Value Investing: Cheapness, Quality, and Investor Confidence*

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Abstract

This paper investigates whether signals from changes in investors' portfolio concentrations can be used to enhance the performance of value and value/quality stock portfolios. Using data on all the more than 1.3 million investor portfolios participating in the Finnish stock market, I find that increases in average shareholder portfolio concentration, a signal of investor confidence, can be used to improve the performance of value portfolios and portfolios selected based on value and quality signals. The results indicate that shareholder portfolio concentration can be used as an additional signal to improve the performance of value-oriented investing strategies.

Keywords: Value investing, quality investing, portfolio concentration, ownership concentration, quality at reasonable price, stock returns.

JEL Classification: G11, G14, G32.

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1. Introduction

This paper explores whether shareholder portfolio holding data can be used to improve the performance of value portfolios. While quality variables, such as profitability, financial strength, and quality more generally (Novy-Marx, 2013; Piotroski, 2000; Asness et al., 2014; respectively), have been shown to enhance the performance of value portfolios selected based on valuation multiples, portfolio concentration and ownership data have not been used in value studies or studies combining value and quality dimensions. This paper aims to fill the gap in the literature.

Previous empirical research finds that value stocks (e.g., high book-to-market) have performed better than growth stocks in the US (Fama and French, 1992; Lakonishok, Shleifer, and Vishny, 1994; La Porta, Lakonishok, Shleifer and Vishny, 1997) as well as internationally (Fama and French, 1998). Moreover, Piotroski (2000) shows that measures of financial strength can be used to separate winners form losers within portfolios of value stocks. Relatedly, Novy-Marx (2013, 2014) finds that quality variables (such as gross-profitability divided by total assets) can be used to improve the performance of value portfolios. Furthermore, Novy-Marx (2014) and Piotroski and So (2012) show that value and quality sorting strategies based on combined ranks perform better than a 50/50 combination of value and quality portfolios.

In this paper, I consider the usefulness of investor portfolio concentration data in selecting value stocks. Ekholm and Maury (2014) find that shareholder portfolio concentration is positively related to future firm performance. Their results are consistent with the idea that concentrated portfolios improve price efficiency which in turn improves managerial decision-making. The results on stock returns in Ivkovic et al. (2008) as well as Ekholm and Maury (2014) suggest that focused investors are more informed than more diversified investors and that information on portfolio concentrations can be a valuable signal on future stock performance.

Thus, previous research would indicate that portfolio concentration data could be used to improve the selection stocks with the high expected returns within a value investing strategy.

Using data on virtually every investor's portfolio holdings in the Finnish market over the period 1996-2005, I employ the portfolio concentration index developed in Ekholm and Maury (2014) which is measured as the average portfolio weight of all shareholders in a firm. The portfolio concentration measure is used as a signal of confidence in the quality of a stock. Two main empirical approaches are employed in this paper. In the first approach, the portfolio concentration index is combined with a value portfolio. In the second approach, portfolio concentration data are combined with a portfolio formed based on combined value and quality ranks.

The results show that information on changes in portfolio concentration can be valuable when used in combination with value-oriented investment strategies. First, portfolio concentration data can be used directly to select the best performing stocks within a value portfolio (i.e., to avoid the so-called value trap). Second, portfolio concentration can be used as a third variable in combination with value and quality variables to obtain higher stock returns. The findings indicate that portfolio concentration data can further enhance the performance of portfolios formed on a combination of quality and value variables. Moreover, portfolio performance is higher when the average portfolio concentration is calculated for larger (such as at least 0.1% or 1% holdings), and presumably more informed, shareholders. In addition, I find that increases in ownership concentration can be used as an alternative investment signal, although the portfolio performance using ownership concentration data is lower than the performance using information on portfolio concentrations. Taken together, the empirical findings in this paper indicate that data on investors' portfolio holdings can be used as a signal that adds to the performance of investment strategies based on value as well as combinations of value and quality without increasing known portfolio risk.

This paper is related to two main strands in the literature. The first strand on investment research has shown that value portfolios (e.g., Fama and French, 1992) and portfolios that combine value and quality (e.g., profitability or financial strength) signals (e.g., Novy-Marx, 2013; Piotroski, 2000; Asness et al., 2014) have generated returns in excess of the market. Another strand in the literature studies the usefulness of holdings data for investment purposes. Regarding insider trades, Jaffe (1974), for example, finds that returns to stocks purchased slightly after insiders' purchases have become public information generate returns significantly higher than that of the market. Relatedly, Kallunki et al. (2009) find that insider selling is informative among those insiders that have the highest proportion of their wealth concentrated in insider stocks. More generally, Ekholm and Maury (2014) find that the average shareholder portfolio concentration is positively related to future profitability, valuations, and stock returns, which is consistent with both monitoring through the stock market and superior stock selection ability by more focused shareholders. While these previous papers consider the investment returns utilizing holdings data, they do not analyze whether holdings data can be useful as an additional signal that could complement value and quality sorts. This paper contributes to the existing literature by showing that investor portfolio data can be used to improve the returns on value-oriented portfolios.

Although this paper uses data available on Finnish listed firms, the findings in this paper are likely to be relevant for international investors due to the following reasons. Firstly, information on holdings data and portfolio concentration could be obtained for other markets than the Finnish market used here. For example, data from 13F filings provided by Thomson Financial that cover institutional investors who manage more than $100 million could be obtained for US firms. These data could be used to calculate a proxy for the AWI (portfolio concentration) measure. Secondly, the findings in this paper indicate that also ownership concentration data, more accessible and easily computed, can be used to improve returns.

The paper proceeds as follows. Section 2 reviews previous research and presents the hypotheses. Section 3 describes the data set. Section 4 presents the empirical findings as well as offers alternative models and robustness tests. Section 5 concludes the paper.

2. Value investing and holdings data

In this section, I review previous literature on value investing and discuss the usefulness of combining information on holdings data (especially shareholder portfolio concentration data) with value and quality investing strategies.

2.1. Value portfolios

Prior research finds that value stocks (e.g., high book-to-market stocks) outperform glamour stocks (or low book-to-market stocks) (Fama and French, 1992; Lakonishok, Shleifer and Vishny, 1994). Lakonishok et al. (1994) report that a value-growth portfolio yields a 10% yearly return. Various explanations for the excess returns have been offered in the literature. Fama and French (1992) argue that value stocks are associated with financial distress, and thus the superior returns are a compensation for risk. However, studies have found that value portfolios are associated with lower risk (e.g., Haugen and Baker, 2009), which does not support the risk explanation based on market efficiency. The second explanation is mispricing. Haugen and Baker (2010) argue that the market tends to overreact to past information on firms' success and failure, which makes expensive stocks too expensive and relatively cheap stocks too cheap. La Porta et al. (1997) find that inexpensive stocks are associated with positive earnings surprises at subsequent quarterly earnings announcements.

2.2. Quality portfolios

Graham (2003) views stock quality as an important part of value investing.[1] Firm profitability is often used as a proxy for quality.[2] Haugen (1999) argues that the payoff to profitability is either zero or positive if markets are efficient or inefficient, respectively. Previous literature uses several measures for quality including profitability (such as ROA[3] and ROE) and financial strength. Novy-Marx (2013) introduces gross profitability divided by total assets as a measure of quality. Gross profitability can be viewed as the product of gross margin (which reflects pricing power) and asset turnover (which is a measure of capital productivity). High profitability, especially if it can be sustained, is also an indication of a firm's competitive advantage. Piotroski (2000) uses several proxies for financial strength (called the F-score) as a quality measure. The F-score is based on four measures of profitability, three measures of liquidity, and two measures that capture operating efficiency.

Measures of quality have been found to predict superior returns. Haugen and Baker (1996) report that profitability measures such as ROE and ROA are significantly positively related to future stock returns in the US and internationally. While Novy-Marx (2013) reports that high gross-profitability to assets is associated with superior stock returns, even higher returns are obtained when portfolios are formed based on both profitability and value.[4] Relatedly, Piotroski (2000) finds that investing in firms that are financially strong significantly improves the performance of value portfolios. In addition, Gompers et al. (2003) explore the relation between corporate governance quality and subsequent stock returns, and they find an

[1] Novy-Marx (2013) notes that while trading on profitability utilizes a value philosophy, the strategy is a growth strategy measured by valuation ratios.

