Portfolio Index was positive for only 71 months. However, it may also be noted from Table 3 that the market index outperformed the free cash flow strategy in 69 out of 132 months. During these months, the average underperformance of the free cash flow portfolio is −2.8%, whereas the average outperformance of the portfolio during the remaining 63 months is 4.7%. These figures indicate that the distribution of monthly market adjusted returns is highly positively skewed,[8] and thus, the free cash flow strategy appears to outperform the market index overall. Interestingly, Table 3 also shows that the standard deviation of the monthly returns for the free cash flow portfolio is slightly lower than the standard deviation of the market index, thereby suggesting that the free cash flow portfolio contradicts the fundamental mean-variance theorem.

8 The skewness coefficient of the monthly market adjusted returns is 0.72.

Table 3
Monthly Returns

	FCF	*HEX*	AR_1	AR_2	AR_3
Mean	0.017	0.009	0.008	0.002	0.006
Parametric *p*-value	(0.002)	(0.127)	(0.000)	(0.000)	(0.000)
Non-parametric *p*-value	(0.004)	(0.124)	(0.038)	(0.386)	(0.056)
Median	0.018	0.004	−0.003	−0.003	0.001
Minimum	−0.145	−0.213	−0.135	−0.086	−0.103
Maximum	0.323	0.221	0.231	0.262	0.243
Standard deviation	0.061	0.067	0.007	0.001	0.005
No. of positive months	83	71	63	59	67
No. of observations	132	132	132	132	132

Notes:
The table reports monthly returns for the free cash flow portfolio (FCF) and for the HEX Portfolio Index (HEX). AR_1 is the market adjusted return, calculated as $R_{FCF} - R_M$, where R_{FCF} denotes the return on the free cash flow portfolio and R_M is the return on the HEX Portfolio Index. AR_2 is the market model adjusted return, calculated as $R_{FCF} - \alpha - \beta R_M$. AR_3 is the Fama-French (1993) adjusted return, calculated as $R_{FCF} - R_f - \beta(R_M - R_f) - \varphi\text{SMB} - \eta\text{HML}$, where R_f is the risk-free return, SMB is the difference between the return on a portfolio of small stocks and the return on a portfolio of large stocks, and HML is the difference between the return on a portfolio of high book-to-market stocks and the return on a portfolio of low book-to-market stocks. The parameters for the market model and for the Fama-French three-factor model are estimated with monthly returns for the previous 36 months. The parametric *p*-value for the null hypothesis of zero mean is based on a conventional *t*-test. The non-parametric *p*-value is obtained via bootstrapping with 10,000 resamplings.

The mean market adjusted return suggests that the free cash flow portfolio outperforms the market index by about 0.8% on a monthly basis. Both the parametric and the non-parametric *p*-values indicate that the outperformance of the free cash flow portfolio is statistically highly significant. The mean market model adjusted return is also positive, being about 0.2%. A simple *t*-test suggests that this mean estimate is statistically significant. However, the *p*-value based on the bootstrapping exercise indicates that the market model adjusted return is not significant. Finally, the Fama-French adjusted returns show that the free cash flow portfolio is more profitable than the market index, as the mean is positive and statistically significant.

In brief, both the annual and monthly returns demonstrate that the free cash flow investment strategy consistently outperforms the market index. The outperformance of the free cash flow strategy is statistically significant even after taking into account the systematic risk of the companies included in the portfolio and the Fama-French (1993) size and book-to-market factors. These findings, together with the fact that the free cash flow portfolio includes only large-capitalization companies with slightly above median P/E ratios, suggest that the superior performance of the free cash flow strategy is unlikely to be related to the cross-sectional anomalies previously documented in the finance literature.

(iii) Robustness Checks

In order to examine the robustness of the findings reported in the previous section, we analyze the incremental impact of individual selection criteria on the performance of the free cash flow strategy. Furthermore, as an additional robustness check, we also examine the performance of the strategy in different market conditions.

The incremental impact of individual selection criteria is analyzed by constructing three different portfolios. The first portfolio consists of all Finnish companies with positive free cash flows, i.e. the portfolio satisfies selection criterion I. The second portfolio includes companies with positive free cash flows and free cash flow multiples in the range of 5-30, and thereby the companies in this portfolio fulfill selection criteria I and II. Finally, the companies selected in the third portfolio are required to have positive free cash flows and debt multiples of less than 10, and hence the portfolio fulfills selection criteria I and III.

Panel A of Table 4 reports the monthly returns for portfolio 1. The results suggest that a portfolio of companies with positive free cash flows slightly outperforms the HEX Portfolio Index. The mean (median) monthly return for portfolio 1 is about 1.5% (1.1%), while the corresponding mean (median) monthly return for the market index is 0.9% (0.4%). The parametric *p*-values indicate that the outperformance of portfolio 1 is statistically highly significant. The non-parametric *p*-values, however, suggest that the market model and the Fama-French adjusted returns are statistically insignificant.

The corresponding monthly returns for portfolios 2 and 3 are reported in Panels B and C of Table 4. The mean market adjusted returns for these two portfolios are positive, and thereby indicate that the portfolios outperform the HEX Portfolio Index. The parametric *p*-values show that the market adjusted returns for portfolios 2 and 3 are statistically significant. However, the bootstrapped *p*-values indicate that the market adjusted return for portfolio 3 is not significant. Furthermore, the bootstrapped *p*-values also show that the market model and the Fama-French adjusted returns for portfolios 2 and 3 are statistically insignificant.

In general, the results reported in Table 4 demonstrate that the outperformance of the free cash flow investment strategy may to a large extent be attributed to the first selection criterion, as a portfolio of companies with positive free cash flows appears to outperform the market index by about 0.6% on a monthly basis. The corresponding figure for the free cash flow portfolio that satisfies all four selection criteria is not much higher, being 0.8%. Interestingly, the additional selection criteria imposed in portfolios 2 and 3 seem to have no noteworthy impact on the mean returns. In fact, the mean monthly returns for portfolios 2 and 3 are even slightly lower than the corresponding mean for portfolio 1. However, the additional selection criteria appear to decidedly decrease the standard deviation of monthly returns.

A comparison of the results reported in Tables 3 and 4 suggests that it is nonetheless justified also to impose the fourth selection criterion of a market value of at least €70 million. The mean and median returns in Table 3 for the free cash flow portfolio are higher, and furthermore, the adjusted returns are statistically more significant. The bootstrapping exercise indicates that the market adjusted returns in Table 3 are significant at the 0.05 level, while being significant only at the 0.10 level in Table 4 for portfolios 1 and 2 and insignificant for portfolio 3. Moreover, the Fama-French adjusted returns in Table 3 are also statistically significant contrary to the corresponding returns in Table 4. In brief, our findings suggest that the first selection criterion already captures most of the benefits of the free cash flow investment strategy. The performance of the strategy may then be fine-tuned by imposing the additional three selection criteria. Hence, the inclusion of all four selection criteria may be considered well-founded.

As noted in the previous section, Table 2 and Figure 1 indicate that the HEX Portfolio Index outperformed the free cash flow portfolio during the exceptional bull market at the end of the 1990s. However, it may also be noted from Table 2 and Figure 1 that

Table 4
Incremental Contribution of Individual Selection Criteria on Monthly Returns