[2] For quality/value strategies, Novy-Marx (2014) finds that buying profitable value stocks exhibit the best returns.

[3] Return on assets (ROA) is often viewed in the strategic management literature as the measure that best reflects a firm's financial performance and competitive advantage (e.g., Dehning and Stratopoulos, 2003).

[4] Such strategies are also referred to as growth at reasonable price (GARP) or quality at reasonable price (QARP).

8.5% annual excess return for a good governance portfolio.[5] Overall, both value and quality strategies are designed to acquire productive assets cheaply.

2.3. Holdings data and value investing

Ekholm and Maury (2014) introduce a firm-level portfolio concentration measure defined as the average portfolio weight of a firm's shareholders. They report that the portfolio concentration measure is positively related to future operational performance, valuation, and abnormal stock returns. The positive relation between portfolio concentration and performance can arise due to superior information possessed by focused shareholders about the firm's prospects and due to informed shareholders' monitoring ability through the so-called exit and learning channels (see also Edmans, 2009). Relatedly, Ivkovic et al. (2008) report that individual shareholders with concentrated portfolios obtain higher returns themselves. Using mutual fund data, Kaperczyk and Seru (2007) find that more concentrated mutual funds outperform less concentrated funds. They also show that the outperformance is due to superior stock selection (but not market timing) by managers of concentrated funds.

Relatedly, information on insider trades (such as trades by officers, directors, and very large shareholders) may also be useful in predicting returns. Several studies report that investing in stocks shortly after the public announcement where insider buying exceeds insider selling with multiple insiders involved have yielded abnormal returns (e.g., Jaffe, 1974). Fidrmuc et al. (2006) report that the effect of insider trades on prices is stronger with more asymmetric information. Furthermore, Kallunki et al. (2009) report that trades by insiders whose wealth is highly concentrated in their firms provide the strongest signals about future returns.

[5] However, Bebchuk et al. (2009) do not find abnormal returns for the governance portfolio for a later period, which they argue is consistent with a learning effect by the market.

Although previous research relates data on portfolio concentration to abnormal stock returns, the information on portfolio concentration has not been combined with investment strategies based on value and quality. The main focus in this paper is to explore how information on investor confidence derived from holdings data can be utilized to improve the returns of already profitable value investing strategies. It can be argued that signals from changes in holdings data can be especially useful in a contrarian setting when informed investors buy shares with relatively low valuations and high expected returns.

2.4. Hypotheses

The key hypotheses in this paper focus on how portfolio and ownership concentration data can be used to enhance the returns of value and quality portfolios. Increases in portfolio concentration (AWI) are likely to contain information about positive future prospects of a company as more concentrated portfolios tend to be more informed (see, e.g., Ivkovic et al., 2008; Ekholm and Maury, 2014). Besides the valuable information from increases in portfolio concentration, another potential benefit relates to a form of market monitoring. The so-called exit model predicts that that trading by informed blockholders leads to more informative stock prices and to better decisions by managers whose compensation typically is linked to the stock price (e.g., Edmans, 2009).

If shareholders with concentrated portfolios are more informed than dispersed shareholders and the market is slow to incorporate such information into prices, one should expect portfolio concentration information to be valuable. Alternatively, portfolio concentration is related to some risk factor (see Section 4.2.3). The first hypothesis can be stated as follows:

> **H1**: Using changes in a firm's average investor portfolio concentration as selection criteria should increase the performance of value and quality investment strategies.

The second hypothesis deals with the use of the more traditional dimension of ownership data: ownership concentration. As was the case for increases in portfolio concentration, increases in ownership concentration can reflect information advantages by blockholders (see, e.g., Demsetz, 1986) concerning future firm performance. Further, governance through trading (exit and learning) and direct intervention (or voice) could improve firm performance (see, e.g., Edmans, 2014). Ownership and governance can also be viewed a part of the "quality" variables. Changes in ownership variables can provide both information about future firm performance and information about firm governance.

Similarly to Hypothesis 1, to the extent that large shareholdings (and ownership concentration) are associated with better information about firms' prospects, one should expect increases in ownership concentration to be positively related to future stock returns if the market is slow to disseminate such private information. Alternatively, corporate ownership concentration is related to some risk factor. The second hypothesis can be expressed as follows:

> **H2:** Using changes in ownership concentration as selection criteria should increase the performance of value and quality investing strategies.

3. Data

3.1. The Finnish Central Securities Depository (FCSD) and ownership variables

This paper uses the FCSD data set from year 1995 to 2006. The FCSD data includes

entries for more than 1.3 Million unique shareholders.[6] In addition, since the focus lies on outside shareholdings, I use ownership data from the low voting share class, which typically is the more traded class. Following Ekholm and Maury (2014), I calculate portfolio concentration (which they call the Average Weight Index (AWI)) for each share and year in the following way. In the first step, the portfolio value in euros for each investor and year (as of December 31) is a calculated as the sum of the product of number of shares times price:[7] In the second step, portfolio concentration for each stock and year (as of December 31) is calculated. This firm-level portfolio concentration measure (AWI) equals the average of individual shareholders' weights held in a firm.[8] Thus, the portfolio concentration measures how important a stock is for its average shareholder. In the empirical analysis, I use the change in AWI (ΔAWI) measured from year-end t-2 to t-1. The portfolio concentration measure is calculated for different categories of shareholders: all investors, investors with at least 0.1%, and investors with 1% of shares in a firm.

I also use a traditional ownership concentration measure: the Herfindahl index (HFI) as in, for example, Demsetz and Lehn (1985). The HFI measure is calculated as the sum of squared

[6] The data include 102,797,708 exchange transaction entries and 19,090,710 entries for mergers, splits, gifts, bankruptcies, IPOs, and other transactions not executed over an exchange. Each entry consists of 18 data fields, including information about both the shareholder and the transaction itself.

[7] Formally, $V = \sum_{i=1}^{M} H_i * P_i$, where *V* equals the portfolio value in euros, *Hi* equals the number of firm *i*'s shares in the portfolio, and *Pi* equals the euro price of firm *i*'s share, and *M* equals the number of different stocks in the investor's portfolio.

[8] Formally, $\text{portfolio concentration (AWI)} = \frac{\sum_{j=1}^{N} \frac{H_j * P}{V_j}}{N}$, where *AWI* equals the average weight, *Hj* equals the number of shares that investor *j* holds, *P* equals the euro price of the share, *Vj* equals the value in euros of investor *j*'s portfolio, and *N* equals the total number of shareholders in the firm. *P* is calculated as the Volume Weighted Average Price (VWAP) (for details, see Ekholm and Maury, 2014).

fractional ownership stakes in a firm for each firm and year (as of December 31).[9] The Herfindahl Index measures ownership concentration, and I consequently expect it to correlate positively with the monitoring power of large shareholders in a firm. The change in HFI (ΔHFI) as measured from year-end t-2 to t-1 is used in the analysis.

3.2. Accounting, valuation, and control variables

Historical records of accounting and valuation data for Finnish publicly traded firms (excluding banks and insurance companies) for the fiscal years 1996 to 2005 are provided by Balance Consulting. I use Return on Assets (ROA) defined as earnings before interest and taxes (EBIT) divided by average total assets during the year as a measure of firm quality. As the valuation measure, the book-to-market ratio defined as the book value of shareholders' equity divided by the market capitalization of the firm's shares is employed as in Fama and French (1992) and Novy-Marx (2013). Other variables used in the analysis are defined in Table 1. The sample used in the main analysis consists of an unbalanced panel that combines the FCSD shareholder register and the Balance Consulting firm-level data.

3.3. Return data and final sample

Dividend and split adjusted monthly stock and index returns for firms on the main list of the NASDAQ OMX Helsinki Stock Exchange for the calendar years 1996 to 2007 are provided by the Department of Finance at Hanken School of Economics. I use the OMX Helsinki Cap

[9] $\mathrm{HFI} = \sum_{j=1}^{N} \left(\frac{H_j}{\sum_{j=1}^{N} H_j} \right)^2$, where *Hj* equals the number of shares that investor *j* holds, and *N* equals the total number of shareholders in the firm. I calculate the Herfindahl Index using data on all shareholders.

index as the market portfolio.[10] Monthly observations for the one month Euro Interbank Offered Rate (EURIBOR) from 1999 to 2007 and the one month Helsinki Interbank Offered Rate (HELIBOR) from 1995 to 1998 are retrieved from Kauppalehti Ltd. As an alternative to the one-factor model, I use the Carhart (1997) factors available for euro countries from Kenneth French's webpage.[11] The final sample that combines the FCSD register, accounting and valuation data for Finnish firms (excluding banks and insurance companies) on the OMXH main list. The number of firms in the final analysis varies between 41 (year 1996/7) and 97 (year 2005/6), with a total of 122 different firms over the period. The number of observations available for each variable is displayed in Table 1.

Stock returns are measured by raw returns, market-adjusted returns (raw return - market portfolio return for the period), Jensen (1968) alpha, and Carhart (1997) alpha. In the main specifications, the return period is from May year *t* to April year *t*+1 to ensure that the information on holdings (measured from year-end *t*-2 to *t*-1) and accounting data (measured at end of *t*-1) is available to investors at the time of portfolio formation at end of April in year *t*.[12]

I estimate Jensen (1968) alphas for each share and year as follows

$$R_t - R_{ft} = \alpha + \beta_t (R_{mt} - R_{ft}) + \varepsilon_t, \quad (1)$$

where R_t is the return on a firm's share in month t, R_{ft} is the risk-free rate in month t, and R_{mt} is the market portfolio return.

[10] This index limits the weight of a single stock to 10%.

[11] Data available at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

[12] It should be noted that there are significant "search costs" involved in computing the AWI portfolio concentration measure. Hence, the information on individual shareholders portfolio concentrations (and possible trading profits) is likely to be available only to few investors.

The Carhart (1997) four factors are returns to zero investment portfolios that capture market, book-to-market, size, and momentum effects, respectively, and can be expressed as follows:

$$R_t - R_{ft} = \alpha + \beta_{MKT}MKT_t + \beta_{HML}HML_t + \beta_{SMB}SMB_t + \beta_{MOM}MOM_t + \varepsilon_t, \quad (2)$$

where R_t is the return on a firm's share in month t and R_{ft} is the risk-free rate in month t. MKT, HML, SMB, and MOM are the returns on the market, value, size, and momentum factors (for details see Carhart, 1997).

4. Empirical analysis

4.1. Empirical design

The research design used in the main analysis is as follows. First, each year firms are grouped into value and growth stock portfolios based on their book-to-market ratios following prior research (e.g. Fama and French, 1992, and Piotroski, 2000). Firms with book-to-market ratios in the highest quartile each year are considered value companies, while firms in the lowest quartile are labeled glamour stocks. Stock returns of value companies with above or equal to the median yearly change in portfolio concentration are reported. This research design builds on the one used in Piotroski (2000). In addition, the returns of glamour portfolios with equal or below median change in portfolio concentration are reported.

In the second specification, portfolio concentration data (ΔAWI above or below the median value) are combined with portfolios (high quartile and low quartile) formed based on combined value and quality ranks. This method follows Novy-Marx (2013, 2014) in which the sum of the combined (equally weighted) ranks of (gross) profitability divided by total assets

(quality) and book-to-market (value) are related to stock returns.[13] Alternative methods and quality variables are discussed in Section 4.3.

4.2.1. Main findings

Table 1 shows descriptive statistics for variables used in the study. Panel A of Table 1 presents data for all firms while Panel B presents data for value firms. Spearman correlations for the main variables are displayed in Appendix 1. The correlations in Panel A of Appendix 1 show that increases in portfolio focus (ΔAWI) are associated with higher future stock returns, and that increases in portfolio concentration tend to be positively correlated with value (book-to-market) and quality (ROA) characteristics in the same year. Regarding the level of portfolio concentration, Ekholm and Maury (2014) report that the average shareholder in the Finnish market holds approximately four stocks in their equity portfolio.

Panel A of Table 2 shows the returns to value and glamour stocks over a ten-year period. The value portfolio, defined as the stocks with a book-to-market ratio in the top 25% each year, has returned 0.61 % p.a. in excess of the market index, whereas glamour stocks (book-to-market ratio in lowest 25%) have returned -8.08% p.a. on average. The Jensen alpha (abnormal return) in annual terms equals 2.16% and -8.66% for value and glamour stocks, respectively. Hence, value portfolios have outperformed glamour stocks during the studied period.

Panel B of Table 2 shows the returns to a value portfolio in which the yearly changes in portfolio concentration (ΔAWI) is above the median. The market-adjusted annual return equals

[13] Each formation date at end of April each year, stocks are ranked according to their profitability and according to their book-to-market ratio. The sum of the two ranks is used to form the high and low quality and value quartile portfolios. For a discussion of the benefits of combined sorting, see Novy-Marx (2014).

4.32%, and the Jensen alpha equals 4.71%. Thus, investing in value stocks in which the change in investors' portfolio concentration is above the median improves the investment returns compared with the pure value portfolio (shown in Panel A). For comparison, a portfolio consisting of glamour stocks with a change in the portfolio concentration below the median level has annual returns of as low as -12.24% and -10.39% using market-adjusted returns and the Jensen alpha, respectively. As shown in Panel B, the difference between value firms with ΔAWI above the median and glamour stocks with ΔAWI below the median equal a marked-adjusted return and Jensen alpha of 16.56% and 15.10%, respectively (significant at the 1% level).[14] Taken together, results indicate that information on shareholder portfolio holdings can benefit value investors.

In Panel C of Table 2, stocks are sorted into quartiles based on their combined book-to-market (value) and return on assets (quality) ranks. A portfolio of stocks in the highest quartile based on the combined value and quality rank yields a market-adjusted return of 4.93% and a Jensen alpha of 5.16% in annual terms. A portfolio with the lowest combined value and quality rank has a market-adjusted annual return and Jensen alpha of -12.48% and -12.60%, respectively. Thus, a strategy combining quality and value yields returns that clearly exceed those of pure value strategies. The value portfolio that only includes stocks with changes in portfolio concentration above the median (Panel B) yields returns comparable to the combined value and quality strategy (Panel C).

Panel D of Table 2 shows the performance of a portfolio that includes stocks from the quarter with the highest combined value and quality rank that have changes in portfolio concentration above the median. The returns to this portfolio formed based on signals from value, quality and changes in portfolio concentration equal 6.85% and 5.63% for market-

[14] Since the sample includes also smaller firms, the possibilities to take short positions may be limited.

adjusted returns and the Jensen alpha, respectively. A portfolio that goes long in this portfolio and shorts a portfolio of stocks in the lowest quarter of the value and quality ranks with ΔAWI values equal to or below the median produces a market-adjusted return of 22.10% and a Jensen alpha 20.99% in annual terms based on portfolio averages. Thus, a strategy that combines value, quality, and data on investor holdings yields higher returns than a strategy based on only value and changes in portfolio concentration (Panel B).

As an alternative to grouping stocks based on their yearly change in AWI, one can select only firms that experience positive yearly changes in AWI into the long portfolio each year and include stocks in the short portfolio that experience reductions in the ΔAWI. Panel E of Table 2 shows the returns to a portfolio of stocks sorted based on value and quality ranks with increases in ΔAWI. The returns to using this specification are higher than those using ΔAWI quartiles in Table 2.