	R	*HEX*	AR_1	AR_2	AR_3
Panel A: Portfolio 1					
Mean	0.015	0.009	0.006	0.001	0.004
Parametric *p*-value	(0.007)	(0.127)	(0.000)	(0.000)	(0.000)
Non-parametric *p*-value	(0.006)	(0.124)	(0.084)	(0.662)	(0.156)
Median	0.011	0.004	0.005	−0.002	0.000
Minimum	−0.160	−0.213	−0.079	−0.076	−0.097
Maximum	0.310	0.221	0.287	0.284	0.252
Standard deviation	0.063	0.067	0.006	0.002	0.005
No. of positive months	77	71	71	62	67
No. of observations	132	132	132	132	132
Panel B: Portfolio 2					
Mean	0.013	0.009	0.004	0.001	0.000
Parametric *p*-value	(0.008)	(0.127)	(0.000)	(0.000)	(0.000)
Non-parametric *p*-value	(0.012)	(0.124)	(0.088)	(0.694)	(0.886)
Median	0.010	0.004	0.003	0.000	0.001
Minimum	−0.163	−0.213	−0.124	−0.110	−0.113
Maximum	0.142	0.221	0.153	0.095	0.077
Standard deviation	0.056	0.067	0.004	0.002	0.001
No. of positive months	77	71	73	67	70
No. of observations	132	132	132	132	132
Panel C: Portfolio 3					
Mean	0.012	0.009	0.003	0.000	0.002
Parametric *p*-value	(0.024)	(0.127)	(0.000)	(0.000)	(0.000)
Non-parametric *p*-value	(0.036)	(0.124)	(0.378)	(0.860)	(0.516)
Median	0.010	0.004	0.000	0.001	0.000
Minimum	−0.169	−0.213	−0.108	−0.068	−0.072
Maximum	0.168	0.221	0.100	0.081	0.087
Standard deviation	0.058	0.067	0.003	0.001	0.002
No. of positive months	78	71	66	69	65
No. of observations	132	132	132	132	132

Notes:
The table reports monthly returns for three different portfolios (R) and for the HEX Portfolio Index (HEX). Portfolio 1 includes all companies with positive free cash flows (Criterion I), Portfolio 2 includes companies with positive free cash flows and low free cash flow multiples (Criteria I & II), and Portfolio 3 includes companies with positive free cash flows and low debt multiples (Criteria I & III). AR_1 is the market adjusted return, calculated as $R_{FCF} - R_M$, where R_{FCF} denotes the return on the free cash flow portfolio and R_M is the return on the HEX Portfolio Index. AR_2 is the market model adjusted return, calculated as $R_{FCF} - \alpha - \beta R_M$. AR_3 is the Fama-French (1993) adjusted return, calculated as $R_{FCF} - R_f - \beta(R_M - R_f) - \varphi SMB - \eta HML$, where R_f is the risk-free return, SMB is the difference between the return on a portfolio of small stocks and the return on a portfolio of large stocks, and HML is the difference between the return on a portfolio of high book-to-market stocks and the return on a portfolio of low book-to-market stocks. The parameters for the market model and for the Fama-French three-factor model are estimated with monthly returns for the previous 36 months. The parametric *p*-value for the null hypothesis of zero mean is based on a conventional *t*-test. The non-parametric *p*-value is obtained via bootstrapping with 10,000 resamplings.

the free cash flow strategy considerably outperformed the market index after the stock market correction started in the spring of 2000. Hence, it is of interest to examine the monthly performance of the free cash flow strategy separately in bull and bear markets.