In sum, Table 2 shows that investor holdings data can be useful for enhancing the performance of value-oriented stock portfolios. The performance (measured by raw and market-adjusted returns, Jensen alpha, and Carhart alpha) of both pure value portfolios and portfolios combining value and quality can be improved with information on investors' holdings (portfolio concentration). The best performance is obtained with a portfolio of stocks that is first selected on combined value and quality ranks and in the second step selected based on changes in investor portfolio concentration. Thus, the results gives support to Hypothesis 1 by showing that one can improve the performance of a quality and value ranked portfolio (e.g., Novy-Marx, 2013) by utilizing portfolio holdings data.

I also calculate the returns to portfolios in which the ΔAWI is calculated for a subset of shareholders that hold larger stakes. I use the thresholds 0.1% and 1% of outstanding shares. The results for these thresholds are shown in Panels A and B of Table 3. The results show that

portfolios sorted first on value and quality ranks and then based on changes in larger shareholders' average portfolio concentration yield a market-adjusted return and a Jensen alpha of 10.10% (9.10%) and 8.87% (7.78%) for 1% (0.1%) shareholders, respectively. Panels A and B also show that the difference in market-adjusted returns and Jensen's alpha between high and low ΔAWI within the value and quality high quartile are statistically significant at the 10% and 5% levels for 0.1% and 1% shareholders, respectively. Taken together, the portfolios sorted based on data for larger shareholders tend to outperform other portfolios based on portfolio concentration data for all shareholders (Table 2). Table 3 also shows that the performance of value portfolios is significantly higher when information on changes in portfolio concentration is utilized.

Panel C of Table 3 shows the performance of the combined value and quality portfolio when changes in ownership concentration (from year-end *t*-2 to *t*-1) measured with the Herfindahl index of all holdings is used instead of changes in portfolio concentration in the last sort.[15] One benefit with ownership concentration data is that such data are easier to obtain and measure than data on investors' portfolio concentration. The value/quality portfolio containing stocks with above median yearly changes in ownership concentration has a market-adjusted annual return and a Jensen alpha of 7.00% and 6.35%, respectively. While the portfolio performance using ownership concentration is higher than that of the value/quality portfolio in Panel D of Table 2, the performance is not as high as for portfolios using portfolio concentration data for 0.1% and 1% shareholders, respectively (Panels A and B of Table 3), or increases or decreases in AWI (Panel E, Table 2). Overall, the results using changes in ownership concentration for sorting stocks give support to Hypothesis 2.

[15] The results are very similar when the Herfindahl index is calculated for 0.1% or 1% shareholders only.

The results from the Carhart (1997) asset pricing tests are not as consistent as those based on raw and market-adjusted returns. Panel D of Table 2 shows that the Carhart (1997) alpha for the high-low portfolio sorted based on portfolio holdings data equals 10.37%, although it is not statistically significant. However, in Panel E of Table 2 the Carhart (1997) alpha for the high-low portfolio sorting on increases/decreases in the AWI variable equals 21.58% and is statistically significant at the 1% level. The reason for the lower significance of the results using the Carhart (1997) alpha in Tables 2 and 3 may lie in the momentum factor or in the relation between the momentum factor and AWI.

4.2.2. Further evidence from multivariate analysis

The positive relation between increases in AWI and portfolio performance measured by raw returns and market-adjusted returns obtained in Section 4.2.1 could be due to a correlation between AWI and other known return patterns. Following Piotroski (2000), I estimate a regression model within the group of high book-to-market firms as well as for all firms. The model takes the following form:

$$\text{Return} = \text{Ln(Book-to-Market)} + \text{Ln(MVE)} + \text{ROA} + \text{Momentum} + \Delta\text{AWI} + \varepsilon, \qquad (3)$$

where Return is the market-adjusted annual return for the period (May year t to April year t+1), Ln(Book-to-Market) is the natural logarithm of the Book-to-Market ratio, Ln(MVE) is the natural logarithm of the market capitalization of equity (both variables are measured at end of t-

1)[16], Momentum is the past 6 month stock return directly prior to portfolio formation,[17] and ε is the error term.[18] Other variables are defined in Section 3.

The results from pooled OLS regressions in which standard errors control for firm and year clustering (see Petersen, 2009, Gow et al. 2010, and Dickinson and Sommers, 2012) are displayed in Table 4.[19] The sample used in the regressions consists of value firms defined as firms with book-to-market ratios above the median value each year. Table 4 shows that the coefficient for changes in portfolio concentration (ΔAWI) for 0.1% and 1% shareholdings is significantly positively related to one-year market-adjusted stock returns at the 1 % level, while the coefficient for ΔAWI for all shareholdings is positive but statistically significant only at the 10% level. Taken together, the regressions indicate that the signal from changes in shareholders' portfolio concentration is not explained by previously known return patters. Thus, the regressions give support to the results from the portfolio approach in Section 4.2.1.

4.2.3. Portfolio risk

[16] Besides controlling for the size effect, market capitalization is an important control variable since the relation between market capitalization and portfolio concentration may be non-trivial as price increases also can increase portfolio concentration.

[17] I use the six month return directly prior to portfolio formation following Piotroski (2000), Mohanram (2005), and Piotroski and So (2012).

[18] To maintain sample size, the momentum variable is set equal to zero for missing observations. The regression model includes a dummy variable which is equal to one if the momentum data was available and zero otherwise.

[19] The results are qualitatively similar when Fama-Macbeth Newey-West standard errors that control for autocorrelation are used as in Piotroski and So (2012).

In this section, I discuss levels of risk-related measures for the various portfolios formed based on value, quality, and changes in portfolio concentration.[20] To further explore whether higher portfolio performance is associated with a compensation for higher risk (e.g., Fama and French, 1992), I follow Mohanram (2005) and estimate CAPM betas (β). In addition, I measure the standard deviation of past 5-year ROA.

Panel A of Table 5 shows that the systematic risk measured by CAPM β (column 1) and the standard deviation of the 5-year ROA (column 2) are significantly lower for the value than for the glamour portfolio. Panel B shows that value firms with high ΔAWI values have somewhat lower risk levels compared with all value firms in Panel A. Similar risk patterns are found for portfolios sorted based on value and quality ranks in combination with ΔAWI for all or 1% shareholders (Panels D and E). Taken together, the results in Table 5 indicate that the portfolios associated with high stock performance (in Tables 2 and 3) generally exhibit lower risk than in the lower performance portfolios. The results in Table 5 support the mispricing explanation but not the explanation holding that return is a reward for risk.

4.3. Further analysis

This section discusses how the main results are affected by (i) the use of F-score as a quality variable, (ii) alternative partitions of the data regarding value/growth portfolio cut-offs, firm size, share turnover, and analyst coverage, (iii) the timing of the use of portfolio concentration data (e.g., using ΔAWI in the first sorting stage versus the last stage), as well as (iv) alternative timings of accounting data and stock returns (e.g., further lagged accounting data), and alternative return periods.

[20] This section on risk measures complements the risk-adjusted portfolio performance analysis using Jensen (1968) alpha and Carhart (1997) four factor alphas in Section 4.2.1.

4.3.1. F-score as quality measure

As an alternative to the ROA measure, I consider Piotroski's (2000) F-score as a quality measure. The F-score measures firms' financial strength by using nine financial variables that can be grouped into three key areas: profitability, financial leverage/liquidity, and operational efficiency (see, Piotroski, 2000, for details). The aggregate of the nine binary variables is the F-score. Data used to calculate the nine binary variables that form the aggregate F-score are obtained from Thomson Financials except for the equity issue variable that is based on the year book Pörssitieto.

Panel A of Tables 6 shows the results for a portfolio that contains high book-to-market firms (Q3, Q4) with high F-score firms (Q3, Q4). The results show that the F-score sort improves the pure value strategy presented in Table 2. Moreover, Panel B of Table 6 shows that partitioning the high F-score / value portfolio based on investor portfolio concentration (high concentration) further improves portfolio performance on a risk-adjusted basis. The returns of the high-low F-score/value/ΔAWI portfolio equal 14% on average using market-adjusted returns (column 2). Taken together, information from portfolio concentration appears to enhance the performance of the Piotroski (2000) method. Also, the performance of the Piotroski-AWI screen is comparable with the profitability-AWI screen (Table 2).

4.3.2. Alternative data partitions

In this section, results using different definitions for value and glamour firms, as well as controlling for firm size, share turnover (liquidity), and analyst coverage (for a discussion of these partitions see Piotroski, 2000) are discussed. I consider alternative partitions for value and

glamour firms (similarly for high and low combined value and quality portfolios) in which value firms are those with above median book-to-market ratios and glamour firms are those with book-to-market ratios equal to or below median levels. As displayed in Panels B and C of Table 6, such definitions of value and glamour stocks yield rather similar results as compared with the results in the main specifications based on quartiles. Furthermore, I also partitioned the sample into stocks with equal to or above median and below median firm size (measured by the market capitalization of the firm). Again the main results are rather similar for large and small firms, although larger firms tend to exhibit somewhat higher portfolio performance for the sample stocks (Panels D and E).

Panels F and G of Table 6 show that portfolio performance tends to be higher for stocks with higher liquidity measured by high and low yearly share turnover (based on the median). Panels H and I of Table 6 display portfolio performance based on the level of analyst coverage (above or below median). The results show that the portfolio performance is not especially sensitive to whether the number of analysts following the firm is high or low. Taken together, the results in Table 6 indicate that portfolio performance is not significantly driven by size, liquidity or analyst coverage, although performance is slightly higher for larger, more liquid and more analyzed firms.[21]

4.3.3. The timing of the use of portfolio concentration data

The main specifications in Table 2 utilize portfolio concentration data for sorting in the last phase after having made value and quality sorts. Alternatively, one could use portfolio concentration data already in the first stage in which case the initial stock selection would be

[21] Piotroski (2000) finds that value stocks that are smaller and associated with higher asymmetric information tend to have higher returns in the US.

based on the combined ranks of ΔAWI and value (book-to-market) as well as on the combined ranks of ΔAWI, value, and quality (ROA). Though not reported in a table, the results indicate that the portfolio performance is higher when the portfolio holdings data is used in the last stage, or put differently, not included in the initial stock selection. For example, a long-short portfolio (high-low) using the combined ranks of ΔAWI, value, and ROA has lower performance than a portfolio initially selected on value and quality with a final screening that includes stocks with ΔAWI above the mean (Panel D, Table 2). Thus, the results indicate that holdings data should be used to complement value and quality in the final stage.

4.3.4. Alternative timings of accounting data and stock returns, and stock return sub-periods

I also consider different lags when using historical accounting data. First, I consider lagging the book value of equity (t-2) and Return on Assets one year (t-2), while using the market value of equity from year-end (t-1). In the specifications with longer lags for accounting data, I measure stock returns over the period $February_t$-$January_{t+1.}$ As displayed in Panel A of Appendix 2, the results are not very sensitive to how the book equity value or ROA are lagged. The results using these lags are very similar to the main results.

Panels B-D of Appendix 2 show the returns for portfolios based on combined value and quality ranks for high and low changes in portfolio concentration over the portfolio formation sub periods 1997-2000, 2001-2003, and 2004-2006. For these sub-periods, the returns are consistently higher for the high value, quality, and high change in portfolio concentration than for the low portfolio. Although, there are variations in the return levels between the time periods, the pattern for the difference between the high and low portfolios is rather consistent which gives support to the conclusions regarding the results in Table 2 estimated for the full period.

5. Summary and conclusion

This paper explores whether information on investors' equity portfolio concentration can be beneficial to value investors. Using unique data on all the more than 1.3 million investor portfolios in the Finnish stock market over a ten-year period, I find that data on changes in average investor portfolio concentration in firms, a proxy for investor confidence, can be used to improve the performance of value portfolios and portfolios based on combined value and quality ranks. The results also indicate that the portfolio performance is somewhat higher when portfolio concentration is calculated for larger, and presumably more informed, shareholders. In addition, the results show that increases in ownership concentration can be used as an additional signal to obtain improved portfolio performance of value oriented strategies, although the portfolio concentration seems to be a better signal than ownership concentration. Overall, the results indicate that it is possible to increase the performance of value-style portfolios by using data on shareholders' portfolio holdings without increasing portfolio risk. Future research could further explore, for example, how investor characteristics and other corporate governance variables could be incorporated into the fundamental analysis of firms.

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Table 1. Descriptive Statistics

This table shows descriptive statistics for variables used in the study. The sample covers Finnish listed firms (excluding banks and insurance companies). Value portfolios are formed at the end of April in year t+1 during a ten-year period (1997-2006). Accounting and valuation variables are measured at end of year t-1 (1996-2005). The change in AWI (average weight index) for all, 0.1%, and 1% shareholders is measured from year-end t-2 to t-1, respectively. The change in HFI is the change in the Herfindahl index of all shareholdings in a firm from year-end t-2 to t-1. ROA is defined as earnings before interest and taxes (EBIT) divided by total assets in year t-1. Book-to-market is the book value of shareholders' equity divided by the market capitalization of the firm's shares in year-end t-1. Stock returns are measured over the period May year t to April year t+1 and defined in section 3.5. Analyst coverage is the number of analysts following a firm. F-score is the Piotroski (2000) measure of financial strength. Stdev returns is the standard deviation in daily stock returns during a year. Momentum is the 6 month stock return prior to portfolio formation. Trading volume is the trading volume for the year. Panel A includes all firms and Panel B includes firms in the highest book-to-market quarter each year. The number of observations varies due to data availability.

	Mean	Standard Deviation	Min.	Max.	Observations
	(1)	(2)	(3)	(4)	(5)
Panel A. All firms					
ΔAWI	-0.0079	0.0365	-0.2141	0.1825	719
ΔAWI_0.1%	-0.0004	0.0572	-0.3938	0.4229	719
ΔAWI_1%	-0.0025	0.0947	-0.4311	0.7107	719
ΔHFI	-0.0040	0.0604	-0.3640	0.4821	719
ROA (%)	9.4079	9.4818	-32.6000	61.0000	764
Book-to-Market	0.6930	0.4738	0.0145	3.7761	764
Analyst coverage dummy	6.1731	6.7683	0.0000	50.0000	722
F-score	5.9731	1.5847	1	9	632
Stdev returns	0.0916	0.0508	0.0168	0.3921	743
Momentum (6 months)	0.1390	0.3010	-0.9575	2.0914	503
CAPM beta	0.7899	0.7324	-1.7012	4.9409	744
Mcap	1855146	13200000	1679	223000000	764
Trading volume	1530.75	11985.80	0.01	155407.00	764
Stdev ROA (5 year)	5.2962	6.5898	0.1817	51.9944	756
Raw return (12 month buy and hold return, May-April)	0.1156	0.4519	-0.9813	2.7872	743
Market-adjusted returns (12 month buy and hold return, May-April)	-0.0312	0.4031	-1.2407	2.3230	743
CAPM alpha (monthly data, May-April)	-0.0031	0.0296	-0.1328	0.0981	744
Carhart four factor alpha (monthly data, May-April)	0.00005	0.0409	-0.2068	0.1823	744
Panel B. Value firms					
ΔAWI	-0.0060	0.0323	-0.1151	0.1825	179
ΔAWI_0.1%	-0.0007	0.0567	-0.3938	0.2058	179
ΔAWI_1%	0.0011	0.1031	-0.3847	0.4669	179
ΔHFI	-0.0002	0.0461	-0.1640	0.3264	179
ROA (%)	5.0652	7.5084	-32.6000	48.3000	187
Book-to-Market	1.3149	0.4542	0.7112	3.7761	187
Analyst coverage dummy	5.8824	6.2850	0.0000	22.0000	170
F-score	5.7459	1.5242	2	9	122