Table 5
Monthly Returns in Bull and Bear Markets

	FCF	*HEX*	AR_1	AR_2	AR_3
Panel A: Bull Market, June 97 – May 00					
Mean	0.011	0.020	−0.009	−0.008	−0.004
Parametric *p*-value	(0.260)	(0.123)	(0.261)	(0.201)	(0.442)
Non-parametric *p*-value	(0.286)	(0.124)	(0.246)	(0.230)	(0.478)
Median	0.015	0.018	−0.013	−0.010	−0.005
Minimum	−0.145	−0.213	−0.130	−0.070	−0.081
Maximum	0.117	0.211	0.091	0.088	0.065
Standard deviation	0.058	0.077	0.048	0.036	0.033
No. of positive months	23	22	11	9	14
No. of observations	36	36	36	36	36
Panel B: Bear Market, June 00 – May 03					
Mean	0.006	−0.016	0.023	0.008	0.012
Parametric *p*-value	(0.493)	(0.154)	(0.003)	(0.208)	(0.035)
Non-parametric *p*-value	(0.486)	(0.150)	(0.002)	(0.186)	(0.042)
Median	0.012	−0.024	0.026	0.007	0.013
Minimum	−0.117	−0.133	−0.048	−0.057	−0.055
Maximum	0.106	0.143	0.176	0.132	0.110
Standard deviation	0.055	0.068	0.045	0.038	0.034
No. of positive months	20	13	23	21	24
No. of observations	36	36	36	36	36

Notes:
The table reports monthly returns for the free cash flow portfolio (FCF) and for the HEX Portfolio Index (HEX) in bull and bear markets. AR_1 is the market adjusted return, calculated as $R_{FCF} - R_M$, where R_{FCF} denotes the return on the free cash flow portfolio and R_M is the return on the HEX Portfolio Index. AR_2 is the market model adjusted return, calculated as $R_{FCF} - \alpha - \beta R_M$. AR_3 is the Fama-French (1993) adjusted return, calculated as $R_{FCF} - R_f - \beta(R_M - R_f) - \varphi SMB - \eta HML$, where R_f is the risk-free return, SMB is the difference between the return on a portfolio of small stocks and the return on a portfolio of large stocks, and HML is the difference between the return on a portfolio of high book-to-market stocks and the return on a portfolio of low book-to-market stocks. The parameters for the market model and for the Fama-French three-factor model are estimated with monthly returns for the previous 36 months. The parametric *p*-value for the null hypothesis of zero mean is based on a conventional *t*-test. The non-parametric *p*-value is obtained via bootstrapping with 10,000 resamplings.

Table 5 reports the monthly returns for the free cash flow portfolio and the HEX Portfolio Index in two distinct three-year subperiods, the bull market from June 1997 to May 2000 and the bear market from June 2000 to May 2003. Panel A of Table 5 suggests that the HEX Portfolio index slightly outperforms the free cash flow portfolio in bull markets, as the mean (median) monthly return for the HEX Portfolio Index is about 2.0% (1.8%), while the mean (median) return for the free cash flow portfolio is 1.1% (1.5%). However, both the parametric and the non-parametric *p*-values demonstrate that the outperformance of the market index is not statistically significant.

Turning the focus to the bear markets, Panel B of Table 5 clearly demonstrates that the free cash flow strategy provides superior returns in comparison to the HEX Portfolio Index. The positive mean and median returns for the free cash flow portfolio are in sharp contrast to the negative returns for the market index. The mean market adjusted return in Panel B indicates that the free cash flow portfolio outperforms the market index by about 2.3% on a monthly basis during bear markets. A simple *t*-test and

Table 6
Monthly Returns During Market Downturns

	FCF	*HEX*	AR_1	AR_2	AR_3
Mean	−0.046	−0.086	0.041	−0.004	0.000
Parametric *p*-value	(0.000)	(0.000)	(0.000)	(0.708)	(0.969)
Non-parametric *p*-value	(0.000)	(0.000)	(0.000)	(0.662)	(0.982)
Median	−0.033	−0.071	0.049	0.003	0.002
Minimum	−0.145	−0.213	−0.053	−0.086	−0.067
Maximum	0.043	−0.052	0.176	0.098	0.092
Standard deviation	0.053	0.035	0.046	0.045	0.038
No. of positive months	4	0	19	13	13
No. of observations	23	23	23	23	23