Stdev returns	0.0791	0.0370	0.0239	0.2376	184
Momentum (6 months)	0.1223	0.2714	-0.9422	0.9488	132
CAPM beta	0.6001	0.5881	-1.7012	2.5289	184
Mcap	534376	1372390	1679	9304000	187
Trading volume	296.43	1301.15	0.01	11221.19	187
Stdev ROA (5 year)	3.9526	3.9171	0.1817	25.4894	185
Raw return (12 month buy and hold return, May-April)	0.1530	0.3584	-0.8384	1.6695	184
Market-adjusted returns (12 month buy and hold return, May-April)	0.0021	0.3720	-1.0666	1.1797	184
CAPM alpha (monthly data, May-April)	0.0013	0.0262	-0.1029	0.0836	184
Carhart four factor alpha (monthly data, May-April)	0.0020	0.0388	-0.1207	0.1451	184

Table 2. Investment Returns to Value, Quality, and Portfolio Concentration

This table shows the investment returns in percentage to value investing strategies using data on Finnish listed OMXH main list firms (excluding banks and insurance companies) over a ten-year period. Portfolios are formed in the end of April in year t each year (1997-2006). Accounting and valuation variables are measured at end of year t-1. The change in AWI (average weight index) is measured from year-end t-2 to t-1. Stock returns are measured over the period May year t to April year t+1 if not otherwise specified. Panel A shows returns for high book-to-market quartile (value) firms and low book-to-market quartile (glamour) firms. Panel B shows returns for high book-to-market and low book-to-market firms controlling for change in AWI. Panel C shows returns for high and low quartile portfolios formed based on the combined book-to-market and ROA rank. Panel D splits the portfolios in Panel C based on changes in AWI (above or below median change). Panel E shows returns for the combined book-to-market and ROA rank that are based on increases in AWI or decreases in AWI.

Strategy	Description of Strategy	Raw return (12 month buy and hold return, May-April)	Market-adjusted returns (12 month buy and hold return, May-April)	CAPM alpha (monthly data (x12), May-April)	Carhart four factor alpha (monthly data (x12), May-April)
		(1)	(2)	(3)	(4)
Panel A. Value stocks vs. glamour stocks					
Value	High BM (Q4)	16.61%	0.61%	2.16%	2.16%
Glamour	Low BM (Q1)	9.09%	-8.08%	-8.66%	3.31%
Value-Glamour	Value-Glamour	7.53%**	8.69%**	10.81%***	-1.15%
Panel B. Value stocks by high and low ΔAWI					
Concentrated Value	High BM (Q4) & high ΔAWI (Q3,Q4)	18.31%	4.32%	4.71%	5.71%
Dispersed Glamour	Low BM (Q1) & low ΔAWI (Q1,Q2)	4.40%	-12.24%	-10.39%	11.16%
High-Low	High-Low	13.91%**	16.56%***	15.10%***	-5.45%
Concentrated – Dispersed Value	High ΔAWI - low ΔAWI within high BM portfolio	2.12%	6.77%	0.50%	0.44%
Panel C. All stocks by high quarter, and low quarters combined rank score using B/M and ROA					
Profitable Value	High BM & ROA rank quartile	20.48%	4.93%	5.16%	5.04%
Unprofitable Glamour	Low BM & ROA rank quartile	3.59%	-12.48%	-12.60%	-6.20%
High - Low	High-Low	16.89%***	17.40%***	17.76%***	11.25%**
Panel D. Combined B/M, ROA rank & high/low ΔAWI					
Profitable Value, Concentrated	High BM & ROA rank quartile (Q4) + high ΔAWI quartile rank (Q3, Q4)	20.24%	6.85%	5.63%	6.34%
Unprofitable Glamour, Dispersed	Low BM & ROA rank quartile (Q1) + low ΔAWI quartile rank (Q1, Q2)	-1.78%	-15.25%	-15.36%	-4.02%
High-Low	High-Low	22.02%***	22.10%***	20.99%***	10.37%
Concentrated – Dispersed Profitable Value	High ΔAWI - low ΔAWI within high BM and ROA portfolio	-0.90%	5.76%	0.21%	0.12%
Panel E. Increases and decreases in AWI					
Profitable Value, Increased Concentration	High BM and ROA rank and ΔAWI >0 (N=94)	24.10%	11.44%	7.97%	11.95%
Unprofitable Glamour, Increased Dispersion	Low BM and ROA rank and ΔAWI <=0	-1.56%	-17.11%	-16.46%	-9.64%

	(N=98)				
High-Low	High-Low	25.67%***	28.55%***	24.43%***	21.58%***
Increased Concentration – Increased Dispersion within Profitable Value	Positive ΔAWI - negative ΔAWI within high BM & ROA portfolio	6.87%	14.63%***	7.08%*	12.56%**

*, **, and *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively.

Table 3. Investment Returns to Value, Quality, and Portfolio Concentration Using Alternative Specifications of Portfolio Concentration

This table shows the investment returns in percentage to value investing strategies using data on Finnish listed OMXH main list firms (excluding banks and insurance companies) over a ten-year period. Portfolios are formed in the end of April in year t each year (1997-2006). Accounting and valuation variables are measured at end of year t-1. The change in AWI (average weight index) is measured from year-end t-2 to t-1. Stock returns are measured over the period May year t to April year t+1. Panel A shows returns for high and low quartile portfolios formed based on the combined book-to-market and ROA rank that are based on changes in AWI (above or below median change) using data on 0.1% shareholdings only. Panel B A shows returns for high and low quartile portfolios formed based on the combined book-to-market and ROA rank that are based on changes in AWI (above or below median change) using data on 1% shareholdings only. Panel C shows returns for the combined book-to-market and ROA rank portfolio for increases in HFI (Hefindahl index of all shareholdings) or decreases in HFI.

Strategy	Description of Strategy	Raw return (12 month buy and hold return, May-April)	Market-adjusted returns (12 month buy and hold return, May-April)	CAPM alpha (monthly data (x12), May-April)	Carhart four factor alpha (monthly data (x12), May-April)
		(1)	(2)	(3)	(4)
Panel A. Value, Quality & ΔAWI for 0.1% shareholders					
Profitable Value, Concentrated	High BM and ROA rank & ΔAWI (0.1%) rank (Q4)	24.06%	9.10%	7.78%	8.69%
Unprofitable Glamour, Dispersed	Low BM and ROA rank & ΔAWI (0.1%) rank (Q1)	0.12%	-13.49%	-13.84%	-1.85%
High-Low	High-Low	23.93%***	22.60%***	21.62%***	10.54%
Concentrated – Dispersed Profitable Value	High ΔAWI_0.1% - low ΔAWI_0.1% within high BM & ROA portfolio	6.71%	9.85%*	6.63%*	5.98%
Panel B. Value, Quality & ΔAWI for 1% shareholders					
Profitable Value, Concentrated	High BM and ROA rank & ΔAWI (1%) rank (Q4)	27.55%	10.01%	8.87%	7.46%
Unprofitable Glamour, Dispersed	Low BM and ROA rank & ΔAWI (1%) rank (Q1)	1.61%	-13.81%	-13.09%	-1.01%
High-Low	High-Low	25.94%***	23.81%***	21.96%***	8.46%
Concentrated – Dispersed Profitable Value	High ΔAWI_1% - low ΔAWI_1% within high BM & ROA portfolio	14.38%***	12.29%**	9.28%**	3.74%
Panel C: Combined B/M, ROA rank & increases/decreases in HFI					
Profitable Value, Increased Own. Concentration	High BM and ROA rank, and Δ HFI >0 (N=94)	23.75%	7.00%	6.35%	8.06%
Unprofitable Glamour, Increased Own. Dispersion	Low BM and ROA rank, and Δ HFI <=0 (N=99)	1.44%	-11.15%	-12.02%	-3.36%
High-Low	High-low	22.32%***	18.16%***	18.38%***	11.41%
Increased Own. Concentration – Increased Own. Dispersion within Profitable Value	Positive ΔHFI - low ΔHFI within high BM & ROA portfolio	6.24%	5.82%	3.89%	4.83%

*, **, and *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively.