Notes:
The table reports monthly returns for the free cash flow portfolio (FCF) and for the HEX Portfolio Index (HEX) during market downturns. Market downturn is defined as a month in which the HEX Portfolio Index fell by more than 5 percent. AR_1 is the market adjusted return, calculated as $R_{FCF} - R_M$, where R_{FCF} denotes the return on the free cash flow portfolio and R_M is the return on the HEX Portfolio Index. AR_2 is the market model adjusted return, calculated as $R_{FCF} - \alpha - \beta R_M$. AR_3 is the Fama-French (1993) adjusted return, calculated as $R_{FCF} - R_f - \beta(R_M - R_f) - \varphi\text{SMB} - \eta\text{HML}$, where R_f is the risk-free return, SMB is the difference between the return on a portfolio of small stocks and the return on a portfolio of large stocks, and HML is the difference between the return on a portfolio of high book-to-market stocks and the return on a portfolio of low book-to-market stocks. The parameters for the market model and for the Fama-French three-factor model are estimated with monthly returns for the previous 36 months. The parametric *p*-value for the null hypothesis of zero mean is based on a conventional *t*-test. The non-parametric *p*-value is obtained via bootstrapping with 10,000 resamplings.

the bootstrapping exercise suggest that both the market adjusted and the Fama-French adjusted returns in Panel B are statistically highly significant.

Finally, we analyze the performance of the free cash flow portfolio during market downturns. 'Market downturn' is defined as a month in which the HEX Portfolio Index fell by more than 5%. This occurred in 23 months during the sample period. The market downturn analysis is motivated by Lakonishok et al. (1994), who claimed that unknown risk factors are more strongly manifested during periods of market turbulence.

The results of the market downturn analysis are reported in Table 6. The table shows that the return for the free cash flow portfolio was positive in four market downturn months. The mean return for the HEX Portfolio Index during these market downturns was −8.6%, compared with the corresponding mean return for the free cash flow portfolio of −4.6%. The mean market adjusted return shows that the free cash flow portfolio outperformed the market index by 4.1% during the downturn months. This outperformance of the free cash flow strategy appears to be statistically highly significant. However, the mean market model adjusted return is negative and statistically insignificant and the mean Fama-French adjusted return is also indistinguishable from zero. Together with the results reported in Table 5, these findings suggest that the superior performance of the free cash flow strategy may not be attributed to unknown risk factors that are typically manifested during periods of market turbulence.

5. CONCLUSIONS

This paper examines the free cash flow investment anomaly documented by Hackel et al. (1994 and 2000) and Hackel and Livnat (1995) in a different market setting. In

this paper, annual financial statement data of Finnish companies are used to identify large-capitalization companies with positive free cash flows, low free cash flow multiples, and low financial leverage. The use of Finnish data is considered to provide an expedient setting to examine whether the empirical findings documented in Hackel et al. (1994 and 2000) and Hackel and Livnat (1995) can be generalized.

The empirical findings reported in this paper demonstrate that the free cash flow anomaly also exists in the Finnish stock market. Our results show that a portfolio of large-capitalization companies with positive free cash flows, low free cash flow multiples, and low financial leverage consistently outperforms the market portfolio. On average, the 12-month buy-and-hold return for the free cash flow portfolio exceeds the corresponding return for the market index by about 11.8%. Moreover, the cumulative 11-year return for the free cash flow portfolio is 614%, compared with the corresponding return for the market index of 144%. Even after taking into account the systematic risk and other known risk factors, the companies in the free cash flow portfolio still provide superior returns in comparison to the market index. These results are surprisingly similar to the empirical findings reported in Hackel et al. (1994 and 2000) and Hackel and Livnat (1995). Thus, consistent with the previous studies, the results presented in this paper suggest that investors can earn abnormal returns with investment strategies based on free cash flows.

REFERENCES

Ali, A. (1994), 'The Incremental Information Content of Earnings, Working Capital from Operations, and Cash Flows', *Journal of Accounting Research*, Vol. 32, pp. 61–76.

Ball, R. (1992), 'The Earnings-price Anomaly', *Journal of Accounting and Economics*, Vol. 15, pp. 319–47.

Banz, R. (1981), 'The Relationship Between Return and Market Values of Common Stock', *Journal of Financial Economics*, Vol. 9, pp. 3–18.

Basu, S. (1983), 'The Relationship Between Earnings' Yield, Market Value and Return for NYSE Common Stocks: Further Evidence', *Journal of Financial Economics*, Vol. 12, pp. 139–56.

Bhandari, L. (1988), 'Debt/Equity Ratio and Expected Common Stock Returns: Empirical Evidence', *Journal of Finance*, Vol. 43, pp. 507–28.

Booth, G., J-P. Kallunki and T. Martikainen (1996), 'Post-announcement Drift and Income Smoothing: Finnish Evidence', *Journal of Business Finance & Accounting*, Vol. 23, pp. 1197–211.

——— ——— ——— (1997), 'Delayed Price Response to the Announcements of Earnings and its Components in Finland', *European Accounting Review*, Vol. 6, pp. 377–92.

Capaul, C., I. Rowley and W. Sharpe (1993), 'International Value and Growth Stock Returns', *Financial Analysts Journal*, Vol. 49, pp. 27–36.

Fama, E. and K. French (1992), 'The Cross-section of Expected Stock Returns', *Journal of Finance*, Vol. 47, pp. 427–65.

——— ——— (1993), 'Common Risk Factors in the Returns on Stocks and Bonds', *Journal of Financial Economics*, Vol. 33, pp. 3–56.

——— ——— (1996), 'Multifactor Explanations of Asset Pricing Anomalies', *Journal of Finance*, Vol. 51, pp. 55–84.

——— ——— (1998), 'Value versus Growth: The International Evidence', *Journal of Finance*, Vol. 53, pp. 1975–99.

Hackel, K.S. and J. Livnat (1995), 'International Investments Based on Free Cash Flow: A Practical Approach', *Journal of Financial Statement Analysis*, Vol. 1, pp. 1–10.

——— ——— and A. Rai (1994), 'The Free Cash Flow/Small-cap Anomaly', *Financial Analysts Journal*, Vol. 50, pp. 33–42.

——— ——— ——— (2000), 'A Free Cash Flow Investment Anomaly', *Journal of Accounting, Auditing and Finance*, Vol. 15, pp. 1–24.

Hawawini, G. and D. Keim (1995), 'On the Predicatibility of Common Stock Returns: Worldwide Evidence', in R.A. Jarrow, V. Maksimovic and W.T. Ziemba (eds.), *Handbooks in Operations Research and Management Science*, Vol. Finance (North Holland).

Junttila, J. (2003), 'Detecting Speculative Bubbles in an IT-intensive Stock Market', *Journal of Economics and Finance*, Vol. 27, pp. 166–89.

Kallunki, J-P. and M. Martikainen (2003), 'Earnings Management as a Predictor of Future Profitability of Finnish Firms', *European Accounting Review*, Vol. 12, pp. 311–25.

——— ——— and T. Martikainen (1998), 'Accounting Income, Income Components and Market-to-book Equity Ratios: Finnish Evidence', *International Journal of Accounting*, Vol. 33, pp. 359–75.

Lakonishok, J., A. Shleifer and R.W. Vishny (1994), 'Contrarian Investment, Extrapolation, and Risk', *Journal of Finance*, Vol. 49, pp. 1541–78.

Lipe, R. (1986), 'The Information Contained in the Components of Earnings', *Journal of Accounting Research*, Vol. 24, pp. 37–64.

Livnat, J. and P. Zarowin (1990), 'The Incremental Information Content of Cash-flow Components', *Journal of Accounting and Economics*, Vol. 13, pp. 25–46.

Ou, J. and S. Penman (1989), 'Financial Statement Analysis and the Prediction of Stock Returns', *Journal of Accounting and Economics*, Vol. 11, pp. 295–329.