Table 4. Multivariate analysis

This table shows cross-sectional regressions of market-adjusted stock returns on book-to-market, ROA, size, momentum, and change in AWI. The sample consists of Finnish listed OMXH main list firms (excluding banks and insurance companies) over a ten-year period. The sample is restricted to value-oriented firms (book-to-market above median each year). Market-adjusted returns are measured over the period May year t to April year t+1. Accounting and valuation variables are measured at end of year t-1 (1996-2005). The change in AWI (average weight index) is measured from year-end t-2 to t-1 and is calculated for all (ΔAWI), 0.1% shareholders ΔAWI_0.1%, or 1% shareholders (ΔAWI_1%) depending on the model. Robust standard errors that control for firm and year clustering (Petersen , 2009) are in parentheses below the coefficient estimates.

	(1)	(2)	(3)
Ln(Book-to-market)	0.1791***	0.1945***	0.2044***
	(0.059)	(0.062)	(0.062)
Ln(MVE)	0.0242*	0.0181	0.0203*
	(0.013)	(0.012)	(0.012)
ROA	0.0095**	0.0099**	0.0087*
	(0.004)	(0.004)	(0.005)
Momentum	-0.1074	-0.0808	-0.0416
	(0.116)	(0.110)	(0.116)
ΔAWI	1.9902*		
	(1.114)		
ΔAWI_0.1%		1.4736***	
		(0.259)	
ΔAWI_1%			0.7097***
			(0.215)
Intercept	-0.3074*	-0.2542	-0.2806
	(0.182)	(0.162)	(0.176)
Observations	349	349	349
R2	0.103	0.112	0.095

*, **, and *** indicate statistical significance based on robust standard errors at the 10, 5, and 1 percent levels, respectively.

Table 5. Portfolio Risk

This table shows mean values of risk-related measures for various portfolios sorted based on information on value, quality, and portfolio concentration. The sample consists of Finnish listed OMXH main list firms (excluding banks and insurance companies) over a ten-year period. Portfolios are formed in the end of April in year t each year (1997-2006). The change in AWI (average weight index) is measured from year-end t-2 to t-1. Column 1 shows CAPM β for the portfolios. Column 2 shows standard deviations of past 5-year (t-5 - t-1) ROA for portfolios. Q4 is the highest quarter and Q1 is the lowest quarter each year, respectively. Panels A-D use data on all shareholders to calculate AWI in a firm, whereas Panel E uses data on at least 1% shareholdings to calculate AWI.

Strategy	Description	CAPM β (systematic risk)	Standard deviation of 5-year ROA
		(1)	(2)
Panel A. All shareholders			
Value	High BM rank (Q4)	0.6001	3.9526
Glamour	Low BM rank (Q1)	1.0379	7.9117
Value-Glamour	High-Low	-0.4378***	-3.9591***
Panel B. All shareholders			
Concentrated Value	High BM rank (Q4) & high ΔAWI (Q3, Q4)	0.5661	3.8301
Dispersed Glamour	Low BM rank (Q1) & low ΔAWI (Q1, Q2)	1.1032	7.5205
High-Low	High-Low	-0.5371***	-3.6904***
Panel C. All shareholders			
Profitable Value	High BM & ROA rank (Q4)	0.6091	4.4339
Unprofitable Glamour	Low BM & ROA rank (Q1)	0.9566	7.7082
High - Low	High-Low	-0.3475***	-3.2742***
Panel D. All shareholders			
Profitable Value, Concentrated	High BM & ROA rank (Q4) & high ΔAWI (Q3, Q4)	0.5290	4.5678
Unprofitable Glamour, Dispersed	Low BM & ROA rank (Q1) & low ΔAWI rank (Q1, Q2)	0.9791	7.7618
High-Low	High-Low	-0.4501***	-3.1940***
Panel E. 1% shareholders			
Profitable Value, Concentrated	High BM & ROA rank (Q4) & high ΔAWI_1% (Q3, Q4)	0.5822	4.0832
Unprofitable Glamour, Dispersed	Low BM & ROA rank (Q1) & low ΔAWI_1% (Q1, Q2)	1.0384	7.3298
High-Low	High-Low	-0.4562***	-3.2466***

*, **, and *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively.

Table 6. Investment Returns to Value, Quality, and Portfolio Concentration Using Alternative Data Partitions

This table shows the investment returns in percentage to value investing strategies using data on Finnish listed OMXH main list firms (excluding banks and insurance companies) over a ten-year period. Portfolios are formed in the end of April in year t each year (1997-2006). Accounting and valuation variables are measured at end of year t-1. The change in AWI (average weight index) is measured from year-end t-2 to t-1. Stock returns are measured over the period May year t to April year t+1. Panel A shows the returns to portfolios ranked by value and F-score with and without ΔAWI screens. Panel B shows returns for high book-to-market and low book-to-market firms controlling for change in AWI. Panel C shows returns for high and low quartile portfolios formed based on the combined book-to-market and ROA rank. Panels D and E split the portfolios in Panel D based on market value of equity (MVE) (above or below median MVE). Panels F and G split the portfolios in Panel D based on liquidity (share turnover in euro) (above or below median share turnover). Panels H and I split the portfolios in Panel D based on analyst coverage (above or below median number of analysts following the firm).

	Raw return (12 month buy and hold return, May-April)	Market-adjusted returns (12 month buy and hold return, May-April)	CAPM alpha (monthly data (x12), May-April)	Carhart four factor alpha (monthly data (x12), May-April)
	(1)	(2)	(3)	(4)
Panel A. Combined value and F-score rank				
High BM & F-score rank quartile (Q4)	19.97%	1.63%	0.17%	-0.18%
Low BM & F-score rank quartile (Q1)	14.49%	-2.35%	-0.16%	0.10%
High-Low	5.47%	3.98%	0.33%	-0.29%
High BM & F-score rank quartile (Q4) + high ΔAWI quartile rank (Q3, Q4)	19.66%	6.54%	0.45%	-0.01%
Low BM & F-score rank quartile (Q1) + low ΔAWI quartile rank (Q1, Q2)	4.73%	-7.44%	-0.42%	1.01%
High-Low	14.92%	13.98%	0.87%	-1.02%
Panel B. Above median BM stocks vs. equal to or below median BM firms by high and low ΔAWI				
High BM (Q3, Q4) & high ΔAWI (Q3,Q4)	18.32%	4.62%	3.69%	2.58%
Low BM (Q1, Q2) & low ΔAWI (Q1,Q2)	9.22%	-6.99%	-8.40%	3.24%
High-Low	9.10%	11.60%	12.09%	-0.66%
Panel C. Above median BM & ROA rank stocks vs. equal to or below median BM & ROA rank firms by high and low ΔAWI				
High BM & ROA rank quartiles (Q3, Q4) & high ΔAWI (Q3,Q4)	19.89%	6.58%	4.35%	1.96%
Low BM & ROA rank quartiles (Q1, Q2) & low ΔAWI (Q1,Q2)	4.47%	-10.97%	-11.04%	-0.63%
High-Low	15.42%	17.55%	15.39%	2.60%
Panel D. Combined B/M, ROA rank & high/low ΔAWI for above median MVE				
High BM & ROA rank quartile (Q3, Q4) + high ΔAWI quartile rank (Q3, Q4)	22.26%	9.17%	5.90%	-2.10%
Low BM & ROA rank quartile (Q1, Q2) + low ΔAWI quartile rank (Q1, Q2)	1.08%	-11.80%	-12.68%	3.64%
High-Low	21.18%	20.98%	18.58%	-5.74%
Panel E. Combined B/M, ROA rank & high/low ΔAWI for equal to or below median MVE				
High BM & ROA rank quartile (Q3, Q4) + high ΔAWI quartile rank (Q3, Q4)	18.41%	4.97%	3.39%	4.48%
Low BM & ROA rank quartile (Q1, Q2) + low ΔAWI quartile rank (Q1, Q2)	9.55%	-9.73%	-8.56%	-7.10%

High-low	8.86%	14.70%	11.95%	11.58%
Panel F. Combined B/M, ROA rank & high/low ΔAWI for above median liquidity				
High BM & ROA rank quartile (Q4) + high ΔAWI quartile rank (Q3, Q4)	25.34%	12.32%	7.20%	-0.50%
Low BM & ROA rank quartile (Q1) + low ΔAWI quartile rank (Q1, Q2)	-0.39%	-11.75%	-12.80%	6.35%
High-low	25.73%	24.07%	19.99%	-6.85%
Panel G. Combined B/M, ROA rank & high/low ΔAWI for equal to or below median liquidity				
High BM & ROA rank quartile (Q3, Q4) + high ΔAWI quartile rank (Q3, Q4)	16.74%	3.27%	2.71%	3.39%
Low BM & ROA rank quartile (Q1, Q2) + low ΔAWI quartile rank (Q1, Q2)	12.59%	-9.68%	-8.08%	-12.39%
High-low	4.15%	12.95%	10.79%	15.78%
Panel H. Combined B/M, ROA rank & high/low ΔAWI for firms with high analyst coverage				
High BM & ROA rank quartile (Q 3, Q4) + high ΔAWI quartile rank (Q3, Q4)	23.36%	9.55%	9.17%	3.51%
Low BM & ROA rank quartile (Q1, Q2) + low ΔAWI quartile rank (Q1, Q2)	4.66%	-10.53%	-8.75%	-1.73%
High-low	18.70%	20.08%	17.92%	5.24%
Panel I. Combined B/M, ROA rank & high/low ΔAWI for firms with low analyst coverage				
High BM & ROA rank quartile (Q3, Q4) + high ΔAWI quartile rank (Q3, Q4)	18.03%	4.99%	1.77%	1.14%
Low BM & ROA rank quartile (Q1, Q2) + low ΔAWI quartile rank (Q1, Q2)	4.28%	-11.41%	-13.24%	0.42%
High-low	13.75%	16.40%	15.01%	0.72%

Appendix 1. Spearman Correlation Analysis

This table shows spearman correlations for main variables used in the study. The sample covers Finnish listed firms (excluding banks and insurance companies). Accounting and valuation variables are measured at end of year t-1 (1996-2005). The change in AWI (average weight index) for all, 0.1%, and 1% shareholders is measured from year-end t-2 to t-1, respectively. The change in HFI is the change in the Herfindahl index of all shareholdings in a firm from year-end t-2 to t-1. ROA is defined as earnings before interest and taxes (EBIT) divided by total assets in year t-1. Book-to-market is the book value of shareholders' equity divided by the market capitalization of the firm's shares in year-end t-1. Stock returns are measured over the period May year t to April year t+1 (see Section 3.5 for details). Other variables are defined in Table 1. Panel A includes all firms and Panel B includes firms in the highest book-to-market quarter each year. The number of observations varies due to data availability.

	Panel A. All firms	1	2	3	4	5	6	7	8	9
1	ΔAWI	1								
2	ΔAWI_0.1%	0.4575*	1							
3	ΔAWI_1%	0.2881*	0.4249*	1						
4	Δ HFI	0.2907*	0.1415*	0.1454*	1					
5	ROA	0.0344	0.0168	-0.0423	-0.0196	1				
6	Book-to-Market	0.0697*	0.0484	0.1237*	0.042	-0.5312*	1			
7	Raw return (12 month buy and hold return, May-April)	0.1452*	0.1222*	0.0538	0.0828*	-0.0037	0.1533*	1		
8	Market-adjusted returns (12 month buy and hold return, May-April)	0.2181*	0.1730*	0.1288*	0.0608	0.0071	0.1670*	0.7067*	1	
9	CAPM alpha (monthly data (x12), May-April)	0.1757*	0.1182*	0.062	0.0456	0.0193	0.1623*	0.7771*	0.8058*	1
10	Carhart four factor alpha (monthly data (x12), May-April)	0.0574	0.0075	-0.0146	-0.0301	0.0661*	0.0546	0.3863*	0.5133*	0.6662*
	Panel B. Value firms									
1	ΔAWI	1								
2	ΔAWI_0.1%	0.4200*	1							
3	ΔAWI_1%	0.2643*	0.4676*	1						
4	Δ HFI	0.2818*	0.1557*	0.1572*	1					
5	ROA	0.1672*	-0.0244	0.0873	0.0394	1				
6	Book-to-Market	0.1781*	0.1252*	0.0688	0.0318	-0.0036	1			
7	Raw return (12 month buy and hold return, May-April)	0.0358	0.1162	0.067	0.012	0.0207	0.0345	1		
8	Market-adjusted returns (12 month buy and hold return, May-April)	0.2118*	0.2482*	0.1500*	-0.0255	0.1092	0.2720*	0.6169*	1	
9	CAPM alpha (monthly data (x12), May-April)	0.1410*	0.1324*	0.0635	-0.0546	0.1085	0.1990*	0.8110*	0.8127*	1
10	Carhart four factor alpha (monthly data (x12), May-April)	0.1087	0.0456	0.003	-0.1409*	0.1907*	0.1919*	0.5653*	0.6915*	0.7786*

*Indicates significance at the 10 % level.

Appendix 2. Investment Returns to Value, Quality, and Portfolio Concentration (%) Using Alternative Timings of Variables

This table shows the investment returns in percentage to value investing strategies using data on Finnish listed OMXH main list firms (excluding banks and insurance companies). Portfolios are formed at the end of April in year t+1 during a ten-year period (1997-2006). Accounting and valuation variables are measured at end of year t-1 (1996-2005). The change in AWI (average weight index) is measured from year-end t-2 to t-1. Stock returns are measured over the period May year t to April year t+1 if not otherwise specified. Panel A shows returns for high/low quartile portfolios formed based on combined ranks for book-to-market, ROA, and change in AWI using lagged accounting data (t-2) with returns measured for February t to January t+1. Panels B through D show returns for high/low quartile portfolios formed based on combined ranks for book-to-market, ROA, and ΔAWI for the sub periods 1997-2000, 2001-2003, and 2004-2006.

	Raw return (12 month buy and hold return, May-April)	Market-adjusted returns (12 month buy and hold return, May-April)	CAPM alpha (monthly data (x12), May-April)	Carhart four factor alpha (monthly data (x12), May-April)
	(1)	(2)	(3)	(4)
Panel A. Combined B/M, ROA rank & high/low ΔAWI, lagged accounting data t-2, returns Feb $_t$ - Jan $_{t+1}$				
High BM & ROA rank quartile (Q4) + high ΔAWI quartile rank (Q3, Q4)	15.92%	4.61%	5.50%	2.20%
Low BM & ROA rank quartile (Q1) + low ΔAWI quartile rank (Q1, Q2)	-5.27%	-20.46%	-18.90%	-0.09%
High-low	21.19%	25.08%	24.40%	2.28%
Panel B. Combined B/M, ROA rank & high/low ΔAWI, period 1997-2000				
High BM & ROA rank quartile (Q4) + high ΔAWI quartile rank (Q3, Q4)	6.04%	4.79%	2.63%	10.88%
Low BM & ROA rank quartile (Q1) + low ΔAWI quartile rank (Q1, Q2)	-14.52%	-22.08%	-23.67%	5.59%
High-low	20.56%	26.87%	26.31%	5.28%
Panel C. Combined B/M, ROA rank & high/low ΔAWI, period 2001-2003				
High BM & ROA rank quartile (Q4) + high ΔAWI quartile rank (Q3, Q4)	24.65%	13.64%	7.96%	9.97%
Low BM & ROA rank quartile (Q1) + low ΔAWI quartile rank (Q1, Q2)	10.59%	5.49%	0.98%	9.01%
High-low	14.06%	8.16%	6.97%	0.96%
Panel D. Combined B/M, ROA rank & high/low ΔAWI, period 2004-2006				
High BM & ROA rank quartile (Q4) + high ΔAWI quartile rank (Q3, Q4)	37.66%	0.67%	7.33%	-6.35%
Low BM & ROA rank quartile (Q1) + low ΔAWI quartile rank (Q1, Q2)	0.57%	-37.72%	-27.36%	-43.87%
High-low	37.10%	38.38%	34.69%	37.51%